

INFORMATION HANDOUT

PERMITS

California Department of Fish and Game, 1600 Permit, Dated January 16, 2013

United States National Marine Fisheries Service, Concurrence letter, 401 Permit, Dated 11-15-12

North Coast Regional Water Quality Control Board, 401 Permit, Dated 02-07-13

United States Army Corps of Engineers, 404 Permit, Dated 12-18-12

United States Army Corps of Engineers, 404 Permit, Dated 01-11-13

United States Fish Wildlife Service, Amended Biological Opinion, Dated 02-14-12

United States Fish Wildlife Service, Biological Opinion, Dated 3-3-10

MATERIALS INFORMATION

Tree Survey, dated 12-22-08

Lead Concentration Data & Sample Location Maps, dated September 2012

Asbestos Survey Information, dated March 2006

Water Information Handout, dated 02-27-13

Hydraulics Report Br. No 20-0296 dated 06-09-11

Foundation Review for Br. No 20-0296, dated 08-07-12

Foundation Report for Br. No 20-0296, dated 07-06-12

Foundation Report for Retaining Walls Br. No 20-0296, dated 07-12-12

Foundation Report for Gateway Monument Pedestals, Br. No 20-0296, dated 1-21-13

Final Seismic Recommendation Br. No 20-0296, dated 12-21-09

Material Recommendations, dated 06-15-12, 03-23-11, 03-17-10, 08-20-08

Bridge As-builts Br. No 20-0296 (20-0035 old #), dated 1948 & 1994



State of California – The Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
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EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director



January 16, 2013

Jeffrey G. Jensen
California Department of Transportation
111 Grand Avenue
Oakland, CA 94623

Subject: Final Lake or Streambed Alteration Agreement
Notification No. 1600-2012-0159-3
Laguna de Santa Rosa Bridge Replacement

Dear Mr. Jensen:

Enclosed is the final Streambed Alteration Agreement (“Agreement”) for the Laguna de Santa Rosa Bridge Replacement (“Project”). Before the Department may issue an Agreement, it must comply with the California Environmental Quality Act (“CEQA”). In this case, the Department, acting as a responsible agency, filed a notice of determination (“NOD”) on January 16, 2013, based on information contained in Laguna de Santa Rosa Bridge Replacement Project Negative Declaration, the lead agency prepared for the Project.

Under CEQA, filing a NOD starts a 30-day period within which a party may challenge the filing agency’s approval of the project. You may begin your project before the 30-day period expires if you have obtained all necessary local, state, and federal permits or other authorizations. However, if you elect to do so, it will be at your own risk.

If you have any questions regarding this matter, please contact, Melissa Escaron, Staff Environmental Scientist, at (707)339-0334 or Melissa.Escaron@wildlife.ca.gov.

Sincerely,

Craig J. Weightman
Acting Environmental Program Manager
Bay Delta Region

cc: Chris Jannusch
California Department of Transportation

Lieutenant Jones
Warden Esquivel
Melissa Escaron

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STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2012-0159-R3
Laguna de Santa Rosa

CALIFORNIA DEPARTMENT OF TRANSPORTATION
LAGUNA DE SANTA ROSA BRIDGE REPLACEMENT PROJECT

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Game (DFG) and California Department of Transportation (Permittee) or as represented Jeffrey G. Jensen.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified DFG on May 12, 2012 that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, DFG has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement

PROJECT LOCATION

The project is located where State Route 12 crosses the Laguna de Santa Rosa, at Post Mile 9.63, east of the City of Sebastopol, in the County of Sonoma, State of California;

PROJECT DESCRIPTION

Caltrans proposes to replace the existing 33.5-foot-wide, 220.25-foot-long, two-lane Bridge over Laguna de Santa Rosa (stream) with a new 58-foot-wide, 236-foot-long, two-lane bridge. The proposed bridge will have three spans and two bents. Four retaining walls are also proposed at the corners of the new bridge to minimize the amount of earthwork, land acquisitions, and impacts to environment. The new bridge alignment will shift to the south to minimize impacts to state and federally listed plant species, riparian trees, wetlands and other aquatic resources, and the bridge elevation will be increased by 3.5 feet. Caltrans proposes to construct half of the new bridge on the south side of the existing one, demolish the existing bridge, and then build the second half of the new bridge.

The Pacific Gas and Electric Company, AT&T, and Comcast plan to relocate gas, electric, telephone, and cable utilities during the summer of 2013, prior to the replacement of the bridge. The bridge replacement will be constructed in three stages over two construction seasons

Bridge Replacement Project Overview

Stage 1

Following the relocation of the utilities, which will occur in 2013, the majority of the work during Stage 1 construction (the first bridge replacement construction season) will be along the southern side of the new bridge alignment. To accommodate Stage 1 work a southern temporary access road will be cleared and graded for access of large equipment, such as pile-driving equipment, cranes, drill rigs, bulldozers, excavators, trucks, etc. Once the temporary access road is created, a temporary access pad will be built. Stage 1 work will include installing sheet piling to create eight temporary cofferdams, cast-in-steel-shell (CISS) concrete piling, and temporary formworks. Once the bents and abutments are completed, the superstructure will be constructed which will consist of setting pre-cast girders and casting a concrete bridge deck. Concurrent with the bridge construction, permanent retaining walls and embankments will be constructed on the southeast and southwest sides from the southern temporary access road. Temporary fill materials such as a temporary water diversion, temporary access road, temporary access pad, and temporary cofferdams, will be removed by October 15. Erosion control measures will then be implemented to stabilize disturbed natural areas. The shoring between the existing and new abutment will be left in place between the first season and second season to protect the abutments and roadway embankment behind the abutments from scour. Once the southern half of the new bridge is completed, traffic will be shifted from the existing structure to the new structure. Depending on the construction progress and schedule, construction may start on the northern portion (Stage 2) of the new structure during the first construction season.

Stage 2

During Stage 2 most of the work will occur along the northern side of the new replacement bridge alignment. The northern temporary access road will be constructed, the southern temporary access road and temporary access pad will be reestablished, and the existing bridge structure will be removed, including the footing piles to at least 3 feet below the existing grade. A protective cover (heavy plastic or plywood) will be placed on the creek bottom as part of the temporary access pad to prevent concrete debris from falling onto the waterway during bridge demolition. The northern half of the bridge will be built similarly to the southern half. A closure concrete pour will be required to connect the Stage 1 and Stage 2 bridges together.

Stage 3

Stage 3 work within DFG jurisdiction includes the removal of all temporary fills and other temporary works. Any voids within the creek remaining from the removal of the original bridge footings will be filled with native soil material.

Utility Relocation

The utilities, including poles and electrical lines, will be relocated during 2013, the season prior to Stage 1 construction. Electrical lines will be rerouted from along the south side of the bridge to the north side. Most of the poles will be relocated to the north side of SR 12, and set with a crane from the existing SR 12 or from an existing dirt path. An alternate access route will be used if a crane is infeasible. A gas line, currently attached to the existing bridge, will be relocated and bored underground on the north side using directional drilling techniques. The bore will be approximately 850 feet long, up to 32 feet deep, and at least 20 feet below the bottom of the creek channel. The bore holes will be located within developed areas outside of DFG jurisdiction.

Temporary Construction Access Road

Two temporary construction access roads are required for project construction and equipment access and will be between 15 and 30 feet wide. Clearing and grading of the temporary access road will be required to construct an access that is safe for large equipment such as pile-driving equipment, cranes, drill rigs, bulldozers, excavators, and trucks. The temporary construction access roads will consist of a bottom pavement-reinforcing fabric with a layer of 6-inch rock (type A) or railroad ballast no. 25 (type B). The temporary construction access roads will be located both north and south of SR 12. The southern temporary access road will be constructed on the south side of the road during the first construction season to allow access for the Stage 1 bridge construction. This temporary access road will start at the Village Campground driveway, extend across the streambed and end on the east side of the stream. The southern temporary construction access road will be removed by October 15 of the first construction season, and be re-established up to the eastern bridge abutment during the second construction season. During Stage 2, the southern temporary construction access will require passing under the Stage 1 bridge construction, which will limit the use to small equipment and foot traffic. Large equipment will operate from the existing bridge, new bridge, and through the development of the northern temporary

construction access road. The northern temporary access road will extend from the staging area to the stream, then turn and extend to the east for the length of the proposed northeast retaining wall 2.

Temporary Access Pad, Stream Diversion, and Trestle

A temporary stream access pad will be constructed to access the area under the bridge. The temporary stream access pad will be approximately 235 feet by 62 feet during Stage 1, and approximately 230 feet by 28 feet during Stage 2. The temporary access pad will consist of a bottom layer of subgrade enhancement textile with a layer of 6-inch rock overlaid with another subgrade enhancement textile and a top layer of aggregate base. Crane mats may be placed over the gravel pad to provide support. The final design of the temporary stream access pad will depend on water level in the Laguna de Santa Rosa

To create a dry work area and divert flows around the work area, grading of wetted areas of the streambed will be necessary and gravel bags will be placed as needed to direct flows towards the main channel. A temporary crossing over the main channel will be required as part of the temporary access pad during Stages 1 and 2. Construction of a 62 foot by 60 foot temporary trestle is proposed for Stage 1, and a 43 foot by 60 foot temporary trestle is proposed for Stage 2. The temporary trestle will be removed by October 15 of each year.

Sheet Piling Cofferdams

Sheet piling will be installed at the abutments, bents, and wing walls prior to foundation work. The sheet pilings will be vibrated or driven to elevation around the new foundation locations. Sheet piling will be used to create eight cofferdams for dewatering activities, and to protect the new abutments from scour. Four cofferdams totaling approximately 5,913 cubic yards on the southern side of the bridge will occupy approximately 3,493 square feet (0.08 ac) during the first season. Another four cofferdams totaling approximately 7,052 cubic yards on the northern side of the bridge will occupy approximately 4,108 square feet (0.09 ac) during the second season. The temporary sheet piles will be removed through the use of vibratory hammer, direct pull, or clamshell grab. Approximately 6,795 cubic yards of sheet pile shoring will remain permanently below the original grade along approximately 6,601 square feet (0.15 ac) of the banks of the creek.

The temporary sheet piling between the existing and new roadway will remain in place between the first season and second season to protect the existing roadway and structure from scour and erosion caused by the offset of the new abutments. The top of the shoring will be installed to the existing roadway grade or higher and will be installed or cut flush with the abutments so that the sheet pilings do not obstruct the waterway during higher winter flows.

Foundation Work

Once the cofferdams are in place, construction activities associated with the

construction of the permanent foundations for abutments, bents, and wing walls, will consist of pumping out excess water, excavating for the footings, installing Cast In Steel Shell (CISS) piling, placing pile concrete, reinforcement steel, concrete forms, and footing concrete.

Retaining Walls

Four retaining walls approximately 20 feet long, 160 feet long, 193 feet long, and 298 feet long will be constructed at each of the bridge corners. These retaining walls will total 660 cubic yards. The retaining walls will also contain the roadway widening cut/fill activities, which will require clearing and grubbing vegetated areas north and south of SR 12. The retaining walls will be constructed from the temporary access roads with the methods described above for Foundation Work. The area behind the retaining walls will then be backfilled with approximately 3,856 cubic yards of clean soil to support the proposed roadway.

Erosion Control

All disturbed areas will be treated with standard Caltrans erosion control methods during and after construction, including the period between Stages 1 and 2. At the wing wall on the north side of the west abutment, exposed slopes will be protected from erosion by installing coir netting secured with wooden stakes. In areas of frequent inundation, coir logs will also be installed. The slopes will be hydroseeded with a suitable mix of native plant species appropriate to the area.

Drainage

The existing pipe and two drainage inlets south of SR 12 will be removed to facilitate widening of the south side of the road west of the bridge. A new 18-inch Alternative Pipe Culvert (APC) will be constructed across the roadway to drain stormwater flows north and into the proposed 18-inch APC, which will be installed north of SR 12 to replace the existing APC on the south side. Overside drains are proposed on the north side and south sides of SR 12 to drain stormwater flows into the waterway.

Proposed Equipment

Cranes will be used for multiple parts of the construction from setting up of the trestle and pile driving to delivery of materials and setting precast girders. Excavators will operate from the temporary construction access roads and temporary access pad and will be used for excavation at the abutments. Drilling equipment will operate from the temporary access pad and be used to clean out the CISS piles. Concrete pumps will operate from the existing roadway, temporary construction access roads, and temporary access pad and will be used to pour concrete for the structure. Baker tanks will be located at the temporary access pad and may be used to store water prior to discharge from dewatered excavations and cleaned out piles. Directional drilling equipment will be used to bore under the creek for utility relocation activities. Other equipment may include loaders, manlifts, paver, hoeram, jackhammers, backhoes, dozers, gradalls, and compaction equipment.

Staging

All project staging will occur outside of DFG 1602 jurisdiction.

Project Schedule

The relocation of utilities is scheduled for summer 2013. Construction of the bridge will span over 2 years and is scheduled to start June 2014 and end December 2015. Construction activities in the stream will occur between June 15 and October 15 of each year to minimize potential impacts to sensitive species. Caltrans will remove riparian trees between September 1 and February 15 to avoid impacts to nesting birds. Tree trimming will precede utility relocation and tree removal will precede road construction activities. The project area to the south of SR 12 will be cleared of vegetation between September 1 and October 15 in 2013 and grubbed in June 2014. The project area to the north of SR 12 will be cleared of vegetation between September 1 and October 15 in 2014 and grubbed in June 2015.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include:

- Riparian habitat
- Native trees
- Arroyo willow thicket habitat
- Oregon ash thicket habitat
- North coast riparian forest
- Central California Coastal Steelhead habitat
- Central California Coast Coho habitat
- California Coastal Chinook Salmon habitat
- Aquatic invertebrates
- Amphibians
- Black crowned night herons
- Double crested cormorants
- Migratory bird nesting
- Raptors
- Western pond turtles and habitat
- Bats and habitat
- Emergent wetlands

The adverse effects the project could have on the fish or wildlife resources identified above include:

- Tree removal
- Increased shading
- Permanent and temporary loss of natural bed and bank
- Permanent and temporary loss of riparian habitat
- Loss of avian nesting, foraging, and roosting sites
- Disruption of nesting

- Loss of bat habitat
- Loss of Western pond turtle habitat
- Loss of amphibian habitat
- Degradation and/or loss of salmonid habitat
- Water quality degradation
- Short-term release of contaminants

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

- 1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to DFG personnel, or personnel from another state, federal, or local agency upon request.
- 1.2 Providing Agreement to Persons at Project Site. This Agreement and any extension and amendments shall be onsite at all times during Project activities.
- 1.3 Access to DFG Lands. This Agreement does not authorize entry to DFG-owned lands. Permittee shall obtain written permission from DFG before entering DFG-owned lands.
- 1.4 Notification of Conflicting Provisions. Permittee shall notify DFG if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, DFG shall contact Permittee to resolve any conflict.
- 1.5 Project Site Entry. Permittee agrees that DFG personnel may, with notification of the Resident Engineer, enter the project site at any time to verify compliance with the Agreement.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below. These conditions apply to DFG jurisdiction as described in the Project Description above.

- 2.1 To minimize adverse impacts to fish and wildlife all work within the bed, bank, channel, and associated riparian habitat shall be confined to the period of June 15 to October 15. Trees and shrubs may be removed using mechanical hand tools between

January 1 and June 14, and between August 31 and December 31, as long as tree removal activities are consistent with Conditions 2.3 and 2.5 below. Stumps shall remain in place until ground disturbing activities begin. Trees and shrubs can be removed between June 15 and August 30 as long as activities are consistent with Conditions 2.3 and 2.5 below. Revegetation work is not confined to this time period.

2.2 At least 30-days prior to commencing project activities covered by this Agreement, the Permittee shall submit to DFG, for review and approval, the qualifications for a number of biologists (Qualified Biologist) that shall oversee the implementation of the conditions in this Agreement. At a minimum, the Qualified Biologists shall have a combination of academic training and professional experience in biological sciences and related resource management activities. The Qualified Biologists shall communicate to the Resident Engineer when any activity is not in compliance with this Agreement and the Resident Engineer shall immediately stop the activity that is not in compliance with this Agreement.

2.3 To protect nesting birds, no project activities shall occur from February 15 through August 31 unless nesting bird surveys have been completed by a Qualified Biologist. To prevent nest abandonment, a Qualified Biologist shall survey within 500 feet of the proposed Project for nesting birds. If nests are found within the Project site or 500 feet from the Project then a Qualified Biologist shall establish a 50-foot buffer radius for nests of non-raptor bird species or a 300-foot buffer radius for raptor nests. A Qualified Biologist shall monitor the nesting birds and shall increase the buffer, through the Resident Engineer, if it is determined the birds are showing signs of unusual or distressed behavior that may be the result of Project activities. To prevent encroachment, the established buffer(s) shall be clearly marked by high visibility material. Surveys shall be conducted during periods of peak activity (early morning, dusk) and shall be of sufficient duration to observe movement patterns. Identified nests shall be reported to DFG. The buffer area shall be marked with high visibility material, protected from work activities and avoided until the young have fledged, as determined by a Qualified Biologist. During work, should birds indicate unusual or distressed behavior that could be indicative of future nest abandonment, a Qualified Biologist shall stop work immediately, through the Resident Engineer, and consult DFG on how to proceed.

2.4 Within 48 hours prior to construction, a Qualified Biologist shall conduct a wildlife survey, at the appropriate time of day, focusing on presence of Western pond turtle (*Clemmys marmorata*) and Foothill yellow legged frog (*Rana boylei*). If any Western pond turtles or Foothill yellow legged frogs are found, a Qualified Biologist shall relocate the animal downstream of the project site in appropriate habitat.

2.5 A Qualified Biologist shall conduct a habitat assessment for potentially suitable bat roosting habitat, including within the open expansion joints of the bridge and trees, March 1 to April 15 or August 31 to October 15 prior to bridge construction activities. If the habitat assessment reveals the bridge structure is

suitable roosting habitat for bats, then appropriate exclusionary measures will be implemented prior to bridge construction during the period between March 1 to April 15 or August 31 to October 15. Potential avoidance efforts may include exclusionary blocking or filling potential roosting cavities with foam, visual monitoring, and staging project work to avoid bats. If bats are known to use the bridge structure, exclusion netting shall not be used. If the habitat assessment reveals suitable bat habitat within trees, and tree removal is scheduled from April 16 through August 30 and/or October 16 through February 28, then presence/absence surveys shall be conducted two to three days prior to any tree removal or trimming. If presence/absence surveys are negative, then tree removal may be conducted by following a two-phased tree removal system. If presence/absence surveys indicate bat occupancy, then the occupied trees shall only be removed from March 1 through April 15 and/or August 31 through October 15 by following the two-phased tree removal system. The two-phased removal system shall be conducted over 2 consecutive days. The first day (in the afternoon), limbs and branches are removed by a tree cutter using chainsaws or other hand tools only. Limbs with cavities, crevices, or deep bark fissures are avoided, and only branches or limbs without those features are removed. On the second day, the entire tree shall be removed.

2.6 If any wildlife is encountered during the course of project activities, said wildlife shall be allowed to leave the area unharmed and on their own volition.

2.7 The Resident Engineer or designated representative and a Qualified Biologist shall be onsite during dewatering and aquatic species relocation activities. Capture and relocation shall be conducted in a manner that minimizes stress and injury to captured animals. Capture methods may include dip nets. All nets shall be made of a soft braded nylon material that is non abrasive. Electrofishing shall be used as a last resort. A relocation site shall be identified and the most direct transportation route shall be determined prior to any capture. The number of animals captured and moved at any one time shall be limited to the number that can be relocated without stress or injury. Prior to handling animals, all hands and equipment shall be wetted down with stream water and shall be free of any materials including hand sanitizers, sunscreen or insect repellent. No animals shall be handled with dry hands or dry equipment. Exclusionary netting or other barriers shall be used to prevent relocated animals from re-entering the dewatered work area. An aeration system shall be used in any live well or other holding facility. Dissolved oxygen levels shall be maintained above 6 parts per million. Water from the local collection site shall be used in live wells or other holding facilities during loading and transport. At no time shall chlorinated tap water be used. Water temperatures within any live well or other holding facility shall be kept at or below water temperature at the collection site. No non-native animals captured shall be returned to the stream or released alive.

2.8 Permittee shall comply with all applicable state and federal laws, including the California and Federal Endangered Species Act. This Agreement does not authorize the take of any state or federally endangered listed species. Liability for any take or

incidental take of such species remains the responsibility of the Permittee for the duration of the project. Any unauthorized take of listed species may result in prosecution and nullification of the Agreement.

2.9 The perimeter of the work site shall be adequately fenced using high visibility Environmentally Sensitive Area (ESA) fencing to prevent damage to adjacent riparian habitat. No construction activities, within the riparian zone, will be allowed within the habitat protected by the ESA fencing (this does not preclude activities from occurring on the bridge or deck work above the ESA area).

2.10 Permittee shall conduct work defined in the above project description, and within the project area, during periods of dry weather. The project area is defined as the bed, bank, channel, and associated riparian habitat. The Permittee shall monitor forecasted precipitation. When $\frac{1}{4}$ inch or more of precipitation is forecasted to occur, the Permittee shall stop work before precipitation commences. No activity of the project may be started if its associated erosion control measures cannot be completed prior to the onset of precipitation. After any storm event, the Permittee shall inspect all sites currently under construction and all sites scheduled to begin construction within the next 72 hours for erosion and sediment problems and take corrective action as needed. Seventy-two hour weather forecasts from National Weather Service shall be consulted and work shall not start back up until runoff ceases and there is less than a 30% forecast for precipitation for the following 24-hour period.

2.11 Permittee shall utilize erosion control measures throughout all phases of operation where sediment runoff from exposed slopes threatens to enter waterways. At no time shall silt laden runoff be allowed to enter the stream or directed to where it may enter the stream. Erosion control installations shall be monitored for effectiveness and shall be repaired or replaced as recommended by a Qualified Biologist or Water Quality Monitor to the Resident Engineer. As needed to prevent sediment transport, Permittee shall deploy soil stabilizer such as hydroseeding, netting, erosion control mats, mulch, fiber rolls, silt fences, check dams, and flow velocity dissipation devices. Permittee shall stabilize and equip construction site entrances and exits with tire washing capability. Materials containing monofilament or plastic shall not be used. Erosion and sediment control measures shall be installed prior to unseasonable rain storms.

2.12 To the extent practicable, Permittee shall leave the root masses of removed trees and shrubs in place. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations.

2.13 To the extent practicable Permittee shall not remove oak trees. Oak trees within the project site that can be avoided shall be fenced along their drip line with high visibility ESA fencing.

2.14 Pending accessibility for maintenance activities, and roadway and bridge geometrics, biofiltration swales or strips shall be installed on both bridge approaches, and on both sides of the roadway, and maintained in perpetuity.

2.15 Permittee shall not permit the operation of equipment within the main channel of the Laguna de Santa Rosa at any time.

2.16 The site shall be dewatered as necessary to provide an adequately dry work area. Any muddy or otherwise contaminated water shall be pumped to a settling tank prior to re-entering the creek. Work site dewatering can be accomplished using pumps and or siphons.

2.17 Permittee shall design the horizontal directional drilling operation in such a way as to minimize the risk of spills of all types. Permittee shall use lower pressure and greater boring depths in areas with frac out potential. If the potential for frac out exists, the Permittee shall prepare a contingency plan to address the release of drilling lubricants. The frac out contingency plan shall include a containment and remediation plan, include staging location of vacuum trucks and equipment, equipment list, and necessary hose lengths. The contingency plan shall include emergency contact phone numbers for prompt response by biological monitors. Permittee shall call biological monitors as soon as a spill is suspected. Permittee shall notify the United State Fish and Wildlife Service (USFWS) and DFG in the event of a frac out. Permittee shall not resume project activities until the spill has been remediated and approval to resume has been granted by the USFWS and DFG.

2.18 If, as currently anticipated, utility relocation commences the year prior to bridge construction activities, all utility relocation will occur from the existing pavement, the existing dirt path on the northeast side of the highway, or from the proposed Alternative Access Route described in the Streambed Alteration Agreement Notification Package (Figure 1).

2.19 If the gradient of the streambed is altered during project operations, Permittee shall return its contours as close as possible to pre-project conditions. Pre-project condition shall be defined (e.g. by engineered plans, LIDAR, geomorphological cross-sections) and dated prior to the commencement of the project. Permittee shall be liable for restoration of contours to pre-project conditions in the event that subsequent erosion is caused by the project.

2.20 Concrete shall be excluded from surface water for a period of 30-days after it is poured/sprayed. During that time the concrete shall be kept moist and runoff from the concrete shall not be allowed to enter any water body. Commercial sealants may be applied to the concrete surface where difficulty in excluding flow for a long period may occur. If sealant is used, water shall be excluded from the site until the sealant is cured. If groundwater comes into contact with fresh concrete, it shall be prevented from flowing towards surface water.

2.21 Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located outside of the creek channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the creek shall be positioned over drip pans. Any equipment or vehicles driven and/or operated within or adjacent to the stream must be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life.

2.22 Refueling of mobile construction equipment and vehicles shall not occur within 50 feet of any water body, or anywhere that spilled fuel could drain to a water body. Refueling of stationary equipment requiring breakdown and setup to move will remain in place. All equipment shall be refueled with appropriate drip pans, absorbent pads, and water quality Best Management Practices. Equipment and vehicles operating in the project area shall be checked and maintained daily to prevent leaks of fuels, lubricants, or other liquids.

2.23 Permittee shall plan appropriately to ensure all work within DFG jurisdiction be completed by October 15 of each year. DFG will not grant work extensions beyond October 15 of each year.

3. Compensatory Measures

3.1 Permittee shall submit an Onsite Restoration Plan for temporary impacts within 3 months of the issuance of this Agreement. The Onsite Restoration Plan shall be based on the Tree Survey Results for the State Route 12 Laguna de Santa Rosa Bridge Replacement Project, prepared by CH2MHill, dated December 3, 2007 (Attachment 1). The Onsite Restoration plan shall include a plant palette of native species to be used, success criteria, a monitoring a reporting schedule, and corrective actions to be taken if mitigation measures do not meet the approved success criteria. All plantings shall be derived from locally available genotypes. The Permittee shall monitor the survival and vigor of onsite plantings for a period of 10 years to ensure attainment of 75% survivorship. Permittee shall control invasive species as needed to ensure attainment of 75% survivorship after 10 years.

3.2 At the issuance of this Agreement DFG has not approved an offsite mitigation location. At least 60 days prior to commencement of construction the Permittee shall submit a detailed North Coast Riparian Forest Habitat Mitigation Plan (Habitat Mitigation Plan) to DFG for review and written approval. The Habitat Mitigation Plan shall mitigate permanent north coast riparian forest habitat impacts at a minimum of a 3:1 acreage ratio. Mitigation shall be based on all trees regardless of diameter at breast height. The Habitat Mitigation Plan shall include proposed mitigation locations, a plant palette of native species to be used, success criteria, a monitoring a reporting schedule, and corrective actions to be taken if mitigation measures do not meet the approved success criteria. The Permittee shall monitor the survival and vigor of offsite plantings for a period of 10 years to ensure attainment of 75% survivorship. Offsite mitigation may

include a combination of habitat restoration, creation, enhancement, and/or preservation of habitat that will support a similar plant community to that found at the project site, including but not limited to the following species: red willow; valley oak; coast live oak; California walnut, black oak; California rose; arroyo willow; Oregon ash; blue elderberry; and hawthorn. The Habitat Mitigation Plan shall be based on the Tree Survey Results for the State Route 12 Laguna de Santa Rosa Bridge Replacement Project, prepared by CH2MHill, dated December 3, 2007 (Attachment 1).

CONTACT INFORMATION

Any communication that Permittee or DFG submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or DFG specifies by written notice to the other.

To Permittee:

California Department of Transportation
Jeffrey G. Jensen
111 Grand Ave.
(510)622-8729
Jeffrey_jensen@dot.ca.gov

To DFG:

Department of Fish and Game
Bay Delta Region
7329 Silverado Trail
Napa, CA 94558
Attn: Lake and Streambed Alteration Program – Melissa Escaron
Notification #1600-2012-0159-R3
mescaron@dfg.ca.gov

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute DFG's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

DFG may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before DFG suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before DFG suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused DFG to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes DFG from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects DFG's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

DFG may amend the Agreement at any time during its term if DFG determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by DFG and Permittee. To request an amendment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter DFG approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to DFG a completed DFG "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). DFG shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (Fish & G. Code, § 1605, subd. (f)).

EFFECTIVE DATE

The Agreement becomes effective on the date of DFG's signature, which shall be: 1) after Permittee's signature; 2) after DFG complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire on December 31, 2017, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

EXHIBITS

The documents listed below are included as exhibits to the Agreement and incorporated herein by reference.

- A. Figure 1. Utility Relocation Access Map

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify DFG in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

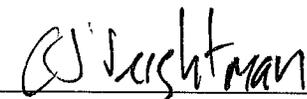
**FOR CALIFORNIA DEPARTMENT OF
TRANSPORTATION**



Jeffrey G. Jensen
Office Chief Biological Sciences and Permits

1/14/2013
Date

FOR DEPARTMENT OF FISH AND GAME



Craig Weightman
Acting Environmental Program Manager

1/16/13
Date

Prepared by: Melissa Escaron
Staff Environmental Scientist

Date Sent: August 13, 2012
Revision Sent: October 16, 2012
Revision Sent: January 14, 2013

FOR DEPARTMENT USE ONLY

Date Received	Amount Received	Amount Due	Date Complete	Notification No.
5/21/12	\$ 4482.75	\$		1600-2012-0159-3



State of California
Dept of Transportation
Check # 082-201449

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME
M. Escaron
LT. Jones
WDN Esquivel



NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Complete EACH field, unless otherwise indicated, following the enclosed instructions and submit ALL required enclosures. Attach additional pages, if necessary.

1. APPLICANT PROPOSING PROJECT Fish & Game

Name	Jeffrey G. Jensen	MAY 21 2012		
Business/Agency	Caltrans District 4	Yountville		
Street Address	111 Grand Avenue			
City, State, Zip	Oakland, CA 94612			
Telephone	(510) 622-8729	Fax	(510) 286-6374	
Email	jeffrey_jensen@dot.ca.gov			

2. CONTACT PERSON *(Complete only if different from applicant)*

Name	Chris Jannusch			
Street Address	111 Grand Avenue			
City, State, Zip	Oakland, CA 94612			
Telephone	(510) 286-5230	Fax	(510) 286-6301	
Email	christopher_jannusch@dot.ca.gov			

3. PROPERTY OWNER *(Complete only if different from applicant)*

Name				
Street Address				
City, State, Zip				
Telephone		Fax		
Email				

4. PROJECT NAME AND AGREEMENT TERM

A. Project Name		Laguna de Santa Rosa Bridge Replacement Project		
B. Agreement Term Requested		<input checked="" type="checkbox"/> Regular (5 years or less) <input type="checkbox"/> Long-term (greater than 5 years)		
C. Project Term		D. Seasonal Work Period		E. Number of Work Days
Beginning (year)	Ending (year)	Start Date (month/day)	End Date (month/day)	
2012	2016	06/15	10/15	
200.00				

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

5. AGREEMENT TYPE

Check the applicable box. If box B, C, D, or E is checked, complete the specified attachment.

A.	<input checked="" type="checkbox"/> Standard (Most construction projects, excluding the categories listed below)	
B.	<input type="checkbox"/> Gravel/Sand/Rock Extraction (Attachment A)	Mine I.D. Number: _____
C.	<input type="checkbox"/> Timber Harvesting (Attachment B)	THP Number: _____
D.	<input type="checkbox"/> Water Diversion/Extraction/Impoundment (Attachment C)	SWRCB Number: _____
E.	<input type="checkbox"/> Routine Maintenance (Attachment D)	
F.	<input type="checkbox"/> DFG Fisheries Restoration Grant Program (FRGP)	FRGP Contract Number: _____
G.	<input type="checkbox"/> Master	
H.	<input type="checkbox"/> Master Timber Harvesting	

6. FEES

Please see the current fee schedule to determine the appropriate notification fee. Itemize each project's estimated cost and corresponding fee. **Note: The Department may not process this notification until the correct fee has been received.**

	A. Project	B. Project Cost	C. Project Fee
1	Laguna de Santa Rosa Bridge Replacement Project	\$14,079,000.00	\$4,482.75
2			
3			
4			
5			
		D. Base Fee (if applicable)	
		E. TOTAL FEE ENCLOSED	\$4,482.75

7. PRIOR NOTIFICATION OR ORDER

A. Has a notification previously been submitted to, or a Lake or Streambed Alteration Agreement previously been issued by, the Department for the project described in this notification?

Yes (Provide the information below) No

Applicant: _____ Notification Number: _____ Date: _____

B. Is this notification being submitted in response to an order, notice, or other directive ("order") by a court or administrative agency (including the Department)?

No Yes (Enclose a copy of the order, notice, or other directive. If the directive is not in writing, identify the person who directed the applicant to submit this notification and the agency he or she represents, and describe the circumstances relating to the order.)

Continued on additional page(s)

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

8. PROJECT LOCATION

A. Address or description of project location.

(Include a map that marks the location of the project with a reference to the nearest city or town, and provide driving directions from a major road or highway)

The Laguna de Santa Rosa Bridge (Caltrans Bridge Number 20-0035) is located at PM 9.63 on State Route (SR) 12 near Morris Street, which is east of the City of Sebastopol in Sonoma County, California as shown on Figure 1-1 of the attached supplemental document. From the CDFG Bay Delta Region 3 office, travel northwest on Silverado Trail toward Oakville Cross Rd., Turn left onto Oakville Cross Rd., Turn left onto St Helena Hwy/CA-29., Turn right onto Oakville Grade, Oakville Grade becomes Dry Creek Rd., Turn right to stay on Trinity Rd. Turn right onto Sonoma Hwy/CA-12 E, Turn left onto Farmers Ln/CA-12. Merge onto CA-12 W toward Eureka/San Francisco/Sebastopol and travel for about eight miles to Morris Street.

Continued on additional page(s)

B. River, stream, or lake affected by the project. Laguna de Santa Rosa

C. What water body is the river, stream, or lake tributary to? Russian River

D. Is the river or stream segment affected by the project listed in the state or federal Wild and Scenic Rivers Acts? Yes No Unknown

E. County Sonoma

F. USGS 7.5 Minute Quad Map Name	G. Township	H. Range	I. Section	J. ¼ Section
Sebastopol	7N	9W	35	

Continued on additional page(s)

K. Meridian (check one) Humboldt Mt. Diablo San Bernardino

L. Assessor's Parcel Number(s)

060-060-001, 060-060-060, 060-010-033, 060-010-017, 004-011-047, 004-011-042, and 004-011-037

Continued on additional page(s)

M. Coordinates (If available, provide at least latitude/longitude or UTM coordinates and check appropriate boxes)

Latitude/Longitude	Latitude: 38.40348 N	Longitude: -122.81616 W	
	<input type="checkbox"/> Degrees/Minutes/Seconds	<input checked="" type="checkbox"/> Decimal Degrees	<input type="checkbox"/> Decimal Minutes
UTM	Easting:	Northing:	<input type="checkbox"/> Zone 10 <input type="checkbox"/> Zone 11

Datum used for Latitude/Longitude or UTM NAD 27 NAD 83 or WGS 84

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

9. PROJECT CATEGORY AND WORK TYPE *(Check each box that applies)*

PROJECT CATEGORY	NEW CONSTRUCTION	REPLACE EXISTING STRUCTURE	REPAIR/MAINTAIN EXISTING STRUCTURE
Bank stabilization – bioengineering/recontouring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bank stabilization – rip-rap/retaining wall/gabion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boat dock/pier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boat ramp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bridge	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Channel clearing/vegetation management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Culvert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris basin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diversion structure – weir or pump intake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filling of wetland, river, stream, or lake	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Geotechnical survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Habitat enhancement – revegetation/mitigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Levee	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low water crossing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Road/trail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sediment removal – pond, stream, or marina	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Storm drain outfall structure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temporary stream crossing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility crossing : Horizontal Directional Drilling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Jack/bore	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Open trench	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other <i>(specify)</i> : Temporary access roads	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

10. PROJECT DESCRIPTION

A. Describe the project in detail. Photographs of the project location and immediate surrounding area should be included.

- Include any structures (e.g., rip-rap, culverts, or channel clearing) that will be placed, built, or completed in or near the stream, river, or lake.
- Specify the type and volume of materials that will be used.
- If water will be diverted or drafted, specify the purpose or use.

Enclose diagrams, drawings, plans, and/or maps that provide all of the following: site specific construction details; the dimensions of each structure and/or extent of each activity in the bed, channel, bank or floodplain; an overview of the entire project area (i.e., "bird's-eye view") showing the location of each structure and/or activity, significant area features, and where the equipment/machinery will enter and exit the project area.

The California Department of Transportation (Caltrans) proposes to replace an existing 33.5 ft wide and 220.25 ft long, 2-lane Laguna de Santa Rosa Bridge with a new 58 ft wide, 236 ft long, two-lane precast/prestress (PC/PS) I-girder bridge, consisting of three spans and two bents within an 8.49 acre temporary construction easement (i.e., project boundary). Prior to construction of the bridge, PG&E, AT&T and Comcast will relocate utilities as early as July 2012 within the project boundary. PG&E will deactivate and abandon an existing main line, then bore a gas line underground on the north side of SR 12, using a directional drill. The bore will be approximately 850 feet long, as deep as approximately 32 feet from the ground, and 20 feet below the bottom of the creek channel. The bore holes will be located away from CDFG jurisdiction.

The bridge will be constructed in three stages over two construction seasons. Construction of the bridge is scheduled to start June 2013 and end December 2015. Construction activities in the stream will occur between June 15 and October 15 of each year to minimize potential impacts to federal and state listed salmonids. Caltrans proposes to construct half of the new bridge on the south side of the existing one, demolish the existing bridge, and rebuild the second half of the new bridge on the north side. The new bridge profile will be elevated approximately 3.3 feet, which will require a new roadway overlay. The proposed bridge design includes constructing four retaining walls on the new structure to minimize the footprint within riparian areas. Temporary access ramps and a temporary stream access pad with a trestle creek diversion are proposed within the stream to allow direct access across the creek during each construction season within CDFG jurisdictional areas. A temporary gravelbag diversion may be used in the creek to direct flows into the channel beneath the temporary trestle. A 30 foot wide temporary access road will be constructed. Sheet pilings will be used at the abutments, bents and retaining walls to create eight cofferdams within the creek. Post-construction operations and maintenance activities will remain the same as pre-project actions. A complete and detailed project description is provided in Chapter 2 of the attached Supplement.

Continued on additional page(s)

B. Specify the equipment and machinery that will be used to complete the project.

Cranes, excavators, drilling equipment, concrete pumps, loaders, manlifts, paver, hoeram, jackhammers, backhoes, dozers, gradalls, and compaction equipment. Equipment use is described in detail in Chapter 2.4.9.1 of the attached Supplement.

Continued on additional page(s)

C. Will water be present during the proposed work period (specified in box 4.D) in the stream, river, or lake (specified in box 8.B).

Yes No (*Skip to box 11*)

D. Will the proposed project require work in the wetted portion of the channel?

Yes (*Enclose a plan to divert water around work site*)
 No

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

11. PROJECT IMPACTS

A. Describe impacts to the bed, channel, and bank of the river, stream, or lake, and the associated riparian habitat. Specify the dimensions of the modifications in length (linear feet) and area (square feet or acres) and the type and volume of material (cubic yards) that will be moved, displaced, or otherwise disturbed, if applicable.

Utility/Bridge project activities will result in: Stream Permanent Impact = 0.05 ac, 301 lf; Stream Temporary Impact = 0.98 ac (includes 0.87 ac in Laguna de Santa Rosa Creek and 0.11 ac in Waters 01, Waters 02 and Water/Wetland D, 600 lf; Stream Shade Impact = up to 0.12 ac, 30 linear feet; Riparian Permanent Impact = 0.56 ac, 301 lf; Riparian Temporary Impact 1.47 ac, 725 lf (1.39 ac, 600 lf bridge; 0.08 ac, 125 lf utility)

Continued on additional page(s)

B. Will the project affect any vegetation? Yes (Complete the tables below) No

Vegetation Type	Temporary Impact	Permanent Impact
North Coast Riparian Forest and 0.23 ac of emergent seasonal wetlands	Linear feet: <u>725</u> Total area: <u>1.47 ac</u>	Linear feet: <u>301</u> Total area: <u>0.56 ac</u>
	Linear feet: _____ Total area: _____	Linear feet: _____ Total area: _____

Tree Species	Number of Trees to be Removed	Trunk Diameter (range)
See Table 3-2 in the attached Supplement		

Continued on additional page(s)

C. Are any special status animal or plant species, or habitat that could support such species, known to be present on or near the project site?

Yes (List each species and/or describe the habitat below) No Unknown

Unoccupied, potential habitat for special-status plants (i.e., Sonoma sunshine, Burke's goldfields, Sebastopol meadowfoam), federal listed salmonids, See Chapter 3.6 of the attached Supplement.

Continued on additional page(s)

D. Identify the source(s) of information that supports a "yes" or "no" answer above in Box 11.C.

Special-status Rare Plant Surveys, USFWS Biological Opinion, Caltrans No effect Determinations and agency concurrences. See the attached Supplement.

Continued on additional page(s)

E. Has a biological study been completed for the project site?

Yes (Enclose the biological study) No

Note: A biological assessment or study may be required to evaluate potential project impacts on biological resources.

F. Has a hydrological study been completed for the project or project site?

Yes (Enclose the hydrological study) No

Note: A hydrological study or other information on site hydraulics (e.g., flows, channel characteristics, and/or flood recurrence intervals) may be required to evaluate potential project impacts on hydrology.

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

12. MEASURES TO PROTECT FISH, WILDLIFE, AND PLANT RESOURCES

A. Describe the techniques that will be used to prevent sediment from entering watercourses during and after construction.

Pavement Reinforcing Fabric will underlay all temporary roadway material. Erosion control procedures will be used as appropriate, such as the placement of mulch on all disturbed area, fiber rolls along slopes, silt fences at the boundaries of the construction site, stabilized construction entrances and exits equipped with tire washing capability, and diversions placed strategically to reduce flow velocity and to filter flows in defined drainage-ways. Erosion control measures will be implemented to address soil stabilization and sedimentation. Typical measures include applying soil stabilizer such as hydroseeding, netting, erosion control mats, velocity dissipation devices, flared end sections for culverts and others. See Chapter 4 in the Supplement.

Continued on additional page(s)

B. Describe project avoidance and/or minimization measures to protect fish, wildlife, and plant resources.

The project design has been revised from earlier concepts in part due to early coordination with the resource agencies. The project will install retaining walls to minimize the amount of earthwork, ROW acquisitions, and impacts to biologically sensitive resources within the project footprint. Heavy equipment will use crane mats within streams to minimize disturbance. A temporary diversion structure with a trestle (platform) will be used to divert the stream and minimize hydrologic impacts in Laguna de Santa Rosa Creek. A temporary access road constructed of six inch minus rock over filter fabric will be used to preserve the integrity of jurisdictional wetlands on the top of the bank. Refer to Chapter 4.0 in the Supplement.

Continued on additional page(s)

C. Describe any project mitigation and/or compensation measures to protect fish, wildlife, and plant resources.

Refer to Chapter 4.0 for a description of avoidance, minimization and compensation measures to protect fish and wildlife in the attached Supplement.

Continued on additional page(s)

13. PERMITS

List any local, state, and federal permits required for the project and check the corresponding box(es). Enclose a copy of each permit that has been issued.

- A. USFWS Biological Opinion Applied Issued
- B. USACE 404 Nationwide Permits #14 and #33 Applied Issued
- C. RWQCB 401 Water Quality Certification Applied Issued
- D. Unknown whether local, state, or federal permit is needed for the project. (Check each box that applies)

Continued on additional page(s)

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

14. ENVIRONMENTAL REVIEW

A. Has a draft or final document been prepared for the project pursuant to the California Environmental Quality Act (CEQA), National Environmental Protection Act (NEPA), California Endangered Species Act (CESA) and/or federal Endangered Species Act (ESA)?			
<input checked="" type="checkbox"/> Yes (Check the box for each CEQA, NEPA, CESA, and ESA document that has been prepared and enclose a copy of each)			
<input type="checkbox"/> No (Check the box for each CEQA, NEPA, CESA, and ESA document listed below that will be or is being prepared)			
<input type="checkbox"/> Notice of Exemption	<input type="checkbox"/> Mitigated Negative Declaration	<input checked="" type="checkbox"/> NEPA document (type): <u>CE(6004)</u>	
<input checked="" type="checkbox"/> Initial Study	<input type="checkbox"/> Environmental Impact Report	<input type="checkbox"/> CESA document (type): _____	
<input checked="" type="checkbox"/> Negative Declaration	<input checked="" type="checkbox"/> Notice of Determination (Enclose)	<input checked="" type="checkbox"/> ESA document (type): <u>Biological Opinion</u>	
<input type="checkbox"/> THP/ NTMP	<input type="checkbox"/> Mitigation, Monitoring, Reporting Plan		
B. State Clearinghouse Number (if applicable)		2008012074	
C. Has a CEQA lead agency been determined?		<input checked="" type="checkbox"/> Yes (Complete boxes D, E, and F)	<input type="checkbox"/> No (Skip to box 14.G)
D. CEQA Lead Agency		Caltrans	
E. Contact Person		Valerie Shearer	F. Telephone Number
			(510) 286-5594
G. If the project described in this notification is part of a larger project or plan, briefly describe that larger project or plan.			
N/A			
<input type="checkbox"/> Continued on additional page(s)			
H. Has an environmental filing fee (Fish and Game Code section 711.4) been paid?			
<input checked="" type="checkbox"/> Yes (Enclose proof of payment)			
<input type="checkbox"/> No (Briefly explain below the reason a filing fee has not been paid)			
Note: If a filing fee is required, the Department may not finalize a Lake or Streambed Alteration Agreement until the filing fee is paid.			

15. SITE INSPECTION

Check one box only.	
<input type="checkbox"/> In the event the Department determines that a site inspection is necessary, I hereby authorize a Department representative to enter the property where the project described in this notification will take place at any reasonable time, and hereby certify that I am authorized to grant the Department such entry.	
<input checked="" type="checkbox"/> I request the Department to first contact (insert name) <u>Chris Jannusch</u>	
at (insert telephone number) <u>(510) 286-5230</u> to schedule a date and time to enter the property where the project described in this notification will take place. I understand that this may delay the Department's determination as to whether a Lake or Streambed Alteration Agreement is required and/or the Department's issuance of a draft agreement pursuant to this notification.	

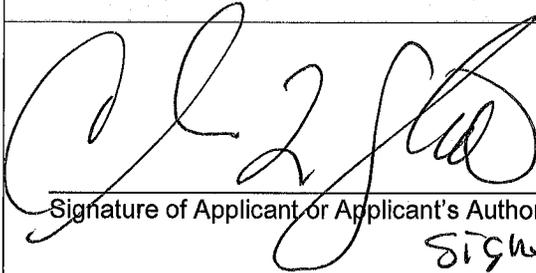
NOTIFICATION OF LAKE OR STREAMBED ALTERATION

16. DIGITAL FORMAT

Is any of the information included as part of the notification available in digital format (i.e., CD, DVD, etc.)?
<input checked="" type="checkbox"/> Yes (Please enclose the information via digital media with the completed notification form)
<input type="checkbox"/> No

17. SIGNATURE

I hereby certify that to the best of my knowledge the information in this notification is true and correct and that I am authorized to sign this notification as, or on behalf of, the applicant. I understand that if any information in this notification is found to be untrue or incorrect, the Department may suspend processing this notification or suspend or revoke any draft or final Lake or Streambed Alteration Agreement issued pursuant to this notification. I understand also that if any information in this notification is found to be untrue or incorrect and the project described in this notification has already begun, I and/or the applicant may be subject to civil or criminal prosecution. I understand that this notification applies only to the project(s) described herein and that I and/or the applicant may be subject to civil or criminal prosecution for undertaking any project not described herein unless the Department has been separately notified of that project in accordance with Fish and Game Code section 1602 or 1611.

 _____
Signature of Applicant or Applicant's Authorized Representative
Signed for

_____ Date 6/27/12

_____ Jeffrey G. Jensen
Print Name

Fish & Game
JUN 29 2012
Yountville



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

November 15, 2012

In response, refer to:
2012/9279

Jeffrey Jensen
Chief, Office of Biological Sciences and Permits
California Department of Transportation
Caltrans District 4
111 Grand Avenue
Oakland, California 94610

Dear Mr. Jensen:

Thank you for your letter of September 25, 2012, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Effective July 1, 2007, the Federal Highway Administration assigned, and Caltrans has assumed all responsibilities for consultation and approval on most highway projects in California. Therefore, Caltrans is now considered the Federal action agency for ESA consultations with NMFS for Federally funded projects. This letter also serves as consultation under the authority of, and in accordance with, the Essential Fish Habitat (EFH) provisions of the Magnuson Stevens Fishery Conservation and Management Act (MSA), and the provisions of the Fish and Wildlife Coordination Act of 1934 (FWCA), as amended. These consultations pertain to Caltrans' proposed Highway 12 Laguna de Santa Rosa Bridge Replacement Project in Sonoma County, California.

The Highway 12 Laguna de Santa Rosa Bridge is located where Highway 12 crosses the Laguna de Santa Rosa east of the City of Sebastopol, in Sonoma County, California. Caltrans proposes to replace the existing 33.5-foot wide by 220-foot long bridge with a 58-foot wide by 236-foot long bridge. Bridge replacement will include the following construction activities over three in-water construction seasons (June 15 to October 15): 1) relocation of underground utility lines; 2) construction of the southern half of the new bridge adjacent to the existing bridge; and 3) demolition of existing bridge and construction of the northern half of the new bridge.

Underground utility relocation will involve use of a directional drill beneath the creek bottom and will not require dewatering or equipment operation within the live channel. A temporary access road, work pad, and stream crossing will be constructed along the existing bridge during two in-water construction seasons. From this pad, new bridge foundations (two piers and two abutments) and superstructure will be constructed, and the existing bridge will be demolished; the existing bridge foundations will be removed to at least three feet below the existing grade. Between in-water construction seasons, the temporary access pad and stream crossing will be removed and measures will be implemented to minimize erosion in disturbed areas.



The project will include the following measures to minimize or avoid impacts on listed fish species and critical habitat: 1) all in-channel construction activities will be conducted between June 15 and October 15; 2) no equipment will operate within the live channel; 3) equipment staging, fuel storage, and refueling will occur in a designated upland location; 4) vegetation removal and soil disturbance will be limited to the minimum area necessary; and 5) appropriate best management practices (BMPs) will be implemented to mitigate for erosion and water pollution from soils and sediments.

Caltrans has determined the potential impacts related to the Highway 12 Laguna de Santa Rosa Bridge Replacement Project are not likely to adversely affect listed species or designated critical habitat, and has asked NMFS for concurrence with this determination.

Endangered Species Act

In your September 25, 2012, letter, Caltrans asked for concurrence with a finding that the project is not likely to adversely affect Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) and CCC coho salmon (*O. kisutch*). Available information indicates the following listed species (Distinct Population Segments [DPS] or Evolutionarily Significant Units [ESU]) or designated critical habitat may occur in the project area.

Central California Coast steelhead DPS

Threatened (71 FR 834; January 5, 2006); and

Central California Coast coho salmon ESU

Critical Habitat (64 FR 24049; May 5, 1999).

The life history of steelhead is summarized in Busby *et al.* (1996) and the life history of CCC coho is summarized by Shapavolov and Taft (1954) and Hassler (1987). The project area is within designated critical habitat for CCC coho salmon. There are no recent records of coho salmon in Laguna de Santa Rosa near the Highway 12 Bridge or any tributaries to the Laguna de Santa Rosa upstream of the project area. There is no designated critical habitat for CCC steelhead within the project area. A small population of CCC steelhead persists in Copeland Creek, which flows into the Laguna de Santa Rosa upstream of the Highway 12 Bridge. Therefore, small numbers of steelhead must pass beneath the Highway 12 Bridge on their migration between the Pacific Ocean and Copeland Creek. Steelhead are not expected in the project area during the in-water construction period (June 15 and October 15) for the following reasons: 1) juvenile steelhead out-migration from Copeland Creek is expected to occur in winter and early spring (December through April) when there is adequate surface flow and fish passage in lower Copeland Creek; 2) adequate surface flow for fish passage in lower Copeland Creek is dependent on precipitation but can persist from mid-October through April; 3) adult steelhead are believed to pass through Laguna de Santa Rosa to and from upstream spawning habitats during periods of higher flow (November through April); and 4) the summer rearing conditions in the project area are unsuitable for salmonids due to the low gradient and high water temperatures. Based on this information, potential take of steelhead or coho salmon during this project is extremely unlikely to occur.

NMFS considers the possibility of adverse effects to listed CCC steelhead and CCC coho salmon designated critical habitat during project implementation to be insignificant because: 1) proposed

activities will occur over a time period when no listed salmonids are anticipated in the project area (June 15 to October 15); 2) turbidity associated with installation and removal of dewatering structures is expected to be minor and temporary and not persist into salmonid migration periods; and 3) the Laguna de Santa Rosa near Highway 12 is not currently utilized by CCC coho salmon and impacts to the small area of habitat associated with the project will not appreciably diminish the quality of designated critical habitat.

Based on the best available information, NMFS concurs with Caltran's determination that CCC steelhead are not likely to be adversely affected by the Highway 12 Laguna de Santa Rosa Bridge Replacement Project. Regarding designated critical habitat, NMFS has determined the proposed project is not likely to adversely modify designated CCC coho salmon critical habitat. This concludes informal consultation in accordance with 50 CFR 402.13(a) for the proposed Highway 12 Laguna de Santa Rosa Bridge Replacement Project in Sonoma County, California. However, further consultation may be required if: 1) new information reveals effects of the project that may affect listed species or critical habitat in a manner or to an extent not previously considered; 2) current project plans change in a manner that causes an effect to listed species or critical habitat not previously considered; or 3) a new species is listed or critical habitat designated that may be affected by the action.

Magnuson-Stevens Fishery Conservation and Management Act

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. EFH includes all associated physical, chemical and biological properties of aquatic habitat that are used by fish. The project is located within an area identified as EFH for coho salmon, species managed by the Pacific Salmon Fishery Management Plan (FMP) under the MSA.

NMFS has evaluated the proposed project for potential adverse effects to EFH pursuant to Section 305(b)(2) of the MSA. Under the EFH implementing regulations [50 C.F.R. 600.810(a)], the term "adverse effect" is defined as any impact that reduces quality and/or quantity of EFH and may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce quantity and/or quality of EFH. Based on information provided in the EFH assessment and developed during consultation, the proposed action may result in temporary increases in turbidity, and therefore NMFS has determined that the proposed action will adversely affect EFH for coho salmon. However, the proposed actions contain adequate measures to avoid, minimize, mitigate, or otherwise offset the adverse effects to EFH. Therefore, NMFS has no additional EFH Conservation Recommendations to provide.

Fish and Wildlife Coordination Act

The purpose of the FWCA is to ensure that wildlife conservation receives equal consideration, and is coordinated with other aspects of water resources development [16 U.S.C. 661]. The FWCA establishes a consultation requirement for federal departments and agencies that undertake any action that proposes to modify any stream or other body of water for any purpose,

including navigation and drainage [16 U.S.C 662(a)]. Consistent with this consultation requirement, NMFS provides recommendations and comments to federal action agencies for the purpose of conserving fish and wildlife resources. The FWCA allows the opportunity to offer recommendations for the conservation of species and habitats beyond those currently managed under the ESA. Pursuant to FWCA, NMFS has no comments to provide.

Please contact Mr. Joseph Heublein at (707) 575-1251, or via e-mail at joe.heublein@noaa.gov should you have any questions.

Sincerely,



for Rodney R. McInnis
Regional Administrator

cc: Eric Chavez, NMFS, Long Beach
Ryan Olah, USFWS, Sacramento
Melissa Escaron, CDFG, Yountville
Copy to File ARN: 151422SWR2012SR01905

Literature Cited

- Busby, P.J., T.C. Wainwright, G.J. Bryant, L. Lierheimer, R.S. Waples, F.W. Waknitz, and I.V. Lagomarsino. 1996. Status review of West Coast steelhead from Washington, Idaho, Oregon and California. United States Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NMFS-NWFSC-27.261 pages.
- Hassler, T.J. 1987. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest) - coho salmon. USFWS Biological Report 82(11.70):1-19. United States Fish and Wildlife Service.
- Shapavolov, L., and A. C. Taft. 1954. The life histories of the steelhead rainbow trout (*Salmo gairdneri gairdneri*) and silver salmon (*Oncorhynchus kisutch*) with special reference to Waddell Creek, California, and recommendations regarding their management. California Department of Fish and Game Fish Bulletin 98: 375 p.

North Coast Regional Water Quality Control Board

February 7, 2013

In the Matter of
Water Quality Certification
for the
California Department of Transportation
Highway 12, Laguna de Santa Rosa Bridge Replacement Project
WDID No. 1B12122WNSO

APPLICANT: California Department of Transportation
RECEIVING WATER: Laguna de Santa Rosa
HYDROLOGIC AREA: Russian River Hydrologic Unit No.1114
COUNTY: Sonoma
FILE NAME: CDOT – HWY 12, Laguna de Santa Rosa Bridge Replacement Project

BY THE EXECUTIVE OFFICER:

1. On May 30, 2012, the North Coast Regional Water Quality Control Board (Regional Water Board) received an application from the California Department of Transportation (Caltrans), requesting Federal Clean Water Act (CWA), section 401, Water Quality Certification (certification) for activities related to the proposed Highway 12 – Laguna de Santa Rosa Project (project). The proposed project would cause disturbances to waters of the United States (U.S.) and waters of the State associated with the Russian River Hydrologic Unit No.1114 (Laguna Hydrologic Sub-Area 114.21). The Regional Water Board provided public notice of the application pursuant to title 23, California Code of Regulations, section 3858 on January 14, 2013, and posted information describing the project on the Regional Water Board's website. No comments were received.
2. The proposed project is located in Sonoma County on State Route 12 (SR12) between post miles (PM) 9.2 and 10.0. The purpose of the project is to replace the existing, deteriorating two-lane bridge with a new two-lane bridge built to current design standards. The scope of work includes: demolishing the existing bridge; constructing a new 236-foot-long bridge using two bents, two abutments, and two retaining walls; utility relocation; and resurfacing and widening the bridge approaches. The Project would be divided into utility relocation and bridge construction contracts. The utility relocation phase would occur over a one year

period (approximately July 2013 through October 2013) and the bridge replacement phase would occur over a two-year period (approximately June 2013 through December 2015).

3. Caltrans has determined that the proposed project would result in 0.04 acres of permanent impacts to U.S. wetlands and 70 linear feet (0.01 acres) of permanent impacts to Other Waters of the U.S. (Laguna de Santa Rosa). The proposed project would also permanently impact approximately 0.57 acres (317 linear feet) of riparian vegetation.
4. Caltrans has determined that the proposed project would result in 0.26 acres (11,361 feet²) of temporary impacts to U.S. wetlands, 68 linear feet (0.45 acres, 25,069 feet²) of temporary impacts to Other Waters of the U.S. (Laguna de Santa Rosa), and 21 linear feet (0.004 acres, 160 feet²) of temporary impacts to Other Waters of the U.S. that are tributary to the Laguna de Santa Rosa. The project would also result in approximately 0.80 acres (425 linear feet) of temporary impacts to riparian vegetation.
5. On-site mitigation for temporary impacts to jurisdictional wetlands and waters would include re-vegetation and monitoring of disturbed areas. Mitigation for permanent and temporary wetland impacts would be provided by purchase of 0.5 acres of mitigation bank credits. Off-site mitigation for permanent impacts to riparian habitat would involve restoration of approximately 1.7 acres of riparian habitat in the Laguna de Santa Rosa watershed.
6. Project implementation would result in approximately 0.55 acres of new and 0.26 acres of reworked impervious surface area (0.81 acre treatment obligation). Caltrans has proposed using a vegetated filter strip to treat 0.31 acres of impervious area. Because Caltrans was unable to reduce the filter strip slope and thereby increase treatment performance, a fifty percent treatment credit will be given (0.155 acres). Additionally, because Caltrans cannot provide treatment of impervious area for direct discharges to the Laguna de Santa Rosa, an additional 0.50 acres of stormwater treatment shall be required. Caltrans will off-set the overall treatment deficit of 1.31 acres by using treatment credits from the Caltrans-funded Sonoma County Fairground low impact development (LID) retrofit project. Caltrans currently holds 2.23 acres of treatment credit from the LID retrofit Project and 0.92 acres of treatment credit would remain after applying the treatment credit for this project.
7. The proposed project would be divided into utility relocation and bridge replacement phases. The utility relocation phase would occur over a one year period (approximately July 2013 through October 2013) and the bridge replacement phase would occur over a two-year period (approximately June 2013 through December 2015). The project would result in approximately 3.2 acres of disturbed soil area. Caltrans will prepare a Stormwater Pollution Prevention Plan detailing Best Management Practices to control pollution from the project area during construction. All disturbed areas within the project will be appropriately stabilized and/or replanted with appropriate native vegetation.
8. Caltrans received authorization from the U.S. Army Corps of Engineers on January 11, 2013, to implement the project under Nationwide Permit Nos. 12 (*utility line*

activities) and 14 (*linear transportation projects*) pursuant to Clean Water Act, section 404. Caltrans has also entered into a 1602 Streambed Alteration Agreement with the California Department of Fish and Game. On May 10, 2010, Caltrans, acting as lead agency, certified a Negative Declaration for the proposed project in order to comply with the California Environmental Quality Act (CEQA) (State Clearing House No. 2008012074). The Regional Water Board has considered the environmental documentation, including any proposed changes, and incorporates any avoidance, minimization, and mitigation measures into the project as a condition of approval to avoid significant affects to the environment.

9. The Laguna de Santa Rosa watershed is listed on the Clean Water Act section 303(d) list as impaired for sediment, temperature, nitrogen, phosphorus, indicator bacteria, dissolved oxygen, and mercury. In addition, activities that impact the riparian zone and reduce riparian vegetation are identified as sources contributing to increased stream temperatures. A focus on measures to reduce sediment discharges to surface waters from construction areas, and measures to avoid, minimize, and mitigate impacts on riparian zones is essential for achieving TMDL, Basin Plan, and CEQA compliance.
10. Pursuant to Regional Water Board Resolution R1-2004-0087, Total Maximum Daily Load Implementation Policy Statement for Sediment-Impaired Receiving Waters within the North Coast Region (Sediment TMDL Implementation Policy), the Executive Officer is directed to “rely on the use of all available authorities, including existing regulatory standards, and permitting and enforcement tools to more effectively and efficaciously pursue compliance with sediment-related standards by all dischargers of sediment waste.”
11. Pursuant to Regional Water Board Resolution R1-2012-0013, Implementation of the Water Quality Objective for Temperature in the North Coast Region (Temperature Implementation Policy), Regional Water Board staff is directed to address factors that contribute to elevated water temperatures when issuing 401 certifications or WDRs (permits) for individual projects. Any permit should be consistent with the assumptions and requirements of temperature shade load allocations in areas subject to existing temperature TMDLs, including EPA- established temperature TMDLs, as appropriate. If applicable, any permit or order should implement similar shade controls in areas listed as impaired for temperature but lacking a TMDL and region-wide as appropriate and necessary to prevent future impairments and to comply with the intrastate temperature objective.
12. The federal antidegradation policy requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California’s antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Water Board’s Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. This certification is consistent with applicable federal and State antidegradation policies, as it does not authorize the discharge of increased concentrations of pollutants or increased volumes of treated wastewater, and does not otherwise authorize degradation of the waters affected by this project.

13. To ensure compliance with Water Quality Objectives within the Basin Plan, adequate wetland and riparian protection and stringent requirements to avoid, minimize, and mitigate the sediment and temperature impacts associated with the proposed project will be incorporated as enforceable conditions in this Water Quality Certification. In addition, Caltrans will be required to conduct surface water monitoring, sampling, and analysis in accordance with the conditions of the Water Quality Certification. Additionally, storm water runoff monitoring, sampling, and analysis will be conducted as required by the State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) Permit for Storm Water Discharges from the State of California, Department of Transportation (Caltrans) Properties, Facilities and Activities Order No. 99 – 06 - DWQ. The surface water data collected will be utilized to assess the adequacy of BMPs during construction as well as site specific mitigation measures proposed to minimize impacts to the environment, including sediment and temperature impacts.
14. This discharge is also regulated under State Water Resources Control Board Order No. 2003-0017-DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification," which requires compliance with all conditions of this certification.

Receiving Waters: Laguna de Santa Rosa in Russian River Hydrologic Unit No. 1114

Filled and/or

Excavated Areas: Permanent – streams (Waters of U.S.): 70 linear feet (0.01 acres)
Permanent – wetlands (Waters of U.S.): 0.04 acres
Permanent – riparian areas (Waters of State): 0.57 acres (317 linear feet)

Temporary – streams (Waters of U.S.): 89 linear feet (0.46 acres)
Temporary – wetlands (Waters of U.S.): 0.26 acres
Temporary – riparian Areas (Waters of State): 0.80 acres (425 linear feet)

Dredge Volume : None

Fill Volume : Permanent - 972 cubic yards
Temporary – 2,790 cubic yards

Mitigation proposed: On-site: Restoration of 89 linear feet of jurisdictional waters and 0.26 acres of jurisdictional wetlands

Off-site: 1.7 acres of riparian habitat restoration and purchase of 0.5 acres of wetland mitigation bank credit

Latitude/Longitude: 38.40348 / -122.81616

Accordingly, based on its independent review of the record, the Regional Water Board certifies that the Caltrans – Highway 12 Laguna de Santa Rosa Bridge Replacement Project (WDID No. 1B12122WNSO), as described in the application will comply with sections 301,

302, 303, 306 and 307 of the Clean Water Act, and with applicable provisions of state law, provided that the Caltrans complies with the following terms and conditions:

All conditions of this certification apply to Caltrans (and all its employees) and all contractors (and their employees), sub-contractors (and their employees), and any other entity or agency that performs activities or work on the project (including the off-site mitigation lands) as related to this Water Quality Certification.

1. This certification action is subject to modification or revocation upon administrative or judicial review; including review and amendment pursuant to Water Code section 13330 and title 23, California Code of Regulations, section 3867.
2. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to title 23, California Code of Regulations, section 3855, subdivision (b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.
3. The validity this certification is conditioned upon total payment of any fee required under title 23, California Code of Regulations, section 3833, and owed by the applicant.
4. All conditions required by this certification shall be included in the Plans and Specifications prepared by Caltrans for the Contractor. In addition, Caltrans shall require compliance with all conditions included in this certification in the bid contract for this project.
5. Caltrans shall provide a copy of this certification and State Water Resources Control Board (SWRCB) Order No. 2003-0017-DWQ (web link referenced below) to the contractor and all subcontractors conducting the work, and require that copies remain in their possession at the work site. Caltrans shall be responsible for work conducted by its contractor or subcontractors.
6. For both the utility relocation and bridge replacement contracts, the Regional Water Board shall be notified in writing each year at least five working days (working days are Monday – Friday) prior to the commencement of ground disturbing activities, water diversion activities or construction activities with details regarding the construction schedule. The notification will allow Regional Water Board staff to be present on-site during installation and removal activities, and to answer any public inquiries that may arise regarding the project. Caltrans shall provide Regional Water Board staff access to the project site to document compliance with this certification.
7. The Resident Engineer (or appropriately authorized agent) shall hold on-site water quality permit compliance meetings (similar to tailgate safety meetings) to discuss permit compliance, including instructions on violation avoidance and violation reporting procedures. The meetings shall be held at least every other week, before forecasted storm events, and when a new contractor or subcontractor arrives to begin work at the site. The contractors, subcontractors and their employees, as well as any inspectors or monitors assigned to the project, shall be present at the meetings. Caltrans shall maintain dated sign-in sheets for attendees at these meetings, and shall make them available to the Regional Water Board on request.

8. All activities and best management practices (BMPs) shall be implemented according to the submitted application materials (dated May 2012 and October 2012) and the findings and conditions of this certification. BMPs for erosion, sediment, turbidity and pollutant control shall be implemented and in place at commencement of, during, and after any ground clearing activities, construction activities, or any other project activities that could result in erosion, sediment, or other pollutant discharges to waters of the State. The BMPs shall be implemented in accordance with the Caltrans Construction Site Best Management Practice Manual (CCSBMPM) and all contractors and subcontractors shall comply with the CCSBMPM. In addition, BMPs for erosion and sediment control shall be utilized year round, regardless of season or time of year. Caltrans shall stage erosion and sediment control materials at the work site. All BMPs shall be installed properly and in accordance with the manufacturer's specifications. If the project Resident Engineer elects to install alternative BMPs for use on the project, Caltrans shall submit a proposal to Regional Water Board staff for review and concurrence.
9. Caltrans shall prioritize the use of wildlife-friendly biodegradable (not photo-degradable) erosion control products wherever feasible. Caltrans shall not use or allow the use of erosion control products that contain synthetic netting for permanent erosion control (i.e. erosion control materials to be left in place for two years or after the completion date of the project). If Caltrans finds that erosion control netting or products have entrapped or harmed wildlife, personnel shall remove the netting or product and replace it with wildlife-friendly biodegradable products. Caltrans shall not use or allow the use of erosion control products that contain synthetic materials within waters of the United States or waters of the State at any time. Caltrans shall request approval from the Regional Water Board if an exception from this requirement is needed for a specific location.
10. Herbicides and pesticides shall not be used within the project. If Caltrans has a compelling case as to why herbicides and pesticides should be used, they may submit a request along with a BMP plan to the Executive Officer of the Regional Water Board for review, consideration, and concurrence.
11. Work in flowing or standing surface waters, unless otherwise proposed in the project description and approved by the Regional Water Board, is prohibited. If construction dewatering of groundwater is found to be necessary, Caltrans shall use a method of water disposal other than disposal to surface waters (such as land disposal) or Caltrans shall apply for coverage under the Low Threat Discharge Permit or an individual National Pollutant Discharge Elimination System (NPDES) Permit and receive notification of coverage to discharge to surface waters, prior to the discharge.
12. Caltrans is prohibited from discharging waste to waters of the State, unless explicitly authorized by this certification. For example, no debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or concrete washings, welding slag, oil or petroleum products, or other organic or earthen material from any construction or associated activity of whatever nature, other than that authorized by this certification, shall not be allowed to enter into waters of the State. Except for temporary stockpiling of waste generated during demolition operations ("temporary" in this instance means generated and removed during the same working day), waste materials shall not be placed within 150 linear feet of waters of the State or where the materials may be

washed by rainfall into waters of the State. Exceptions to the 150-foot limit may be granted on a case-by-case basis provided Caltrans first submits a proposal in writing that is found acceptable by Regional Water Board staff or the Regional Water Board liaison to Caltrans.

13. Caltrans shall implement a demolition debris containment plan to prevent demolition waste from entering State waters. The strategy may be detailed either in the SWPPP submitted with the Notice of Intent for the bridge construction contract or submitted separately to the Water Board. Demolition shall not commence until the demolition plan has been found acceptable to Water Board staff or the Caltrans liaison to the Regional Water Board.
14. Caltrans shall submit, subject to review and concurrence by the Regional Water Board staff or Caltrans liaison to the Regional Water Board, a dewatering and/or diversion plan that appropriately describe the dewatered or diverted areas and how those areas will be handled during construction. The diversion/dewatering plans shall be submitted no later than 30 days prior to conducting the proposed activity. Information submitted shall include the area or work to be diverted or dewatered and method of the proposed activity. All diversion or dewatering activities shall be designed to minimize the impact to waters of the State and maintain natural flows upstream and downstream. All dewatering or diversion structures shall be installed in a manner that does not cause sedimentation, siltation or erosion upstream or downstream. All dewatering or diversion structures shall be removed immediately upon completion of project activities.
15. In-channel work, including removal of stream diversion structures, shall only be conducted between June 15 and October 15; extensions shall not be granted. This certification does not authorize Caltrans to draft surface waters.
16. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall be prohibited within waters of the State. Fueling of individual equipment types within waters of the State may be authorized if Caltrans first prepares a fueling plan that:
 - 11) Identifies the specific piece of machinery that may require fueling within waters of the State;
 - 12) Provides justification for the need to refuel within State waters. The justification shall describe why fueling outside of jurisdictional waters is infeasible; and
 - 13) Includes a narrative of specific BMPs that shall be employed to prevent and capture fuel releases.

Fueling of equipment within waters of the State shall be prohibited until the above mentioned plan has been approved by Regional Water Board staff or the Regional Water Board liaison for Caltrans. The fueling plan may be submitted individually, included in the project Storm Water Pollution Prevention Plan (SWPPP), or submitted as a SWPPP amendment.

17. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall not result in a discharge or a threatened discharge to any waters of the State or the U.S. At no time shall Caltrans use any vehicle or equipment which leaks any substance that may impact water quality.

18. Caltrans shall implement appropriate BMPs to prevent the discharge of equipment fluids to the stream channel. The minimum requirements shall include: storing hazardous materials at least 150 linear feet outside of the stream banks; checking equipment for leaks and preventing the use of equipment with leaks; and pressure washing or steam cleaning equipment to remove fluid residue on any of its surfaces prior to its entering any stream channel in a manner that does not result in a discharge to waters of the State.
19. If, at any time, an unauthorized discharge to surface water (including wetlands, rivers or streams) occurs, or any other water quality problem arises, the associated project activities shall cease immediately until adequate BMPs are implemented. The Regional Water Board shall be notified promptly and in no case more than 24 hours after the unauthorized discharge or water quality problem arises.
20. Caltrans and their contractor are not authorized to discharge wastewater (e.g., water that has contacted uncured concrete or cement, or asphalt) to surface waters, ground waters, or land. Wastewater may only be disposed of to a sanitary waste water collection system/facility (with authorization from the facility's owner or operator) or a properly-licensed disposal or reuse facility. If Caltrans or their contractor proposes an alternate disposal method, Caltrans or their contractor shall request authorization from the Regional Water Board. Plans to reuse or recycle wastewater require written approval from Regional Water Board staff.
21. Concrete shall be excluded from surface water for a period of 30-days after it is poured/sprayed. During that time the concrete shall be kept moist and runoff from the concrete shall not be allowed to enter any water body. Commercial sealants may be applied to the concrete surface where difficulty in excluding flow for a long period may occur. If sealant is used, water shall be excluded from the site until the sealant is cured. If groundwater comes into contact with fresh concrete, it shall be prevented from flowing towards surface water.
22. Caltrans shall provide analysis and verification that placing non-hazardous waste or inert materials (which may include discarded product or recycled materials) will not result in degradation of water quality, human health, or the environment. All project-generated waste shall be handled, transported, and disposed in strict compliance with all applicable State and Federal laws and regulations. When operations are complete, any excess material or debris shall be removed from the work area and disposed of properly and in accordance with the Special Provisions for the project and/or Standard Specification 7-1.13, Disposal of Material Outside the Highway Right of Way. Within 30 days of disposing of materials off-site Caltrans shall submit to the Regional Water Board the satisfactory evidence provided to the Caltrans Engineer by the Contractor referenced in Standard Specification 7-1.13. In accordance with State and Federal laws and regulations, Caltrans is liable and responsible for the proper disposal of waste generated by their project.
23. All imported fill material shall be clean and free of pollutants. All fill material shall be imported from a source that has the appropriate environmental clearances and permits. The reuse of low-level contaminated solids as fill on-site shall be performed in accordance with all State and Federal policies and established guidelines and must be submitted to the Regional Water Board for review and concurrence.

24. Gravel bags used within the Laguna de Santa Rosa shall meet the gravel specifications described below in condition number 25. Gravel bag fabric shall be nonwoven polypropylene geotextile (or comparable polymer) and shall conform to the following requirements:
 - 11) Mass per unit area, grams per square meter, min ASTM Designation: D 5261 – 270
 - 12) Grab tensile strength (25-mm grip), kilonewtons, min. ASTM Designation: D4632* 0.89
 - 13) Ultraviolet stability, percent tensile strength retained after 500 hours, ASTM Designation: D4355, xenon arc lamp method 70 or appropriate test method for specific polymer
 - 14) Gravel bags shall be between 600 mm and 800 mm in length, and between 400 mm and 500 mm in width.
 - 15) Yarn used in construction of the gravel bags shall be as recommended by the manufacturer or bag supplier and shall be of a contrasting color. The opening of gravel-filled bags shall be secured to prevent gravel from escaping. Gravel-filled bags shall be between 13 kg and 22 kg in mass.
 - 16) Caltrans shall request approval from the Regional Water Board if an exception from this requirement is needed for a specific location.
25. Gravel used in the construction of the temporary Laguna de Santa Rosa access pad shall:
 - 11) Consist of mechanically-rounded and washed, and/or river run gravel obtained from a river or creek bed;
 - 12) Be clean, hard, sound, durable, uniform in quality, and free of disintegrated material, organic matter, or other deleterious substances;
 - 13) Be composed entirely of particles that have no more than one fractured face;
 - 14) Have a cleanliness value of at least 85, using the Cleanness Value Test Method for California Test No. 227; and
 - 15) Have a diameter no less than 0.75 inches in diameter, and no greater than four inches in diameter.
26. The Laguna de Santa Rosa temporary access pad shall be completely removed on or before October 15. Extensions shall not be granted. Installation or removal of the temporary access pad shall not impact the form or substrate of the Laguna de Santa Rosa. Caltrans shall conduct pre- and post-surveys of the Laguna to ensure that installation or removal of the temporary access pad did not impact the Laguna's form or substrate. If Caltrans finds there was an impact, then the Laguna de Santa Rosa shall be restored to its previous conditions and documentation shall be provided to the Regional Water Board no later than 30 days from completion of the post-construction survey.
27. In order to demonstrate compliance with receiving water limitations and water quality objectives surface water monitoring shall be conducted. When conducting surface water monitoring Caltrans shall establish discharge, upstream (background) and downstream monitoring locations to demonstrate compliance with applicable water quality objectives. The downstream location shall be no more than 100 feet from the discharge location.

- 11) Surface water monitoring shall be conducted whenever a project activity is conducted within waters of the State (e.g. including but not limited to the installation, use or removal of stream diversions, pile installations, and cofferdams). Measurements and observations shall be collected from each sampling location four times daily.
- 12) Surface water monitoring shall be conducted immediately when any project activity has mobilized sediment or other pollutants resulting in a discharge and/or has the potential to alter background conditions within waters of the State (including but not limited to storm water runoff, concrete discharges, leaks, and spills.). The continuing frequency is contingent upon results of field measurements and applicable water quality objectives.

Surface water monitoring field measurements shall be taken for pH and turbidity. In addition, visual observations of each location shall be documented daily for each established monitoring location and monitoring event and include the estimate of flow, appearance of the discharge including color, floating or suspended matter or debris, appearance of the receiving water at the point of discharge (occurrence of erosion and scouring, turbidity, solids deposition, unusual aquatic growth, etc.), and observations about the receiving water, such as the presence of aquatic life. If a project activity has reached a steady state and is stable, then Caltrans may request a temporary reprieve from this condition from the Regional Water Board until an activity or discharge triggers the monitoring again.

28. Whenever, as a result of project activities (in-stream work or a discharge to receiving waters), downstream measurements exceed any water quality objective 100 feet downstream of the source(s) all necessary steps shall be taken to install, repair, and/or modify BMPs to control the source(s). The frequency of surface water monitoring shall increase to hourly and shall continue until measurements demonstrate compliance with water quality objectives for each parameter listed below and measured levels are no longer increasing as a result of project activities. In addition, the overall distance from the source(s) to the downstream extent of the exceedence of water quality objectives shall be measured.

Monitoring results shall be reported to appropriate Regional Water Board staff person by telephone within 24 hours of taking any measurements that exceed the limits detailed below (only report turbidity if it is higher than 20 NTU).

pH	<6.5 or >8.5 (any changes >0.5 units)
turbidity	20% above natural background

Monitoring results and upstream and downstream pictures within the working and/or disturbed area and discharge location shall be taken and submitted to the appropriate Regional Water Board staff within 24 hours of the incident. All other monitoring data documenting compliance with water quality objectives shall be reported on a monthly basis and is due to the Regional Water Board by the 15th of the following month.

29. Post Storm Event Reports:

- 11) Once the project has begun ground-disturbing activities, and subsequent to a qualifying rain event that exceeds 0.5-inches of precipitation, Caltrans shall inspect the project within 24 hours and take photos of all discharge locations, and disturbed areas, including all excess materials disposal areas, in order to demonstrate that erosion control and revegetation measures are present and have been installed appropriately and are functioning effectively. A brief report containing these photos, corrective actions (if necessary), and any surface water monitoring results collected pursuant to this Order or the Construction General Permit (SWRCB Order 2009-009 DWQ) shall be submitted to the Regional Water Board within 10 days after the end of the qualifying rain event. Inspections are required daily during extended rain events. Once the project site is stable, in a steady state (channel- ground- or vegetation-disturbing activities have ceased), and has demonstrated sufficient and effective erosion and sediment control, Caltrans may request a reprieve from this condition from the Regional Water Board. At least one post-construction inspection is required to demonstrate sufficient and effective erosion and sediment control and compliance with the Basin Plan.
 - 12) Rain events are periods of precipitation that that are separated by more than 48-hours of dry weather. Rainfall amounts may be taken from on-site rain gauges, from the nearest California Data Exchange Center station (<http://cdec.water.ca.gov>), or by a custom method or station approved by Regional Water Board staff.
30. Grubbing of vegetation shall not occur in areas of temporary impact, as identified in the application materials. Vegetation within these areas shall be cleared to no less than one inch from the soil surface.
 31. To avoid and minimize impacts, temporary access roads shall employ reinforcing fabric and temporary soil confinement systems when placed over jurisdictional wetlands and waters. Applicable road locations and crossing designs shall be consistent with the Water Pollution Control Details included in Attachment A of this certification.
 32. Caltrans shall submit a mitigation and monitoring plan (MMP) to address on-site and off-site mitigation measures for temporary and permanent project impacts to jurisdictional wetlands, waters, and riparian vegetation. Bridge replacement construction shall be prohibited until a MMP has been found acceptable to the Executive Officer. The MMP shall include:
 - 11) A proposal to revegetate and monitor all temporarily impacted jurisdictional waters and riparian areas. The proposal shall include:
 - a. A planting palette, planting plans, and proposed seed mixes;
 - b. Success criteria, including vigor, percent cover, percent invasive cover, and 75% survival of trees at the end of ten years. Final success criteria for wetland restoration may be considered at five years;
 - c. Corrective actions to be taken if mitigation measures do not meet the proposed success criteria;

- d. A plan to re-vegetate all temporarily impacted areas in the first full planting season (November to April) subsequent to the year construction is complete and erosion control is established in the impacted area. Caltrans shall include a plan to stabilize areas above the Laguna de Santa Rosa Ordinary High Water Mark using appropriate native soil-stabilizing species;
 - e. An invasive plant control plan;
 - f. A monitoring period of no less than ten years;
 - g. Photo-documentation; and
 - h. Annual reporting at the end of years 0 (as-built), 1, 3, 5, 7, 9, and 10. Caltrans shall propose report delivery deadlines;
- ii) A proposal to restore no less than 1.7 acres of riparian habitat in the Laguna de Santa Rosa watershed. Caltrans may partner with the Laguna de Santa Rosa Foundation to restore riparian habitat adjacent the north bank of Gravenstein Creek at “The Brown Farm,” or, at an alternative site found acceptable to the California Department of Fish and Wildlife and the Regional Water Board. The proposal shall include:
- a. Mitigation goals;
 - b. A planting palette, planting plans, and proposed seed mixes;
 - c. A plan to implement the mitigation no later than Fall 2014;
 - d. Success criteria;
 - e. An invasive plant control plan;
 - f. Photo-documentation;
 - g. Corrective actions to be taken if mitigation measures do not meet the proposed success criteria;
 - h. A monitoring period of no less than ten years, and
 - i. Annual reporting at the end of years 0 (as-built), 1, 3, 5, 7, 9 and 10. Caltrans shall propose report delivery deadlines.

Project construction shall be prohibited until the MMP has been found acceptable to the Executive Officer. Utility relocation work may commence in advance of MMP acceptance provided specific activities and restoration measures related to the utility relocation activities are first submitted to and found acceptable by Regional Water Board staff or the Caltrans liaison to the Regional Water Board.

- 33. Prior to commencement of bridge construction, Caltrans shall submit confirmation of the purchase of credits equivalent to no less than 0.5 acres of seasonal wetland establishment from a United States Army Corps of Engineers-approved mitigation bank within the appropriate service area.
- 34. Caltrans shall install a compost-amended vegetated filter strip to treat roadway stormwater runoff. The strip shall be no less than 9,821 square feet, have a slope not greater than 25 percent, and be situated adjacent westbound SR12, approximately between post-miles 9.74 and 9.81. The strip shall be entered into the District’s permanent stormwater treatment BMP database and monitored and maintained to ensure BMP efficacy.
- 35. In the event of any violation or threatened violation of the conditions of this certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under applicable state or federal law.

For the purposes of section 401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this certification. In response to a suspected violation of any condition of this certification, the State Water Board may require the holder of any federal permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In response to any violation of the conditions of this certification, the Regional Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

36. The Regional Water Board may add to or modify the conditions of this Order, as appropriate, to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act.
37. This certification is not transferable. In the event of any change in control of ownership of land presently owned or controlled by the Applicant, the Applicant shall notify the successor-in-interest of the existence of this certification by letter and shall forward a copy of the letter to the Regional Water Board. The successor-in-interest must send to the Regional Water Board Executive Officer a written request for transfer of this certification to discharge dredged or fill material under this Order. The request must contain the following:
 - 11) requesting entity's full legal name;
 - 12) the state of incorporation, if a corporation;
 - 13) address and phone number of contact person; and
 - 14) a description of any changes to the project or confirmation that the successor-in-interest intends to implement the project as described in this Order.
38. Except as may be modified by any preceding conditions, all certification actions are contingent on: a) the discharge being limited, and all proposed revegetation, avoidance, minimization, and mitigation measures being completed, in strict compliance with Caltrans' project description and CEQA documentation, as approved herein, b) Caltrans shall construct the project in accordance with the project described in the application and the findings above, and c) compliance with all applicable water quality requirements and water quality control plans including the requirements of the Water Quality Control Plan for the North Coast Region (Basin Plan), and amendments thereto. Any change in the design or implementation of the project that would have a significant or material effect on the findings, conclusions, or conditions of this Order must be submitted to the Executive Officer of the Regional Water Board for prior review, consideration, and written concurrence. If the Regional Water Board is not notified of a significant alteration to the project, it will be considered a violation of this Order, and Caltrans may be subject to Regional Water Board enforcement actions.

Please contact our staff Environmental Specialist / Caltrans Liaison, Brendan Thompson at (707) 576-2699, or via e-mail, at Brendan.Thompson@waterboards.ca.gov, if you have any questions.

Original Signed By

Matthias St. John
Executive Officer

130207_CDOT_Hwy12_LagunaDeSantaRosa_401Cert

Enclosure: Attachment A – Temporary Construction Access Road Details

Web link: State Water Resources Control Board Order No. 2003-0017 -DWQ, General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification can be found at:
http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0017.pdf

Original to: Ms. Lilian Acorda, Caltrans, District 4, 111 Grand Ave., Oakland, CA 94612

Copies to: Mr. Cyrus Vafai, Caltrans, District 4, 111 Grand Ave., Oakland, CA 94612

Electronic Copies to: U.S. Army Corps of Engineers, Regulatory Functions - San Francisco District

California Department of Fish and Game, Bay Delta Region



DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16TH FLOOR
SAN FRANCISCO, CALIFORNIA 94103-1398

DEC 18 2012

REPLY TO
ATTENTION OF

Regulatory Division

Subject: File Number 2008-00255N

Mr. Jeffery Jensen
Office of Biological Sciences and Permits
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Dear Mr. Jensen:

This correspondence is in reference to your submittal of May 14, 2012, concerning Department of the Army (DA) authorization to replace a bridge located where State Route (SR) 12 crosses the Laguna de Santa Rosa at post mile 9.63, east of the City of Sebastopol, in Sonoma County, California (38.40394, -122.81541).

The purpose of the project is to replace the Laguna de Santa Rosa Bridge to meet current design standards and to make the bridge structurally sound. Work will include replacement of an existing 33.5 foot wide and 220.25 foot long, two-lane bridge with a new 236 foot long two-lane precast bridge consisting of three spans and two bents. The bridge deck will be widened to 58 feet, elevated 3.5 feet, and will be shifted to the south. Four retaining walls will be constructed on the corners of the new bridge above ordinary high water mark. Bridge construction will occur in three stages over two construction seasons.

Work will require temporary creek diversions. A temporary stream access pad with a temporary crane access trestle will be placed within Laguna de Santa Rosa to allow direct access to the bridge during each construction season. A temporary gravel bag diversion may be used to divert flows into the channel around the temporary trestle. A 30 foot wide temporary access road will be installed and will require temporary fill into jurisdictional wetlands to the north and south of SR 12. Sheet piles will be used at the abutments, bents, and retaining walls to create eight cofferdams. Two of the eight cofferdams will be temporarily installed within waters of the U.S. Prior to construction of the bridge PG&E will deactivate and abandon an existing main line, then bore a gas line underground on the north side of SR 12, using directional drill technique. The bore will be approximately 850 feet long, as deep as approximately 32 feet beneath the ground and approximately 20 feet below the bottom of the creek channel.

Work within U.S. Army Corps of Engineers (Corps) jurisdiction will require the permanent placement of fill in 0.25 acre (1,187 linear feet) and temporary placement of fill in 0.204 acre (331 linear feet) wetlands associated with the Laguna de Santa Rosa. Work will also require the

permanent placement of fill in 0.011 acre (60 linear feet) and the temporary placement of fill in 0.914 acre (364 linear feet) in the Laguna de Santa Rosa. All work shall be completed in accordance with the plans and drawings titled "*USACE File #2008-00255N, Laguna de Santa Rosa Bridge Replacement, November 29, 2012, Figures 1 to 11*" provided as enclosure 1.

Section 404 of the Clean Water Act (CWA) generally regulates the discharge of dredged or fill material below the plane of ordinary high water in non-tidal waters of the United States, below the high tide line in tidal waters of the United States, and within the lateral extent of wetlands adjacent to these waters. Section 10 of the Rivers and Harbors Act generally regulates construction of structures and work, including excavation, dredging, and discharges of dredged or fill material, occurring below the plane of mean high water in tidal waters of the United States; in former diked baylands currently below mean high water; outside the limits of mean high water but affecting the navigable capacity of tidal waters; or below the plane of ordinary high water in non-tidal waters designated as navigable waters of the United States. Navigable waters of the United States generally include all waters subject to the ebb and flow of the tide; and/or all waters presently used, or have been used in the past, or may be susceptible for future use to transport interstate or foreign commerce. A preliminary jurisdictional determination (JD) has been completed for your site. Preliminary JDs are written indications that there may be waters of the U.S. on a parcel or indications of the approximate location(s) of waters of the U.S. on a parcel. Preliminary JDs are advisory in nature and may not be appealed.

Based on a review of the information in your submittal, the project qualifies for authorization under DA Nationwide Permits (NWP) 12 for *Utility Line Activities* and 14 for *Linear Transportation Projects*, 77 Fed. Reg. 10184, February 21, 2012, pursuant to Section 404 of the CWA of 1972, as amended (33 U.S.C. § 1344 *et seq.*). The project must be in compliance with the terms of the NWP, the general conditions of the NWP program, and the San Francisco District regional conditions cited in enclosure 2. You must also be in compliance with any special conditions specified in this letter for the NWP authorization to remain valid. Non-compliance with any term or condition could result in the revocation of the NWP authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps. This NWP authorization does not obviate the need to obtain other State or local approvals required by law.

This verification will remain valid for two years from the date of this letter. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon a NWP will remain authorized provided the activity is completed within 12 months of the date of a NWP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 330.4(e) and 33 CFR 330.5 (c) or (d). The Chief of Engineers will periodically review NWPs and their conditions and will decide to either modify, reissue, or revoke the permits. If a NWP is not modified or reissued within five years of its effective date, it automatically expires and becomes null and void. It is incumbent upon you to remain informed of any changes to the NWPs. Changes to the NWPs will be announced by Public Notice posted on our website (<http://www.spn.usace.army.mil/regulatory/index.html>). Upon completion of the

project and all associated mitigation requirements, you shall sign and return the Certification of Compliance, enclosure 3, verifying that you have complied with the terms and conditions of the permit.

This authorization will not be effective until you have obtained a Section 401 water quality certification from the North Coast Regional Water Quality Control Board (RWQCB). If the RWQCB fails to act on a valid request for certification within two months after receipt of a complete application, the Corps will presume a waiver of water quality certification has been obtained. You shall submit a copy of the certification to the Corps prior to the commencement of work.

General Condition 18 stipulates that project authorization under a NWP does not allow for the incidental take of any federally-listed species in the absence of a biological opinion (BO) with incidental take provisions. As the principal federal lead agency for this project, Caltrans initiated consultation with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to address project related impacts to listed species, pursuant to Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. Section 1531 *et seq.*). By letters of March 10, 2010 and February 14, 2012 (cited in enclosures 4 and 5), the USFWS concluded consultation. By letter of November 15, 2012, the NMFS concurred with the determination that the project was not likely to adversely affect Central California Coast steelhead and Central California Coast coho salmon and designated critical habitat for this species (enclosure 6).

In order to ensure compliance with this NWP authorization, the following special conditions shall be implemented:

1. While temporary creek diversions are in place, appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable.
2. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows.
3. Temporary fills must be removed at the end of each construction season in their entirety. The affected area must be returned to pre-construction elevations post-construction.
4. Within 1-year of initiation of temporary impact to a jurisdictional feature, you shall re-contour the temporarily impacted area and replant it with appropriate soil-stabilizing native species. Planting shall occur as depicted in the enclosed figures titled, "USACE File #2008-00255N, Laguna de Santa Rosa Bridge Replacement, November 29, 2012, Figures 8 to 11" (enclosure 1). A 10-year monitoring program will be implemented. Annual monitoring reports shall be submitted to the Corps by November 1, of each year. By the end of the tenth year, re-vegetated areas shall achieve absolute vegetative cover

similar to pre-construction conditions. The reports shall include representative photos of the re-vegetated areas. If the cover requirements for the re-vegetated areas are not met, the Corps may require further monitoring, re-vegetation, and/or off-site mitigation.

5. To establish pre-construction absolute vegetative cover, a survey of baseline conditions shall be completed prior to any impact to a jurisdictional feature to determine pre-construction absolute cover.
6. In the event that you are unable to implement the plan described in special condition 4 within 1-year of initiation of temporary impact to a jurisdictional feature, you must purchase credits at a Corps approved mitigation bank to compensate for the temporary impact at a 3:1 ratio. If no approved bank or in-lieu fee is available, you shall propose an alternative mitigation plan to be reviewed and approved by the Corps.
7. You shall submit, to the Corps, confirmation of the purchase of credits equivalent to at least 0.3 acre of seasonal wetland establishment from a Corps approved mitigation bank within the appropriate Service Area. The specific mitigation bank shall be approved by the Corps before the credits are secured.
8. Initiation of impact to any jurisdictional feature associated with bridge replacement may not proceed until the Corps has received copies of receipts for the mitigation bank purchases (see Special Condition 7 above). Utility relocation may occur prior to the purchase of credits.
9. To remain exempt from the prohibitions of Section 9 of the Endangered Species Act, the Terms and Conditions enumerated in the shall be fully implemented as stipulated in the BOs entitled, "*Re-initiation of the Biological Opinion for the State Route 12, Laguna de Santa Rosa Bridge Replacement Project, State Route 12 in Sebastopol, Sonoma County, California (Caltrans EA 1A2900)*" (pages 1-17) dated February 14, 2012, and "*Biological Opinion for the Laguna de Santa Rosa Bridge Replacement Project State Route 12 in Sebastopol, Sonoma County, California (Caltrans EA 1A2900)*" (pages 1-32) dated March 3, 2010 (enclosures 4 and 5). The USFWS is, however, the authoritative federal agency for determining compliance with the incidental take statement and for initiating appropriate enforcement actions or penalties under the Endangered Species Act.
10. Avoidance measures established to ensure protection of Central California coast steelhead and central California coast coho salmon shall be fully implemented as stipulated in the NMFS letter 2012/9279 (pages 1-4) dated November 15, 2012 (enclosure 6). The NMFS is, however, the authoritative federal agency for determining compliance with avoidance measures and for initiating appropriate enforcement actions or penalties under the Endangered Species Act.

You may refer any questions on this matter to Paula Gill of my Regulatory staff by telephone at 415-503-6776 or by e-mail at Paula.C.Gill@usace.army.mil. All correspondence should be addressed to the Regulatory Division, North Branch, referencing the file number at the head of this letter.

The San Francisco District is committed to improving service to our customers. My Regulatory staff seeks to achieve the goals of the Regulatory Program in an efficient and cooperative manner, while preserving and protecting our nation's aquatic resources. If you will like to provide comments on our Regulatory Program, please complete the Customer Service Survey Form available on our website: <http://www.spn.usace.army.mil/regulatory/>.

Sincerely,



 Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copies Furnished (w/o encls):

CA RWQCB, Santa Rosa, CA
U.S. EPA, San Francisco, CA
CA SWRCB, Sacramento, CA
USFWS, Sacramento, CA
NMFS, Santa Rosa, Ca
CDFG, Yountville, Ca



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16TH FLOOR
SAN FRANCISCO, CALIFORNIA 94103-1398

Regulatory Division

JAN 11 2013

SUBJECT: File Number 2008-00255N

Mr. Jeffery Jensen
Office of Biological Sciences and Permits
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Dear Mr. Jensen:

This correspondence is in reference to your submittal of January 9, 2013, concerning Department of the Army (DA) authorization to replace a bridge located where State Route (SR) 12 crosses the Laguna de Santa Rosa at post mile 9.63, east of the City of Sebastopol, in Sonoma County, California (38.40394, -122.81541). This NWP authorization letter supersedes the letter issued by this office on December 18, 2012.

The purpose of the project is to replace the Laguna de Santa Rosa Bridge to meet current design standards and to make the bridge structurally sound. Work will include replacement of an existing 33.5 foot wide and 220.25 foot long, two-lane bridge with a new 236 foot long two-lane precast bridge consisting of three spans and two bents. The bridge deck will be widened to 58 feet, elevated 3.5 feet, and will be shifted to the south. Four retaining walls will be constructed on the corners of the new bridge above ordinary high water mark. Bridge construction will occur in three stages over two construction seasons.

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Work within U.S. Army Corps of Engineers (Corps) jurisdiction will require the permanent placement of fill in 0.25 acre (1,187 linear feet) and temporary placement of fill in 0.204 acre (331 linear feet) wetlands associated with the Laguna de Santa Rosa. Work will also require the permanent placement of fill in 0.011 acre (60 linear feet) and the temporary placement of fill in 0.914 acre (364 linear feet) in the Laguna de Santa Rosa. All work shall be completed in accordance with the plans and drawings titled "*USACE File #2008-00255N, Laguna de Santa Rosa Bridge Replacement, November 29, 2012, Figures 1 to 11*" provided as enclosure 1.

Section 404 of the Clean Water Act (CWA) generally regulates the discharge of dredged or fill material below the plane of ordinary high water in non-tidal waters of the United States, below the high tide line in tidal waters of the United States, and within the lateral extent of wetlands adjacent to these waters. Section 10 of the Rivers and Harbors Act generally regulates construction of structures and work, including excavation, dredging, and discharges of dredged or fill material, occurring below the plane of mean high water in tidal waters of the United States; in former diked baylands currently below mean high water; outside the limits of mean high water but affecting the navigable capacity of tidal waters; or below the plane of ordinary high water in non-tidal waters designated as navigable waters of the United States. Navigable waters of the United States generally include all waters subject to the ebb and flow of the tide; and/or all waters presently used, or have been used in the past, or may be susceptible for future use to transport interstate or foreign commerce. A preliminary jurisdictional determination (JD) has been completed for your site. Preliminary JDs are written indications that there may be waters of the U.S. on a parcel or indications of the approximate location(s) of waters of the U.S. on a parcel. Preliminary JDs are advisory in nature and may not be appealed.

Based on a review of the information in your submittal, the project qualifies for authorization under DA Nationwide Permits (NWP) 12 for *Utility Line Activities* and 14 for *Linear Transportation Projects*, 77 Fed. Reg. 10184, February 21, 2012, pursuant to Section 404 of the CWA of 1972, as amended (33 U.S.C. § 1344 *et seq.*). The project must be in compliance with the terms of the NWP, the general conditions of the NWP program, and the San Francisco District regional conditions cited in enclosure 2. You must also be in compliance with any special conditions specified in this letter for the NWP authorization to remain valid. Non-compliance with any term or condition could result in the revocation of the NWP authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps. This NWP authorization does not obviate the need to obtain other State or local approvals required by law.

This verification will remain valid for two years from the date of this letter. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon a NWP will remain authorized provided the activity is completed within 12 months of the date of a NWP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 330.4(e) and 33 CFR 330.5 (c) or (d). The Chief of Engineers will

periodically review NWP's and their conditions and will decide to either modify, reissue, or revoke the permits. If a NWP is not modified or reissued within five years of its effective date, it automatically expires and becomes null and void. It is incumbent upon you to remain informed of any changes to the NWP's. Changes to the NWP's will be announced by Public Notice posted on our website (<http://www.spn.usace.army.mil/regulatory/index.html>). Upon completion of the project and all associated mitigation requirements, you shall sign and return the Certification of Compliance, enclosure 3, verifying that you have complied with the terms and conditions of the permit.

This authorization will not be effective until you have obtained a Section 401 water quality certification from the North Coast Regional Water Quality Control Board (RWQCB). If the RWQCB fails to act on a valid request for certification within two months after receipt of a complete application, the Corps will presume a waiver of water quality certification has been obtained. You shall submit a copy of the certification to the Corps prior to the commencement of work.

General Condition 18 stipulates that project authorization under a NWP does not allow for the incidental take of any federally-listed species in the absences of a biological opinion (BO) with incidental take provisions. As the principal federal lead agency for this project, Caltrans initiated consultation with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to address project related impacts to list species, pursuant to Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. Section 1531 *et seq.*). By letters of March 10, 2010 and February 14, 2012 (cited in enclosures 4 and 5), the USFWS concluded consultation. By letter of November 15, 2012, the NMFS concurred with the determination that the project was not likely to adversely affect Central California Coast steelhead and Central California Coast coho salmon and designated critical habitat for this species (enclosure 6).

In order to ensure compliance with this NWP authorization, the following special conditions shall be implemented:

1. While temporary creek diversions are in place, appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable.
2. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows.
3. Temporary fills must be removed at the end of each construction season in their entirety. The affected area must be return to pre-construction elevations post-construction.

4. Within 1-year of initiation of temporary impact to a jurisdictional feature, you shall re-contour the 0.914 acre of temporarily impacted area within Laguna de Santa Rosa. Appropriate areas (i.e. areas above Ordinary High Water Mark) shall be replanted with appropriate soil-stabilizing native species. Planting shall occur as depicted in the enclosed figures titled, “USACE File #2008-00255N, Laguna de Santa Rosa Bridge Replacement, November 29, 2012, Figures 8 to 11” (enclosure 1).
5. You shall submit, to the Corps, confirmation of the purchase of credits equivalent to at least 0.5 acre of seasonal wetland establishment from a Corps approved mitigation bank within the appropriate Service Area. The 0.5 acre of purchased credits will compensate for (1) permanent placement of fill in 0.25 acre (1,187 linear feet) of wetlands, (2) temporary placement of fill in 0.204 acre (331 linear feet) wetlands, and (3) permanent placement of fill in 0.011 acre (60 linear feet) of Laguna de Santa Rosa. The specific mitigation bank shall be approved by the Corps before the credits are secured.
6. Initiation of impact to any jurisdictional feature associated with bridge replacement may not proceed until the Corps has received copies of receipts for the mitigation bank purchases (see Special Condition 5 above). Utility relocation may occur prior to the purchase of credits.
7. To remain exempt from the prohibitions of Section 9 of the Endangered Species Act, the Terms and Conditions enumerated in the shall be fully implemented as stipulated in the BOs entitled, “Re-initiation of the Biological Opinion for the State Route 12, Laguna de Santa Rosa Bridge Replacement Project, State Route 12 in Sebastopol, Sonoma County, California (Caltrans EA 1A2900)” (pages 1-17) dated February 14, 2012, and “Biological Opinion for the Laguna de Santa Rosa Bridge Replacement Project State Route 12 in Sebastopol, Sonoma County, California (Caltrans EA 1A2900)” (pages 1-32) dated March 3, 2010 (enclosures 4 and 5). The USFWS is, however, the authoritative federal agency for determining compliance with the incidental take statement and for initiating appropriate enforcement actions or penalties under the Endangered Species Act.
8. Avoidance measures established to ensure protection of Central California coast steelhead and central California coast coho salmon shall be fully implemented as stipulated in the NMFS letter 2012/9279 (pages 1-4) dated November 15, 2012 (enclosure 6). The NMFS is, however, the authoritative federal agency for determining compliance with avoidance measures and for initiating appropriate enforcement actions or penalties under the Endangered Species Act.

You may refer any questions on this matter to Paula Gill of my Regulatory staff by telephone at 415-503-6776 or by e-mail at Paula.C.Gill@usace.army.mil. All correspondence should be addressed to the Regulatory Division, North Branch, referencing the file number at the head of this letter.

The San Francisco District is committed to improving service to our customers. My Regulatory staff seeks to achieve the goals of the Regulatory Program in an efficient and cooperative manner, while preserving and protecting our nation's aquatic resources. If you will like to provide comments on our Regulatory Program, please complete the Customer Service Survey Form available on our website: <http://www.spn.usace.army.mil/regulatory/>.

Sincerely,



 Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copies Furnished (w/o encls):

CA RWQCB, Santa Rosa, CA
U.S. EPA, San Francisco, CA
CA SWRCB, Sacramento, CA
USFWS, Sacramento, CA
NMFS, Santa Rosa, Ca
CDFG, Yountville, Ca



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846



In Reply Refer To:
81420-2009-F-0261-R001-2

FEB 14 2012

Mr. James Richards
Attn: John Yeakel
Office of Biological Science and Permits, MS 8E
California Department Transportation
111 Grand Avenue
Oakland, California 94623-0660

Subject: Reinitiation of the Biological Opinion for the State Route 12, Laguna de Santa Rosa Bridge Replacement Project, State Route 12 in Sebastopol, Sonoma County, California (Caltrans EA 1A2900)

Dear Mr. Richards:

This is in response to your September 13, 2010, request to reinitiate formal consultation with the U. S. Fish and Wildlife Service (Service) on the California Department of Transportation's (Caltrans) proposed State Route 12, Laguna de Santa Rosa Bridge Repair Project in Sebastopol, Sonoma County, California (Service File No. 81420-2009-F-0261-2). The reinitiation is prompted by design changes and the completion of two-year protocol surveys for listed plants. At issue are the potential effects on the endangered Sebastopol meadowfoam (*Limnanthes vinculans*), endangered Sonoma sunshine (*Blennosperma bakeri*), and endangered Burke's goldfields (*Lasthenia burkei*). This document is issued pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

This reinitiation is based on: (1) the March 3, 2010, Biological Opinion (Service File No. 81420-2009-F-0261-2); (2) Caltrans September 13, 2010, request for reinitiation and description of the revised project and effects on listed plants; (3) a 2010 special-status plant survey report prepared by Garcia and Associates; (4) project description changes provided by Caltrans on September 27, 2011; and (5) other information available to the Service.

The following changes are made to the March 3, 2010, Biological Opinion:

1. Add the following to the list of sources described in the first paragraph on page 2 upon which the formal consultation was based:

- a. Caltrans September 13, 2010, request for reinitiation and description of the revised project and effects on listed plants;
- b. A 2010 special-status plant survey report prepared by Garcia and Associates; and
- c. Project description changes provided by Caltrans on September 27, 2011.

2. Add to the *Consultation History*:

- September 13, 2010 The Service received a letter via an electronic mail (e-mail) message requesting reinitiation of consultation due to revisions to the original project description and the completion of two years of protocol plant surveys. The request was dated September 13, 2010, and included a copy of the plant survey report.
- October 20, 2010 The Service received project description changes from Caltrans via an e-mail message.
- December 13, 2010 The Service contacted Caltrans regarding compensation guidelines for Sebastopol meadowfoam, Sonoma sunshine, and Burke's goldfields as outlined in the 2007 Programmatic Biological Opinion for Conservation Strategy for the Santa Rosa Plain and contractor responsibility.
- December 28, 2011 The Service provided Caltrans with additional guidance regarding species compensation as outlined in the 2007 Programmatic Biological Opinion for the Conservation Strategy for the Santa Rosa Plain and suggested language for contractor responsibility via an e-mail message.
- March 1, 2011 The Service and Caltrans corresponded via e-mail and telephone regarding compensation credits to offset effects to potential Sebastopol meadowfoam, Sonoma sunshine, and Burke's goldfields habitat.
- March 2, 2011 The Service sent Caltrans an e-mail message clarifying that individual credits for each of three listed plants could be totaled to satisfy needed compensation if shared banking credits could not be found for all three listed plants at the same Service-approved conservation bank.
- March 2, 2011 The Service sent Caltrans recommended wording for conservation measures regarding compensation for the three listed plants and contractor responsibility via an e-mail message.

- September 27, 2011 The Service received a revised project description from Caltrans via an e-mail message. In addition to changes to the project design, Caltrans provided revised compensation language for the three listed plants and contractor responsibility.
- November 18, 2011 The Service issued a draft biological opinion (Service File No. 81420-2009-F-0261-R001-1).
- January 27, 2012 The Service received a request from Caltrans to finalize the November 18, 2011, draft Biological Opinion with no requested edits.

3. All references to “Chris Nagano” should be changed to “the Coast-Bay/Forest Foothill Division Chief at the Sacramento Field Office of the Service”.
4. Change the second paragraph from the *Description of the Proposed Project* on page 4 from:

Caltrans proposes to replace the Laguna de Santa Rosa Bridge with a new two-lane bridge that complies with the current Caltrans roadway standards of 12.0-foot lane widths and 8.0-foot shoulder widths. The proposed bridge structure is a Precast/Prestress (PC/PS) I-girder bridge 231 feet in length, consisting of three equal spans 77 feet in length. The bridge will be widened to 58 feet to conform to current standards. Post-construction operations and maintenance activities will remain the same as pre-project actions.

To:

Caltrans proposes to replace the Laguna de Santa Rosa Bridge with a new two-lane bridge that complies with the current Caltrans roadway standards of 12.0-foot lane widths and 8.0-foot shoulder widths. The proposed bridge structure is a Precast/Prestress (PC/PS) I-girder bridge 236 feet long, consisting of three equal spans and two bents. The bridge will be 58 feet wide to conform to current standards. Post-construction operations and maintenance activities will remain the same as pre-project actions.

5. Change the last paragraph from the *Description of the Proposed Project* on page 4 from:

The new bridge alignment will be shifted to the south to avoid and minimize impacts to aquatic and wetland resources present within the vicinity of the proposed project. Caltrans proposes to construct half of the new bridge on the south side of the existing one, demolish the existing bridge, and rebuild the second half of the new bridge on the north side. The new bridge profile will be elevated approximately 2.6 to 2.9 feet, which will require new roadway overlay to conform the existing roadway to the new structure. The proposed bridge design will require the construction of retaining walls on the northeast, southeast and southwest corners of the new structure. The retaining walls are a

design feature intended to minimize the amount of earthwork, Right Of-Way (ROW) acquisitions, and impacts to biologically sensitive resources within the project footprint.

To:

The new bridge alignment will be shifted to the south to avoid and minimize impacts to aquatic and wetland resources within the vicinity of the proposed project. Caltrans proposes to construct half of the new bridge on the south side of the existing one, demolish the existing bridge, and rebuild the second half of the new bridge on the north side. The new bridge profile will be elevated approximately 3.3 feet, which will require new roadway overlay to conform the existing roadway to the new structure. The proposed bridge design will require the construction of four retaining walls, approximately 16, 130, 163, and 268 feet long, on the northeast, southeast, and southwest corners of the new structure. The retaining walls are a design feature intended to minimize the amount of Earthwork, ROW acquisitions, and adverse effects to biologically sensitive resources.

6. Change the Phase 1/Stage 1 description on page 5 from:

Phase 1: Caltrans will remove the existing sidewalk on the north, widen the existing roadway at both ends of the bridge, and install retaining walls and embankments on the approaches to the bridge. Traffic will be redirected to the north while Caltrans demolishes the southern portion of the existing bridge and replaces it with the proposed new structure.

To:

Stage 1: The majority of the work during Stage 1 construction will occur along the southern side of the replacement bridge alignment. The contractor will first remove a portion of the existing sidewalk and barrier to accommodate the temporary Stage 1 traffic lanes and to facilitate access for the Stage 1 bridge construction. Concrete debris from this removal stage will be prevented from entering the waterway through the use of protective covers or fill pads over the creek bottom and water. The contractor will clear, grub, and grade the area for access of large equipment such as pile-driving equipment, cranes, drill rigs, bulldozers, excavators, and trucks. The contractor will construct Stage 1 work from fill gravel pads to install sheet piling, Cast-In-Steel-Shell (CISS) piling, and temporary formworks. The steel piles have a 4-foot diameter and will be below grade. A cofferdam will be necessary. A seal course or dewatering will be used depending on the water table. Once the bents and abutments are completed, the contractor will construct the superstructure, which will consist of setting precast girders and placing a cast-in-place concrete deck. The contractor will construct the retaining walls and embankments on the southeast and southwest sides concurrently with the bridge construction.

During Stage 1 (the first construction season), the contractor will access the creek from the Village Campground driveway at Station 14+50 and from the area south of the

existing highway through the use of temporary fill pads and crane mats. Direct access across the creek will be accomplished over a temporary trestle which will be removed by October 15 of each season. Wetted areas of the creek bottom outside of the primary flow channel will be filled and graded with temporary gravel pads to allow work to be performed above any flowing or standing water. Any off-channel flow will be redirected towards the single primary flow channel. Work will also commence from the southeast quadrant of the project site. Work performed will be within the proposed State ROW, and Temporary Construction Easements. Temporary access pad fill may be placed within the wetted perimeter. Temporary trestles of approximately 30 by 60 feet will be placed along the east side of the channel.

Temporary fill, including the temporary trestle, will be removed by October 15. Sheet piling or other shoring system will be used along the road centerline to maintain the existing roadway section. The temporary shoring will be left in place between the first season and second season to protect the existing roadway and to protect the existing abutment from scour. The top of the shoring will be installed to the existing roadway grade or higher and will be installed or cut flush with the abutments so that the sheet piles do not obstruct the waterway during higher winter flows.

Once Stage 1 (southern half of the new bridge and roadway section) is completed, traffic will be shifted from the existing to new structure and roadway section. If time permits, the contractor may start construction on the northerly portion of the new structure during the first construction season.

7. Change the Phase 2/Stage 2 description on page 5 from:

Phase 2: Caltrans will shift traffic to the new structure, demolish the remaining portion of the existing bridge, build the northern half of the new bridge, and connect the two new half bridges with final closure pour to form one bridge.

To:

Stage 2: During Stage 2, most of the work will occur along the north side of the new replacement bridge alignment. The contractor will remove the remaining existing structure including the foundation piles to at least 3 feet below the existing grade. A protective cover and fill pad placed on the creek bottom will be used to prevent concrete debris from falling onto the creek bottom. The contractor will then build the northern half of the bridge similar to the southern half. A closure pour will be used to connect the Stage 1 and Stage 2 bridge segments together. The contractor will construct the northwest and northeast retaining walls and embankments concurrently with the bridge construction.

During Stage 2 (the second construction season), the contractor will use the northern temporary access road and reestablish the southern access to work on the Stage 2 bridge construction. The southern access will require the contractor to pass under the Stage 1 bridge construction limiting its use to small equipment and foot-traffic. Large equipment

will operate primarily from the existing bridge, new bridge, or through the development of a northern access using temporary fill pads and crane mats. If needed, direct access across the creek will be through the use of a temporary trestle, as described in Stage 1.

8. Change the Phase 3 description on page 5 from:

Phase 3: Caltrans will remove the interior retaining walls and build two type 26 80SW rail barriers to provide a standard width of 40 feet (for two 12 foot travel lanes and two 8 foot shoulders). Standard sidewalks will also be built on both sides of the bridge. Construction access to the proposed project site will be provided via the existing roadway, a temporary access road on the southwest side of SF 12, and possibly by a 20-foot-wide temporary construction access road along the northern edge of State Route 12. Staging of all necessary equipment and materials will occur within an approximately 22,000-square foot staging area north of State Route 12.

To:

Stage 3: During Stage 3 which will also occur during the second construction season, the remaining concrete barrier (type 80 SW) will be placed along the southern side. The contractor will access this work from the roadway.

Once construction is completed, all temporary fills and other temporary works will be removed. Any voids remaining from the removal of existing foundations will be filled with native material. (This will occur in Stage 2 or Stage 3, depending on if the contractor finishes Stage 3 within the construction window).

9. Delete the fourth and fifth paragraphs of the Phase 3 description on page 5 beginning with "One pole will be relocated..." and "The utility company equipment will access..." Replace these two paragraphs with:

Utility Relocation. Utility relocation construction will be scheduled for summer 2012. Electrical lines will be rerouted from along the south side of the bridge to the north side. All electrical poles will be relocated, within the described project footprint, and most of the poles will be relocated to the north side of the bridge. Some willows and trees will be trimmed. A gas line, currently attached to existing bridge, will be relocated and bored underground on the north side, using a directional drill. The bore will be approximately 850 feet long, as much as 50 feet deep, and 40 feet below the bottom of the creek channel. The 4-inch gas courier pipe will be inside an 8-inch steel casing pipe.

10. Change the second complete paragraph on page 6 from:

Construction of the proposed project is expected to commence in June 2011 and to be complete by August 2013. In general, construction activities will occur between mid-June and mid-October of each year to minimize potential project-related effects on fish species.

To:

Construction is scheduled to start June 2013 and end December 2015. The construction window will span two years to accommodate utility relocation, including Pacific Gas and Electric gas and electric line relocation during the summer of 2012. Construction activities in or near water will occur between June 15 and October 15 of each year to minimize potential adverse effects to listed salmonids. Other scoped work such as roadway widening, sidewalk, driveway and bus stop construction may take place simultaneously with the bridge construction work or during the non-dry season.

11. Throughout the biological opinion change the Service's Law Enforcement contact from:

Dan Crum of the Service's Law Enforcement Division at (916) 414-6660.

To:

Resident Agent-in-Charge of the Service's Law Enforcement Division at (916) 414-6660.

12. Delete *Proposed Conservation Measure 1* on page 7 due to the completion of two-year protocol surveys since the issuance of the March 3, 2010, Biological Opinion.

13. Change *Proposed Conservation Measure 8* on page 8 from:

Based on the ratios stated in Service 2007, Caltrans will minimize the effects associated with the loss of 0.23 acre of suitable Burke's goldfields, Sonoma sunshine and Sebastopol meadowfoam habitat with the credit purchase or preservation of 0.23 acre of occupied or established habitat and 0.1 acre of established habitat for Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam from an appropriate Service-approved conservation bank within the Santa Rosa Plain within 60 calendar days prior to initial ground breaking on the construction project.

Caltrans will provide the Service with the appropriate documents indicating that credits have been purchased no later than thirty (30) calendar days before groundbreaking, specifically including the amount of credits purchased based on the actual area affected by the proposed action.

To:

Based on the ratios stated in the 2007 Programmatic Biological Opinion for the Santa Rosa Plain Conservation Strategy, Caltrans will minimize the effects associated with the loss of 0.194 acre of suitable Burke's goldfields, Sonoma sunshine and Sebastopol meadowfoam habitat with the credit purchase or preservation of 0.2 acre of occupied or established habitat and 0.1 acre of established habitat for Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam from an appropriate Service-approved

conservation bank within the Santa Rosa Plain within 60 calendar days prior to initial ground breaking on the construction project.

Caltrans proposes to purchase 0.1 acre of Sebastopol meadowfoam credits from the Swift/Turner Conservation Bank. Caltrans will also purchase 0.1 acre of Sonoma sunshine credits and 0.1 acre of Burke's goldfields credits from the Alton North conservation bank.

(The second paragraph is deleted.)

14. Change *Proposed Conservation Measure 11* on page 8 from:

Biological Monitoring and Environmental Training. Caltrans will provide appropriate biological monitoring staff (Service-approved biologist and botanist) to meet the requirements established in this biological opinion. At least fifteen (15) days prior to the onset of construction activities Caltrans will submit the names(s) and credentials of biologists who will conduct activities specified in the following measures. The main responsibility of the Service-approved biologist and botanist will be to minimize the potential take of listed species and disturbance of sensitive environmental resources during construction activities. This will be accomplished through implementation of the projects' environmental commitments, conservation and avoidance measures to achieve environmental compliance with all the permit conditions. Specific tasks to be carried out by the biological monitor(s) include the following:

To:

Biological Monitoring and Environmental Training. Caltrans will provide appropriate biological monitoring staff (Service-approved biologist that is a botanist) to meet the requirements established in this biological opinion. At least fifteen (15) days prior to the onset of construction activities Caltrans will submit the names(s) and credentials of biologists who will conduct activities specified in the following measures. The main responsibility of the Service-approved botanist will be to minimize the potential take of listed species and disturbance of sensitive environmental resources during construction activities. This will be accomplished through implementation of the projects' environmental commitments, and conservation and avoidance measures to achieve environmental compliance with all the permit conditions. Specific tasks to be carried out by the biological monitor(s) include the following:

15. Change *Proposed Conservation Measure 11a* on page 9 from:

The designated Service-approved biologist and botanist will inform field management and construction personnel of the need to avoid and protect resources. A worker environmental awareness program will be prepared and delivered to construction personnel. An outline of the employee environmental awareness program will be submitted to Ryan Olah, CoastBay/Forest Foothill Division Chief, Endangered Species Program, within twenty (20) working days prior to the start of construction. The program

will focus on the conservation measures that are relevant to employee's personal responsibility. The program will provide workers with information on their responsibilities with regard to the listed plants. Construction personnel will be educated on the types of sensitive resources located in the project area and the measures required to avoid effects on these resources. Personnel will attend an environmental training program before groundbreaking activities for each individual construction contract. Materials covered in the training program will include environmental rules and regulations for the projects and requirements for limiting activities to the construction ROW and avoiding demarcated sensitive resources areas. Training will educate construction supervisors and managers on: the need for resource avoidance and protection; construction drawing format and interpretation; staking methods to protect resources; the construction process; roles and responsibilities; project management structure and contacts; environmental commitments; and emergency procedures. Documentation of the training, including individual signed affidavits, will be submitted to the Service with the annual compliance report.

To:

The designated Service-approved botanist(s) will inform field management and construction personnel of the need to avoid and protect resources. A worker environmental awareness program will be prepared and delivered to construction personnel. An outline of the employee environmental awareness program will be submitted to the Coast-Bay/Forest Foothills Division Chief at the Sacramento Field Office of the Service within twenty (20) working days prior to the start of construction. The program will focus on the conservation measures that are relevant to employee's personal responsibility. The program will provide workers with information on their responsibilities with regard to the listed plants. Construction personnel will be educated on the types of sensitive resources located in the project area and the measures required to avoid effects on these resources. Personnel will attend an environmental training program before groundbreaking activities for each individual construction contract. Materials covered in the training program will include environmental rules and regulations and requirements for limiting activities to the construction ROW and avoiding demarcated sensitive resources areas. Training will educate construction supervisors and managers on: the need for resource avoidance and protection; construction drawing format and interpretation; staking methods to protect resources; the construction process; roles and responsibilities; project management structure and contacts; environmental commitments; and emergency procedures. Documentation of the training, including sign-in sheets, will be kept on file and made available to the Service upon request.

16. Change *Proposed Conservation Measure* 11b on page 9 from:

Proof of environmental training and fulfillment of compensation requirements will be provided to Ryan Olah, CoastBay/Forest Foothill, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, California 95825-1846.

To:

Proof of environmental training and fulfillment of compensation requirements will be provided to the Coast-Bay/Forest Foothills Division Chief at the Sacramento Field Office of the Service.

17. Change *Proposed Conservation Measure* 11d on page 10 from:

A Service-approved biologist and botanist (s) will be onsite during all activities that may result in the harm, destruction, malicious removal, and/or reduction of individuals of the three listed plants or their seed banks. The qualifications of the biologist and botanist(s) will be presented to the Service for review and written approval at least thirty (30) calendar days prior to ground-breaking at the project site. The Service-approved biologist and botanist(s) will keep a copy of this biological opinion in their possession when onsite. The Service-approved biologist and botanist(s) will be given the authority to communicate verbally or by telephone, electronic mail or hardcopy with Caltrans personnel, construction personnel or any other person(s) at the project site or otherwise associated with the project. The Service-approved biologist and botanist(s) will have oversight over implementation of the conservation measures in this biological opinion, and will have the authority to stop project activities if they determine any of the requirements associated with those measures are not being fulfilled. If the Service-approved botanist(s) exercises this authority, the Service will be notified by telephone and electronic mail within 24 hours. The Service contact will be considered Ryan Olah, Coast-Bay/Forest Foothill Division Chief, Endangered Species Program at the Sacramento Fish and Wildlife Office at telephone (916) 414-6600.

To:

A Service-approved biologist that is a botanist (s) will be onsite during all activities that may result in the harm, destruction, malicious removal, and/or reduction of individuals of the three listed plants or their seed banks. The qualifications of the botanist(s) will be presented to the Service for review and written approval at least thirty (30) calendar days prior to ground-breaking at the project site. The Service-approved botanist(s) will keep a copy of this biological opinion in their possession when onsite. Through the Resident Engineer or their designee, the Service-approved biological monitors will be given the authority to communicate either verbally, by telephone, e-mail message, or hardcopy with Caltrans personnel, construction personnel or any other person(s) at the project site or otherwise associated with the project to ensure the terms and conditions of this biological opinion are met. If situations arise where the terms and conditions may not be met or are not being met, the biological monitor will inform the Resident Engineer, who has the authority to stop work. If the Resident Engineer exercises this authority, the Service will be notified by telephone and e-mail message within one working day. The Service contact is Ryan Olah, Coast-Bay/Forest Foothills Division Chief in the Sacramento Fish and Wildlife Office at (916) 414-6600. Discussions with the Resident Engineer, biological monitor, Caltrans staff, and Service staff, will take place to identify and inform actions to resolve the issue and to document decisions.

18. Change *Proposed Conservation Measure 11f* on page 10 from:

Twenty-four (24) hours prior to the start of construction, the Service-approved biologist and botanist will identify and mark sensitive wetland, vernal pool swales and/or riparian areas. The contractor will not disturb vernal pool swales, riparian or wetland areas, marked or otherwise, unless indicated on construction plans. Temporary siltation fencing will be installed in advance of construction activity as indicated on the construction plans. Physical protective measures will remain on site and in good repair until all construction activities in that zone are complete. Protective measures will be removed in consultation with the botanist and/or biological monitors.

To:

Twenty-four (24) hours prior to the start of construction, the Service-approved botanist will identify and mark sensitive wetland, vernal pool swales and/or riparian areas. The contractor will not disturb vernal pool swales, riparian or wetland areas, marked or otherwise, unless indicated on construction plans. Temporary siltation fencing will be installed in advance of construction activity as indicated on the construction plans. Physical protective measures will remain on site and in good repair until all construction activities in that zone are complete. Protective measures will be removed in consultation with the botanist and/or biological monitors.

19. Change *Proposed Conservation Measure 11g* on page 11 from:

The Service-approved biologist and botanist(s) will ensure that the spread or introduction of invasive exotic plant species will be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas will be removed.

To:

The Service-approved botanist (s) will ensure the spread or introduction of invasive exotic plant species will be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas will be removed.

20. Change *Proposed Conservation Measure 14* on page 13 from:

Access Points, Vehicle Parking and Staging Areas. Construction access points and staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants will be restricted to ruderal or developed lands and within the described construction footprint and will not be located in any areas that support sensitive habitat. These locations have been identified as the bridge and within Village Park Campground, the Brown Farm, and the Laguna de Santa Rosa Wetlands Preserve (LSRWP). An additional staging area has been identified within the LSRWP adjacent to a Chevron gas station, which has an existing access road to the staging site. All required BMPs for Storm Water Pollution Prevention will be implemented in staging areas.

If on-site staging is not sufficient for construction operations, off-site staging may be considered. A Service-approved biologist and botanist will survey any proposed off-site staging area to determine if sensitive resources are located on the site that would be disturbed by staging activities. If sensitive resources are found, an appropriate buffer zone will be staked and flagged as necessary to avoid impacts. If sensitive resources cannot be avoided, the site will not be used. The following additional measures refer to staging, storage, vehicle parking, and access areas:

- a. Contractors may independently seek off-site staging locations. Caltrans will either obtain or ensure that its contractor obtains all required regulatory permits, including approval of the Service, for off-site construction access points and staging areas. Offsite staging locations will be subject to the requirements of resource agencies and permits will be the responsibility of the contractor.
- b. Caltrans will require as part of the construction contract that all contractors comply with the Act in the performance of the work as described in the project description of this biological opinion and conducted within the action area.
- c. If a staging, storage, access, or vehicle parking area that is in compliance with the Act is not available, the agency with jurisdiction and the contractor would be responsible for compliance with the Act.

To:

Access Points, Vehicle Parking and Staging Areas. Construction access points and staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants will be restricted to ruderal or developed lands and within the described construction footprint and will not be located in any areas that support sensitive habitat. These locations have been identified as the bridge and within Village Park Campground, the Brown Farm, and the LSRWP. An additional staging area has been identified within the LSRWP adjacent to a Chevron gas station, which has an existing access road to the staging site. All required BMPs for Storm Water Pollution Prevention will be implemented in staging areas.

Caltrans will require all contractors to comply with the Act in the performance of the action and shall perform the action as outlined in the *Description of the Proposed Project* of this biological opinion as provided by Caltrans in the September 13, 2010, request for reinitiation, additional project information provided on September 27, 2011, and all other supporting documentation submitted to the Service. Caltrans shall include language in their contracts that expressly requires contractors and subcontractors to work within the boundaries of project footprint identified in this biological opinion, including vehicle parking, staging, laydown areas, and access roads.

21. Change the *Action Area* section on page 15 from:

The action area is defined in 50 CFR § 402.02, as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.” The Laguna de Santa Rosa Bridge (Caltrans Bridge Number 20-0035) is located at PM 9.6 on State Route 12, east of the City of Sebastopol in Sonoma County, California. The project is located within the Sebastopol 7.5-minute United States Geological Survey (USGS) quadrangle (Section 35, Township 7N, Range 9W, 38.40348 N/122.81616 W [NAD83]). The project is located on the western edge of the Santa Rosa Plain and is included in the area addressed by the Final Santa Rosa Plain Conservation Strategy (SRPCS) Team, 2007). The action area covered encompasses the project footprint, equipment staging and lay down areas, construction access roads, temporary creek diversion, Caltrans ROW limits, construction easements, and adjacent lands that will be subjected to noise, light, and vibration disturbance as described in the project description provided in this biological opinion. The project footprint is approximately 1.20 acres and includes all areas that will be permanently affected by the project. The construction staging and access areas are all those areas that will be temporarily used during project construction, which comprise approximately 2.93 acre. The total action area is approximately 4.13 acres.

To:

The action area is defined in 50 CFR § 402.02, as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” The Laguna de Santa Rosa Bridge (Caltrans Bridge Number 20-0035) is located at PM 9.6 on State Route 12, east of the City of Sebastopol in Sonoma County, California. The project is located within the Sebastopol 7.5-minute USGS quadrangle (Section 35, Township 7N, Range 9W, 38.40348 N/122.81616 W [NAD83]). The project is located on the western edge of the Santa Rosa Plain and is included in the area addressed by the Final SRPCS Team, 2007). The action area covered encompasses the project footprint, equipment staging and lay down areas, construction access roads, temporary creek diversion, Caltrans ROW limits, construction easements, and adjacent lands that will be subjected to noise, light, and vibration disturbance as described in the project description provided in this biological opinion. The project footprint is approximately 0.95 acres and includes all areas that will be permanently affected by the project. The construction staging and access areas are all those areas that will be temporarily used during project construction, which comprise approximately 3.70 acres. The total action area is approximately 4.65 acres.

22. Change the last paragraph of the Burke’s goldfields Environmental Baseline on page 22 from:

Caltrans identified 0.24 acre of suitable habitat in the action area for Burke’s goldfields but did not observe this listed plant as a result of a 2009 special-status plant survey (GANDA 2009). Although the Laguna de Santa Rosa Bridge Replacement project is located within the range of Burke’s goldfields. Protocol-level surveys conducted in 2005,

2006, and 2009, on a portion of the action area (Village Park Campground) where suitable plant habitat was identified, did not result in the observation of listed plants but did identify at least 0.24 acre of suitable habitat for Burke's goldfields. Burke's goldfields may be represented in the existing seed bank and therefore individual(s) may have been present but not observed during the surveys. Therefore, given the ecology and biology of the species, especially its ability to persist undetected in the seed form, the presence of suitable habitat, and the recent nearby records, it is likely Burke's goldfields inhabit the action area.

To:

Protocol-level surveys conducted in 2005, 2006, 2009, and 2010 did not result in the observation of listed plants but did identify at least 0.194 acre of suitable habitat for Burke's goldfields (GANDA 2009, 2010). Burke's goldfields may be represented in the existing seed bank and therefore individual(s) may have been present but not observed during the surveys. Therefore, given the ecology and biology of the species, especially its ability to persist undetected in the seed form, the presence of suitable habitat, and the recent nearby records, it is likely Burke's goldfields inhabit the action area.

23. Change the last paragraph of the Sonoma sunshine *Environmental Baseline* on page 23 from:

The Laguna de Santa Rosa Bridge Replacement project is located within the distribution range of the Sonoma sunshine. Protocol-level surveys conducted in 2005, 2006, and 2009, on a portion of the action area (Village Park Campground) where suitable plant habitat was identified, did not result in the observation of listed plants but did identify at least 0.24 acre of suitable habitat for Sonoma sunshine. Sonoma sunshine may be represented in the existing seed bank and an individual(s) may have been present but not observed during the surveys. Therefore, given the ecology and biology of the species, especially its ability to persist undetected in the seed form, the presence of suitable habitat, and the recent nearby records, it is likely Sonoma sunshine inhabit the action area.

To:

The Laguna de Santa Rosa Bridge Replacement project is located within the range of the Sonoma sunshine. Protocol-level surveys conducted in 2005, 2006, 2009, and 2010 did not result in the observation of listed plants but did identify at least 0.194 acre of suitable habitat for Sonoma sunshine. Sonoma sunshine may be represented in the existing seed bank and an individual(s) may have been present but not observed during the surveys. Therefore, given the ecology and biology of the species, especially its ability to persist undetected in the seed form, the presence of suitable habitat, and the recent nearby records, it is likely Sonoma sunshine inhabit the action area.

24. Change the last paragraph of the Sebastopol meadowfoam *Environmental Baseline* on page 23 from:

The Laguna de Santa Rosa Bridge Replacement project is located within the distribution range of the Sebastopol meadowfoam. Protocol-level surveys conducted in 2005, 2006, and 2009, on a portion of the action area (Village Park Campground) where suitable plant habitat was identified, did not result in the observation of listed plants but did identify at least 0.24 acre of suitable habitat for Sebastopol meadowfoam. Sebastopol meadowfoam may be represented in the existing seed bank and an individual(s) may have been present but not observed during the surveys. Therefore, given the ecology and biology of the species, especially its ability to persist undetected in the seed form, the presence of suitable habitat, and the recent nearby records, it is likely Sebastopol meadowfoam inhabit the action area.

To:

The Laguna de Santa Rosa Bridge Replacement project is located within the distribution range of the Sebastopol meadowfoam. Protocol-level surveys conducted in 2005, 2006, 2009, and 2010 did not result in the observation of listed plants but did identify at least 0.194 acre of suitable habitat for Sebastopol meadowfoam. Sebastopol meadowfoam may be represented in the existing seed bank and an individual(s) may have been present but not observed during the surveys. Therefore, given the ecology and biology of the species, especially its ability to persist undetected in the seed form, the presence of suitable habitat, and the recent nearby records, it is likely Sebastopol meadowfoam inhabit the action area.

25. Change the last two paragraphs of the Direct Effects section on page 24 from:

The proposed project will eliminate suitable habitat and may cause loss of individual Sebastopol meadowfoam, Sonoma sunshine and Burke's goldfields and their seeds within the seed bank. Implementation of the proposed project will result in direct, permanent effects to approximately 0.23 acre of currently suitable habitat within the action area. The 0.23 acre is the total for 0.0337 acre of effects as a result of utility pole installation and 0.20 acre for bridge widening and construction within suitable vernal pool plant habitat.

Preservation of 0.23 acre of occupied or established habitat and 0.1 acres of established habitat within Service-approved mitigation banks, reserves, or acquired habitat to compensate for the direct loss of habitat would likely benefit the Sebastopol meadowfoam, Burke's goldfields, and Sonoma sunshine by contributing to their overall recovery. Minimal adverse effects may occur on some of the proposed mitigation banks and preserves as part of their establishment and management, but overall these mitigation banks and preserves are anticipated to have a net beneficial effect for the three listed plants. Implementation of a management plan for each of the mitigation banks and preserves likely would ensure that the conservation values for the bank or preserve would be maintained to provide optimal habitat conditions for these listed plants.

To:

The proposed project will eliminate suitable habitat and may cause loss of individual Sebastopol meadowfoam, Sonoma sunshine, and Burke's goldfields and their seeds within the seed bank. Implementation of the proposed project will result in direct, permanent effects to approximately 0.194 acre of currently suitable habitat within the action area.

Purchase 0.1 acre of Sebastopol meadowfoam credits from the Swift/Turner Conservation Bank and 0.1 acre of Sonoma sunshine credits and 0.1 acre of Burke's goldfields credits from the Alton North Conservation Bank to compensate for the direct loss of 0.194 acre of habitat would likely benefit the three listed plants by contributing to their overall recovery. Minimal adverse effects may occur on some of the proposed conservation banks as part of their establishment and management, but overall these conservation banks are anticipated to have a net beneficial effect for the three listed plants. Implementation of a management plan for each of the conservation banks likely would ensure that the conservation values for the banks would be maintained to provide optimal habitat conditions for these listed plants.

26. Change the *Conclusion* section on page 26 from:

After reviewing the current status of the Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam, the environmental baseline for the action areas, and the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the Laguna de Santa Rosa Bridge Replacement Project is not likely to jeopardize the continued existence of these three listed vernal pool plant species. We based this determination on the following: (1) the effects analysis and compensation abide by the guidelines of the Conservation Strategy and; (2) conservation measures would be implemented to minimize the adverse effects to the listed plants. The loss of suitable habitat within the action area will be minimized by the preservation and management of 0.23 acre of occupied or established habitat and 0.1 acres of established habitat for the listed plants.

To:

After reviewing the current status of the Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam, the environmental baseline for the action areas, and the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the Laguna de Santa Rosa Bridge Replacement Project is not likely to jeopardize the continued existence of these three listed vernal pool plant species. We based this determination on the following: (1) the effects analysis and compensation abide by the guidelines of the Conservation Strategy and; (2) conservation measures would be implemented to minimize the adverse effects to the listed plants. The loss of suitable habitat within the action area will be minimized by the purchase 0.1 acre of Sebastopol meadowfoam credits from the Swift/Turner Conservation Bank and 0.1 acre of Sonoma

sunshine credits and 0.1 acre of Burke's goldfields credits from the Alton North conservation bank.

27. Change the Service contact on page 28 from "Maral Kasparian" to "John Cleckler".

28. Add the following reference to *Literature Cited*:

Garcia and Associates (GANDA). 2010. Special-Status Plant Surveys 2010, State Highway 12, Laguna de Santa Rosa Bridge, Sebastopol, Sonoma County, California. July 2010. Prepared by Ann Howald for Caltrans District 4, Oakland, California.

This concludes the reinitiation of formal consultation on the action for the proposed Caltrans State Route 12, Laguna de Santa Rosa Bridge Replacement Project in Sonoma County, California. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the effects to Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam, as analyzed in this biological opinion are exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

If you have any questions regarding this reinitiation of the biological opinion for the State Route 12, Laguna de Santa Rosa Bridge Replacement Project, State Route 12 in Sonoma County, California, please contact John Cleckler or Ryan Olah at the letterhead address or at (916) 414-6600.

Sincerely,



For

Susan K. Moore
Field Supervisor

cc:

Scott Wilson and Stephanie Buss, California Department of Fish and Game, Yountville, California

Stuart Kirkham and Jeffrey Jensen, California Department of Transportation, Oakland, California



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
81420-2009-F-0261-2

MAR 03 2010

Mr. James B. Richards
Attn: John Yeakel
California Department of Transportation
111 Grand Avenue
P.O. Box 23660
Oakland, California 94632

Subject: Biological Opinion for the Laguna de Santa Rosa Bridge Replacement Project,
State Route 12 in Sebastopol, Sonoma County, California (Caltrans EA 1A2900)

Dear Mr. Richards:

This letter is in response to your November 22, 2008, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Laguna de Santa Rosa Bridge Repair Project in Sebastopol, Sonoma County, California.

This document represents the Service's biological opinion on the effects of the proposed action on four endangered plant species: Sebastopol meadowfoam (*Limnanthes vinculans*), Sonoma sunshine (*Blennosperma bakeri*), and Burke's goldfields (*Lasthenia burkei*). This biological opinion is issued pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The proposed Laguna de Santa Rosa Bridge Replacement project may affect the Sebastopol meadowfoam, Sonoma sunshine, and Burke's goldfields due to presence of suitable habitat for these endangered vernal pool plant species within the action area. The project is unlikely to affect many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha*) due to the rarity of the species, with one population being eight miles away from the action area, and the low probability that the action area contains suitable habitat for this plant. Caltrans determined that the action will have no effect on the endangered Sonoma County distinct population segment (DPS) of the California tiger salamander (*Ambystoma californiense*).

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This document is based on: (1) A request for information letter to Caltrans from the Service dated October 10, 2006 regarding project effects to the four endangered vernal pool plant species; (2) the November 22, 2008, biological assessment submitted to the Service by Caltrans; (3) various correspondences with the Service and Caltrans; (4) the March 18, 2009, updated project description, layout plans and information on pending plant surveys; (5) Caltrans' September 30, 2009, and November 24, 2009, response letters to the Service's respective June 28, 2009, October 8, 2009, and October 20, 2009 electronic information requests; (6) Caltrans' revised December 30, 2009, project description; (7) a 2009 Special Status Plant Survey Report; (8) and other information available to the Service.

Consultation History

October 10, 2006	The Service issues a Request for Information letter regarding project effects to four endangered vernal pool plant species.
February 5, 2008	Electronic mail message (email) exchange between the Service and Caltrans regarding the status of the vernal pool plant biological assessment.
April 30, 2008	Email exchange between the Service and Caltrans regarding the status of the vernal pool plant biological assessment.
October 19, 2008	The Service and Caltrans conducted a site visit.
November 25, 2008	The Service received the November 2008 Biological Assessment for Endangered Vernal Pool Plants, State Route 12, Laguna de Santa Rosa Bridge Replacement Project Sonoma County, California (EA 1A2900) from Caltrans.
December 22, 2008	The Service issues a Request for Information letter for clarification of information in the November 25, 2008, biological assessment.
March 06, 2009	The Service receives responses to the December 22, 2008, letter and requests that Caltrans to incorporate information into project description.
March 18, 2009	The Service receives a biological description with updated project description and layout plans from Caltrans.
April 20, 2009 to June 5, 2009	Email exchange between the Service and Caltrans regarding compensation for project effects to vernal pool plant species; the Service makes recommendations regarding compensation ratios for effects to vernal pool plant species.

- June 23, 2009 The Service sends Caltrans an electronic correspondence with recommendations regarding compensation ratios for effects to vernal pool plant species.
- July 20, 2009 The Service sends Caltrans an electronic inquiry regarding their response to the Service's electronic correspondence about compensation for project effects to plant species.
- July 21, 2009 Caltrans responds to the Service's July 20, 2009, inquiry stating they will respond in the near future.
- August 24, 2009 The Service sends Caltrans an electronic inquiry regarding their response status.
- September 2, 2009 Caltrans responds to the Service's August 24, 2009, electronic inquiry stating they are producing a response document.
- October 8, 2009 The Service receives an electronic version of the September 30, 2009, Signed Mitigation Letter from Caltrans which includes a revised project description with changes to plant compensation and a reduced project footprint.
- October 8, 2009 The Service sends an electronic correspondence request for clarification of information received in Caltrans' September 30, 2009, Signed Mitigation letter.
- October 9, 2009 The Service receives hard copies of Caltrans' September 30, 2009, Signed Mitigation letter and the 2009 Special-Status Plant Survey Report.
- October 12, 2009 The Service receives Caltrans' utilities and plant maps by electronic correspondence.
- October 20, 2009 The Service sends Caltrans two email correspondences regarding the September 30, 2009, Signed Mitigation Letter requesting additional information for the reduced footprint and plant compensation ratios.
- November 17, 2009 The Service sends Caltrans an electronic inquiry regarding their response status to the October 20, 2009, requests for additional information.
- November 25, 2009 The Service receives an electronic letter and maps from Caltrans dated November 24, 2009, responding to the Service's October 8, 2009, and November 17, 2009, electronic requests for information.

- December 8, 2009 The Service sends Caltrans an electronic correspondence requesting clarification about affected suitable plant habitat acreage.
- December 12, 2009 The Service receives Caltrans' response by email to the December 8, 2009, inquiry about affected suitable plant habitat acreage.
- December 12, 2009 The Service requests by electronic correspondence for Caltrans to revise their original project description with information provided in the September 30, 2009, and November 24, 2009, letters and resend the revised project description to the Service.
- December 30, 2009 The Service receives a hardcopy of the most current project description from Caltrans.

BIOLOGICAL OPINION

Description of Proposed Action

The following project description, inclusive of the proposed compensation, avoidance and minimization measures, was provided by Caltrans and is an excerpt from Caltrans' *State Route 12 Laguna de Santa Rosa Bridge Replacement Project, March 2009, Biological Assessment for Endangered Vernal Pool Plants* and Caltrans' *December 29, 2009, updated project description* with minor modifications for reasons of clarity and accuracy provided by the Service. A comprehensive description of the project is available in both aforementioned documents.

Caltrans proposes to replace the Laguna de Santa Rosa Bridge with a new two-lane bridge that complies with the current Caltrans roadway standards of 12.0-foot lane widths and 8.0-foot shoulder widths. The proposed bridge structure is a Precast/Prestress (PC/PS) I-girder bridge 231 feet in length, consisting of three equal spans 77 feet in length. The bridge will be widened to 58 feet to conform to current standards. Post-construction operations and maintenance activities will remain the same as pre-project actions.

The new bridge alignment will be shifted to the south to avoid and minimize impacts to aquatic and wetland resources present within the vicinity of the proposed project. Caltrans proposes to construct half of the new bridge on the south side of the existing one, demolish the existing bridge, and rebuild the second half of the new bridge on the north side. The new bridge profile will be elevated approximately 2.6 to 2.9 feet, which will require new roadway overlay to conform the existing roadway to the new structure. The proposed bridge design will require the construction of retaining walls on the northeast, southeast and southwest corners of the new structure. The retaining walls are a design feature intended to minimize the amount of earthwork, right of-way (ROW) acquisitions, and impacts to biologically sensitive resources within the project footprint.

The proposed project will be constructed in three phases:

Phase 1: Caltrans will remove the existing sidewalk on the north, widen the existing roadway at both ends of the bridge, and install retaining walls and embankments on the approaches to the bridge. Traffic will be redirected to the north while Caltrans demolishes the southern portion of the existing bridge and replaces it with the proposed new structure.

Phase 2: Caltrans will shift traffic to the new structure, demolish the remaining portion of the existing bridge, build the northern half of the new bridge, and connect the two new half bridges with final closure pour to form one bridge.

Phase 3: Caltrans will remove the interior retaining walls and build two type 26 80SW rail barriers to provide a standard width of 40 feet (for two 12 foot travel lanes and two 8 foot shoulders). Standard sidewalks will also be built on both sides of the bridge. Construction access to the proposed project site will be provided via the existing roadway, a temporary access road on the southwest side of SF 12, and possibly by a 20-foot-wide temporary construction access road along the northern edge of State Route 12. Staging of all necessary equipment and materials will occur within an approximately 22,000-square foot staging area north of State Route 12.

This is a replacement of an existing structure in the same location, which will only slightly increase the footprint and will not have a significant change to the overall vernal pool hydrology of the site. Within the construction access and staging areas, Caltrans proposes to place geofabric at ground level and place dirt over the fabric to establish construction access roads. To preserve topography and hydrology, no cut or fill activities will take place in these areas.

This project will require the acquisition of ROW on both sides of the highway as well as a temporary construction easement and utility easement. The embankment on the northeast quadrant of the bridge still falls within the existing Caltrans ROW, but additional ROW will be needed in other locations. A total of seven (7) parcels will be partially affected. It is anticipated that approximately 20 utility poles will need to be relocated for this project, however the exact locations will be determined at a later phase of the project.

One pole will be relocated in an area of suitable listed plant habitat where two years of protocol-level surveys have not been completed. The permanent effects to suitable listed plant habitat from one utility pole relocation will be approximately 0.0001 acre. The temporary effects will be approximately 0.0337 acre for access.

The utility company equipment will access the area from the Village campground parking lot. The pole relocation will take approximately three weeks. Remaining poles will be relocated within areas that have two years of protocol-level surveys completed, or are outside of suitable habitat and are within Caltrans ROW. The gas line, water line, and storm drain on the north side of State Route 12 will also need to be relocated. All utility relocations will take place within the

proposed project footprint. The exact locations for the relocated utilities will be determined at a later phase in the design process.

The storm drain specifications will include Caltrans install longitudinal drainage in the Northwest quadrant, the Southwest quadrant, and the Northeast quadrant of the project. In all cases the drainage will consist of a series of State Standard G2 drainage inlets and 18-inch pipe. The pipe, which will primarily be in the roadway shoulder and running longitudinally to the highway, will be plastic, concrete or metal. In the Northwest and Southwest quadrants this system replaces the existing system because it is not in the correct location after the widening. On the west-side of the bridge, the south side system will be connected with the northside system so there will be only one outfall near the bridge abutment. On the eastside of the bridge, the longitudinal drainage system in the Northeast quadrant will extend approximately 500 feet east of the bridge where it will outfall into a swale. This swale drains to the west back toward the main channel of the Laguna. The exact location and dimensions of the relocated storm drain will be determined at a later phase in the design process.

Construction of the proposed project is expected to commence in June 2011 and to be complete by August 2013. In general, construction activities will occur between mid-June and mid-October of each year to minimize potential project-related effects on fish species.

Equipment

Cranes will be used for multiple parts of the construction from setting up of the trestle and pile driving to delivery of materials and setting precast girders. Excavators will be used for excavation at the abutments. Drilling equipment will be used to clean out the cast in steel shell piles. Concrete pumps will be used to place any cast-in-place concrete for the structure. Baker tanks may be used to store water prior to discharge from dewatered excavations and piles. Other equipment may include loaders, manlifts, paver, hoeram, jackhammers, backhoes, dozers, gradalls, and compaction equipment.

Construction access points and staging areas

Construction access points and staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants will be on ruderal or developed lands and within the construction right-of-way and will not be located in any areas that support sensitive habitat. During the first construction season, contractor equipment would access the creek from the Village Campground driveway and from the area south of the existing highway, within the proposed State ROW and the surveyed habitat area. During the second construction season, construction equipment would be on the new bridge, to install the piles for the northern half of the bridge.

Caltrans' Proposed Conservation Measures

Caltrans proposes to avoid and minimize, for effects to the Sonoma sunshine, Sebastopol meadowfoam and Burke's goldfields through the following measures:

1.  Pre-construction Surveys: Pre-construction surveys for federally-listed plants will be conducted in all areas of currently suitable habitat that did not undergo complete 2-year protocol surveys following the Santa Rosa Plain Conservation Strategy guidance and are located within the project footprint. In the event that a special-status plant(s) is found during pre-construction surveys, the resource agencies would be contacted, and the appropriate avoidance and minimization actions would be determined. Protocol rare plant surveys will be conducted as pre-construction measures, and the results of these surveys will be provided to the Service. If populations of Burke's goldfields and Sonoma sunshine are found within the area during the protocol surveys, then additional mitigation will be purchased per the ratios provided in the 2007 Programmatic Biological Opinion for the U.S. Army Corps of Engineers Permitted Project that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Service File 81420-2008-F-0261). If a population of greater than 2,000 individuals of any of the three species is found, Caltrans will re-initiate consultation with the Service. If no listed plant populations are found during protocol surveys, compensation will only be purchased following the ratio for effects to suitable habitat for Sebastopol meadowfoam.
2. Environmentally Sensitive Area (ESA) Fencing: All areas with currently suitable habitat located adjacent to the construction zone will be protected with ESA fencing and will be clearly marked to avoid inadvertent encroachment of personnel or equipment beyond the designated work area.
3. Site Access and Staging Areas: To the extent possible, construction access, staging, storage, and parking areas will be located on ruderal or developed lands within the Caltrans ROW and will not be located in any areas designated as suitable plant habitat.
4. Erosion Control: Erosion control measures will be implemented to minimize the potential for stormwater runoff or other construction debris to enter suitable habitat adjacent to the construction zone. Coir rolls, silt fencing, and/or other erosion control measures will be installed around the perimeter of the construction zone in locations within or adjacent to designated suitable habitat. Erosion control measures and buffers will also be implemented during revegetation of areas adjacent to designated suitable habitat.
5. Revegetation: Following construction, temporarily disturbed areas will be revegetated with a suitable erosion control mix. All project effects to seasonal wetlands and suitable, rare plant habitat are considered permanent when determining the level of compensation, since the proposed project will be constructed over two growing seasons. However, the

"temporary" disturbed areas such as construction access and staging areas, are not in the footprint of the bridge structure, and will be available for revegetation following the two dry seasons of construction. The word "temporary" was used in this context to express that the area would be available for revegetation following construction.

6. **Dust Control:** A speed limit of 15 miles per hour in unpaved areas within the action area will be enforced to reduce dust and excessive soil disturbance. Caltrans will implement all appropriate Best Management Practices (BMP) for dust control. Caltrans typically uses water trucks for dust control.
7. **Spill Control:** The Contractor, as required by standard specifications, will implement spill and leak prevention procedures when chemicals or hazardous substances are stored. Spills of petroleum products, substances listed under CFR Title 40, Parts 110, 117 and 302, as well as sanitary and septic waste will be contained and cleaned up as soon as it is safe.
8. Based on the ratios stated in Service 2007, Caltrans will minimize the effects associated with the loss of 0.23 acre of suitable Burke's goldfields, Sonoma sunshine and Sebastopol meadowfoam habitat with the credit purchase or preservation of 0.23 acre of occupied or established habitat and 0.1 acre of established habitat for Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam from an appropriate Service-approved mitigation bank within the Santa Rosa Plain within 60 calendar days prior to initial ground breaking on the construction project.

Caltrans will provide the Service with the appropriate documents indicating that credits have been purchased no later than thirty (30) calendar days before groundbreaking, specifically including the amount of credits purchased based on the actual area affected by the proposed action.

9. If requested, before, during, or upon completion of ground breaking and construction activities, Caltrans will allow access by Service and/or CDFG personnel to the project site to inspect project effects to the three listed plants and habitat.
10. **Construction Windows:** Construction will be limited to the dry season June 1st- October 15, in or near aquatic habitat when drainages and wetlands would be either dry or at their lowest water level to minimize impacts to aquatic resources or soil hydrology. Vegetation clearing will be confined to the minimal area, within the action area footprint and construction access and staging areas, necessary to facilitate construction activities. Plant habitat that can be avoided during construction will be flagged and designated as an Environmentally Sensitive Area. All construction personnel will avoid these Environmentally Sensitive Areas.

11. Biological Monitoring and Environmental Training. Caltrans will provide appropriate biological monitoring staff (Service-approved biologist and botanist) to meet the requirements established in this biological opinion. At least fifteen (15) days prior to the onset of construction activities Caltrans will submit the names(s) and credentials of biologists who will conduct activities specified in the following measures. The main responsibility of the Service-approved biologist and botanist will be to minimize the potential take of listed species and disturbance of sensitive environmental resources during construction activities. This will be accomplished through implementation of the projects' environmental commitments, conservation and avoidance measures to achieve environmental compliance with all the permit conditions. Specific tasks to be carried out by the biological monitor(s) include the following:

- a. The designated Service-approved biologist and botanist will inform field management and construction personnel of the need to avoid and protect resources. A worker environmental awareness program will be prepared and delivered to construction personnel. An outline of the employee environmental awareness program will be submitted to Chris Nagano, Division Chief, Endangered Species Program, within twenty (20) working days prior to the start of construction. The program will focus on the conservation measures that are relevant to employee's personal responsibility. The program will provide workers with information on their responsibilities with regard to the listed plants. Construction personnel will be educated on the types of sensitive resources located in the project area and the measures required to avoid effects on these resources. Personnel will attend an environmental training program before groundbreaking activities for each individual construction contract. Materials covered in the training program will include environmental rules and regulations for the projects and requirements for limiting activities to the construction right-of-way and avoiding demarcated sensitive resources areas. Training will educate construction supervisors and managers on: the need for resource avoidance and protection; construction drawing format and interpretation; staking methods to protect resources; the construction process; roles and responsibilities; project management structure and contacts; environmental commitments; and emergency procedures. Documentation of the training, including individual signed affidavits, will be submitted to the Service with the annual compliance report.
- b. Proof of environmental training and fulfillment of compensation requirements will be provided to Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, California 95825-1846.
- c. There will be an adequate number of Service-approved biologists to monitor the effects of the project on Sebastopol meadowfoam, Burke's goldfields, and

Sonoma sunshine. The number of Service-approved biologists who are on site will be determined by the Service, CDFG, and/or the Caltrans biologist.

- d. A Service-approved biologist and botanist (s) will be onsite during all activities that may result in the harm, destruction, malicious removal, and/or reduction of individuals of the three listed plants or their seed banks. The qualifications of the biologist and botanist(s) will be presented to the Service for review and written approval at least thirty (30) calendar days prior to ground-breaking at the project site. The Service-approved biologist and botanist(s) will keep a copy of this biological opinion in their possession when onsite. The Service-approved biologist and botanist(s) will be given the authority to communicate verbally or by telephone, electronic mail or hardcopy with Caltrans personnel, construction personnel or any other person(s) at the project site or otherwise associated with the project. The Service-approved biologist and botanist(s) will have oversight over implementation of the conservation measures in this biological opinion, and will have the authority to stop project activities if they determine any of the requirements associated with those measures are not being fulfilled. If the Service-approved botanist(s) exercises this authority, the Service will be notified by telephone and electronic mail within 24 hours. The Service contact will be Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office at telephone (916) 414-6600.
- e. The Resident Engineer or their designee will be responsible for implementing the conservation measures in this biological opinion and will be the point of contact for the proposed action. The Resident Engineer or their designee will maintain a copy of this biological opinion onsite whenever construction is in progress. Their name(s) and telephone number(s) will be provided to the Service at least thirty (30) calendar days prior to ground-breaking at the project. Prior to ground-breaking, the Resident Engineer will submit a letter to the Service verifying he/she is in possession of a copy of this biological opinion and has read and understands the conservation measures.
- f. Twenty-four (24) hours prior to the start of construction, the Service-approved biologist and botanist will identify and mark sensitive wetland, vernal pool swales and/or riparian areas. The contractor will not disturb vernal pool swales, riparian or wetland areas, marked or otherwise, unless indicated on construction plans. Temporary siltation fencing will be installed in advance of construction activity as indicated on the construction plans. Physical protective measures will remain on site and in good repair until all construction activities in that zone are complete. Protective measures will be removed in consultation with the botanist and/or biological monitors.

- g. The Service-approved biologist and botanist(s) will ensure that the spread or introduction of invasive exotic plant species will be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas will be removed.
12. Erosion and Sediment Control Plan. Caltrans will prepare and implement an erosion control and restoration plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities. The plan will include all the necessary local jurisdiction requirements regarding erosion control and will implement BMP's for erosion and sediment control as required. Only appropriate native plant material will be used for erosion control and restoration. Erosion control measures will be implemented to minimize the potential for stormwater runoff or construction debris to enter suitable habitat adjacent to the construction zone. Coir rolls, silt fencing, and/or other erosion control measures will be constructed around the perimeter of the construction zone in locations within or adjacent to designated suitable habitat. Erosion control measures and buffers will also be implemented during revegetation of areas adjacent to designated suitable habitat. Erosion control will be placed on all disturbed slopes at the top or bottom of slopes, or on the slope if it is more than 20 feet long down the slope. Erosion control will be placed at material disposal sites as directed by the Caltrans Erosion Control Branch.
 13. Storm Water Pollution Prevention Plan (SWPPP). Caltrans will submit to the Regional Water Quality Control Board (RWQCB) a notice of intent to discharge stormwater before construction and/or operation activities begin and will develop and implement a SWPPP as required by the conditions of a National Pollutant Discharge Elimination System (NPDES) permit. Caltrans will prepare a SWPPP that identifies BMP's for discharges and groundwater disposal from dewatering operations associated with road construction and interchange improvements. The SWPPP will identify how and where these discharges would be disposed of during construction and operations. The SWPPP will include provisions for the following:
 - a. Construction activities will be limited, such as to minimize the area of ground disturbance. No disturbance will be allowed outside the limits of applicable permits. Preservation of existing vegetation will be provided to the maximum extent possible. To minimize effects to listed plant habitat, all required BMP's will be in place during the construction of each phase of each project. Sensitive areas will be marked with high visibility fencing to clearly identify the construction area relative to sensitive areas.
 - b. Installation of temporary erosion control devices will be an integral part of construction. Sedimentation fences will be used to contain polluted or turbid runoff from the work site. Other methods of temporary erosion control, including but not limited to hay bail check dams, will be employed to protect riparian areas,

streams and water courses, and all other areas susceptible to damage from run-off. Erosion control devices will be installed concurrently with construction earthwork.

- c. A stabilized construction entrance/exit will be constructed for any access point within 200 feet of a body of water to reduce the tracking of mud and soil.
- d. Clear water diversion will only be used when necessary to isolate construction activities occurring within or near a water body, such as stream bank stabilization, or culvert, bridge, pier or abutment installation. Clear water diversion will only be implemented where allowed by appropriate regulatory permits. De-watering or return water diversion flows will be controlled by piping channel lining, non-erosive grades, or other means to reduce erosion and water turbidity of streams. At the completion of the construction activity requiring de-watering or diversion, stream or gully banks will be immediately restored to allow water to follow along its original course.
- e. Material from excavation and grading activities will be used in the construction of engineered embankments, wherever possible. Excess materials from excavation activities will be hauled and disposed of at a permitted site. The disturbed right-of-way will be reseeded with the appropriate seed mixture. Spoils materials will not be placed in sensitive habitat areas, such as wetlands, or in Federal Emergency Management Agency (FEMA)-identified floodplains.
- f. Dedicated fueling areas and refueling practices will be designated. If possible, dedicated refueling areas will be located at least 200-feet from a body of water. Dedicated fueling areas will be protected from storm water run-on and run-off, and will be located at least 50 feet from downstream drainage facilities. Fueling will be performed on level-grade areas. On site fueling will only be used where it is impractical to send vehicles and equipment off site for fueling. When fueling must occur onsite, the contractor will designate an area to be used subject to approval of the Resident Engineer, representing Caltrans. Drip pans or absorbent pads will be used during on-site vehicle and equipment fueling.
- g. Spill control BMP's will be implemented anytime chemicals and/or hazardous substances are stored or used on the projects. Employees will be educated in proper material handling, spill prevention, and clean-up. Clean-up materials will be on-site and located near material storage and use. The Contractor, as required by standard specifications, will implement spill and leak prevention procedures when chemicals or hazardous substances are stored. Spills of petroleum products; substances listed under CFR Title 40, Parts 110, 117, and 302; sanitary and septic waste will be contained and cleaned up as soon as it is safe.

- h. The temporary stockpiling of all materials will be located a minimum of 50 feet away from concentrated flows of storm water, drainage courses, and inlets. Stockpiles of “cold mix” asphalt materials will be placed on and covered with plastic or comparable material prior to the onset of precipitation. All other stockpiles will be covered, protected with soil stabilization measures, and a temporary perimeter sediment barrier, prior to the onset of precipitation.
 - i. Erosion control devices will be monitored on a regular basis and augmented as necessary. In the event of pending storms, and in compliance with the SWPPP, erosion control devices will be inspected to ensure that such devices are in place and are functional. Monitoring and maintenance of erosion control devices and adjacent disturbed areas will continue during and immediately after significant storm events.
14. Access Points, Vehicle Parking and Staging Areas. Construction access points and staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants will be restricted to rural or developed lands and within the described construction footprint and will not be located in any areas that support sensitive habitat. These locations have been identified as the bridge and within Village Park Campground, the Brown Farm, and the Laguna de Santa Rosa Wetlands Preserve (LSRWP). An additional staging area has been identified within the LSRWP adjacent to a Chevron gas station, which has an existing access road to the staging site. All required BMPs for Storm Water Pollution Prevention will be implemented in staging areas.

If on-site staging is not sufficient for construction operations, off-site staging may be considered. A Service-approved biologist and botanist will survey any proposed off-site staging area to determine if sensitive resources are located on the site that would be disturbed by staging activities. If sensitive resources are found, an appropriate buffer zone will be staked and flagged as necessary to avoid impacts. If sensitive resources cannot be avoided, the site will not be used. The following additional measures refer to staging, storage, vehicle parking, and access areas:

- a. Contractors may independently seek off-site staging locations. Caltrans will either obtain or ensure that its contractor obtains all required regulatory permits, including approval of the Service, for off-site construction access points and staging areas. Offsite staging locations will be subject to the requirements of resource agencies and permits will be the responsibility of the contractor.
- b. Caltrans will require as part of the construction contract that all contractors comply with the Act in the performance of the work as described in the project description of this biological opinion and conducted within the action area.

- c. If a staging, storage, access, or vehicle parking area that is in compliance with the Act is not available, the agency with jurisdiction and the contractor would be responsible for compliance with the Act.

15. Revegetation and Restoration. Following construction, temporarily disturbed areas will be revegetated with a suitable erosion control mix. All project effects to seasonal wetlands and suitable, rare plant habitat are considered permanent when determining the level of compensatory mitigation, per the Conservation Strategy guidelines (Service 2007) and also since the proposed project will not conclude nor will temporarily disturbed areas be restored to baseline or better in one growing season. However, the "temporary" disturbed areas referred to in Caltrans' Proposed Avoidance and Minimization Measures, such as construction access and staging areas, are not in the footprint of the bridge structure, and will be available for revegetation following the two dry seasons of construction.

The contractor will restore all temporarily disturbed areas to conditions that are equal to or better than the original conditions in accordance with Caltrans requirements.

- a. All debris, construction spoils, remaining installation materials, and miscellaneous litter will be removed for proper off-site disposal. Stream bank contours will be reestablished following construction and permanent erosion control will be installed if necessary.
- b. Drainage banks will be stabilized using certified weed-free straw bales, biodegradable jute, or other appropriate methods (e.g., sediment lots). More aggressive erosion control treatments will be implemented as needed. Where appropriate, discarded soil will be left in a roughened condition to reduce erosion and promote re-vegetation. Permanent erosion control measures will be implemented following completion of construction on an as-needed basis.
- c. Upon completion of the proposed action, all listed plant habitat subject to "temporary" ground disturbances, including storage and staging areas, temporary roads, etc. will be re-contoured, if appropriate, and re-vegetated with seeds and/or cuttings of appropriate plant species to promote restoration of the area to pre-project conditions. Caltrans will submit a Restoration and Re-vegetation Plan that utilizes native seed mixes sixty (60) calendar days before construction groundbreaking begins, with regards to restoring affected storage, staging, parking, and temporary roads within the action area.

16. Caltrans will provide the Service with adequate annual written reports that describe the progress of implementation of these conservation measures. The first report will be submitted by December 31, the first year of groundbreaking, and annually thereafter on December 31 until the project is completed. The reports will be

addressed to Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office.

17. Caltrans will submit a post-construction compliance report within 60 calendar days of the completion of construction. This report will detail (i) dates that construction occurred; (ii) pertinent information concerning the success of the projects in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on the Sonoma sunshine, Sebastopol meadowfoam and/or Burke's goldfields, if any; (v) occurrences of harm or destruction to these species; and (vi) other pertinent information. The reports will be addressed to Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office.
18. Caltrans will report to the Service any information about take or suspected take of listed wildlife species not authorized in this biological opinion. Caltrans will notify the Service via electronic mail and telephone within 24 hours of receiving such information. Notification will include the date, time, location of the incident or of the finding of a dead or injured animal, and photographs of the specific animal. The individual animal will be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The Service contacts will be considered as Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office at (916) 414-6600, and Dan Crum of the Service's Law Enforcement Division at (916) 414-6660.
19. Observations of Sebastopol meadowfoam, Burke's goldfields, and/or Somoma sunshine or any listed or sensitive plant and/or animal species will be reported to the California Natural Diversity Database (CNDDDB) and Chris Nagano, Division Chief, Endangered Species Division, Sacramento Fish and Wildlife Office within thirty (30) calendar days of the observation.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." The Laguna de Santa Rosa Bridge (Caltrans Bridge Number 20-0035) is located at PM 9.6 on State Route 12, east of the City of Sebastopol in Sonoma County, California. The project is located within the Sebastopol 7.5-minute United States Geological Survey (USGS) quadrangle (Section 35, Township 7N, Range 9W, 38.40348°N/122.81616° W [NAD83]). The project is located on the western edge of the Santa Rosa Plain and is included in the area addressed by the Final Santa Rosa Plain Conservation Strategy (SRPCS) (SRPCS Team, 2007). The action area covered encompasses the project footprint, equipment staging and lay down areas, construction access roads, temporary creek diversion, Caltrans Right-of-Way (ROW) limits, construction easements,

The project footprint is approximately 1.20 acres and includes all areas that will be permanently affected by the project. The construction staging and access areas are all those areas that will be temporarily used during project construction, which comprise approximately 2.93 acre. The total action area is approximately 4.13 acres.

Analytical Framework for the Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this Biological Opinion relies on four components: (1) the *Status of the Species* and (2) *Environmental Baseline*, which evaluates Sebastopol meadowfoam, Sonoma sunshine, and Burke's goldfields habitat conditions, the factors responsible for those conditions, and the species' survival and recovery needs; and evaluates the condition of these species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of three plants; (3) the *Effects of the Action*, which determines the direct and indirect effects of the proposed federal action and the effects of any interrelated or interdependent activities on these species; and (4) *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the action area on them.

In accordance with policy and regulation, this jeopardy determination is made by evaluating the effects of Sebastopol meadowfoam, Sonoma sunshine, and Burke's goldfields current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of any of these three species in the wild.

The jeopardy analysis in this Biological Opinion places an emphasis on consideration of the range-wide survival and recovery of the Sebastopol meadowfoam, Sonoma sunshine, and Burke's goldfields and the role of the action area in the survival and recovery of these three listed species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Status of Species

Burke's goldfields

Burke's goldfields was federally listed as endangered on December 2, 1991 (Service 1991). Critical habitat has not been designated for this species. This species' distribution is confined almost entirely within the Santa Rosa Plain and a comprehensive conservation strategy for the Sonoma County population is included in the Conservation Strategy (Conservation Strategy Team 2005a). Burke's goldfields is an annual herb in the aster family (Asteraceae). Full grown plants are typically branched (CNPS 2009) and less than 11.8 inches tall (Hickman 1993). Its

leaves are opposite, pinnately lobed, and less than 2 inches long. Burke's goldfields typically bloom between April and June with yellow, daisy-like inflorescences with separate involucre bracts (leaf-like structures beneath the flower head) (Skinner and Pavlik 1994). Its flowers are insect-pollinated and self-incompatible, meaning that they can set seed only when fertilized by pollen from another individual plant (Ornduff 1966; Crawford and Ornduff 1989). This species produces dry, one-seeded fruits (achenes) that are generally less than 0.2 inches long. The fruits of Burke's goldfields can be distinguished from those of other goldfields species by the presence of one long awn (bristle and numerous short scales) (Hickman 1993). Smooth goldfields (*Lasthenia glaberrima*) can be distinguished from Burke's goldfields by their partly fused involucre bracts and a pappus (ring of scale-like or hair-like projections at the crown of an achene) of numerous narrowed scales. Common goldfields (*Lasthenia californica*) are distinguished from Burke's goldfields by their lobeless, linear leaves (Hickman 1993). Individual Burke's goldfields plants may exhibit some geographic variation in morphology (McCarten 1985 as cited in CH2M Hill 1995; Patterson *et al.* 1994). Patterson *et al.* (1994) reported robust specimens from the southern Santa Rosa Plain near the Laguna de Santa Rosa and variation in the number of awns from a Lake County population.

Burke's goldfields is endemic to the central California Coastal Range region where it was historically found in Mendocino, Lake, and Sonoma counties (CNPS 2009; Patterson *et al.* 1994). The plant is now considered extirpated in Mendocino County. The two existing occurrences for Lake County, at Manning Flat and a winery on State Route 29, are presumed extant. Otherwise, the remaining distribution seems to be limited to Sonoma County, with the core population primarily located in the northwestern and central areas of the Santa Rosa Plain (CNDDDB 2009). Two additional occurrences are located south of State Route 12, near the Laguna de Santa Rosa (CH2M Hill 1995). Another occurrence has been recorded north of Healdsburg (Patterson *et al.* 1994).

Burke's goldfields are associated with vernal pool and swale wetland habitats generally below 1640-foot elevation (Hickman 1993). The plant has been found in a variety of unique seasonal wetland situations. This includes a series of claypan vernal pools on volcanic ash soils at the Manning Flat occurrence in Lake County (Service 1991; CNDDDB 2009). (Common goldfields and few-flowered navarretia (*Navarretia leucocephala pauciflora*) were also found at the Manning Flat location [CNDDDB 2009]). In Sonoma County, Burke's goldfields are found in vernal pools with nearly level to slightly sloping loam, clay loam, and clay soils. A clay or hardpan layer, approximately 2 to 3 feet below the surface, restricts downward movement of water (Service 1991). Burke's goldfields are primarily found in pools with Huichica loam in the northern part of the Santa Rosa Plain (Patterson *et al.* 1994; CNDDDB 2009). This particular soil type consists of a fine textured clay loam on top dense clay and cemented layers (Patterson *et al.* 1994). In the southern portion of the Santa Rosa Plain, the species is likely to be found on Wright loam or Clear Lake clay (Patterson *et al.* 1994; CNDDDB 2009). Wright loam is defined by a fine silty loam on top of dense clay and marine sediments. Clear Lake clay consists of a thick layer of hard dense clay (Patterson *et al.* 1994). Burke's goldfields is often found growing with the listed Sonoma sunshine and Sebastopol meadowfoam). These listed species are often

found with other common vernal pool-associated plants of the Santa Rosa Plain, including Douglas' pogogyne (*Pogogyne douglasii* ssp. *parviflora*), Lobb's aquatic buttercup (*Ranunculus lobbii*), smooth goldfields, California semaphore grass (*Pleuropogon californicus*), maroonspot downingia (*Downingia concolor*), and button-celery (*Eryngium* species) (CNDDDB 2009).

Seed banks are of particular importance to annual plant species, such as Burke's goldfields, which are subject to uncertain or variable environmental conditions associated with a Mediterranean climate (Cohen 1966, 1967; Parker *et al.* 1989; Templeton and Levin 1979). Little is known about the seed life of Burke's goldfields. Circumstantial evidence suggests that Burke's goldfields can successfully germinate from seed banks translocated in soil to other appropriate wetland habitat (C. Wilcox, California Department of Fish and Game, 2000 *in litt.*). As annual species, both Burke's goldfields and Sonoma sunshine are expected to respond to environmental stochastic events, such as changes in vegetative composition, climate, and disturbance, by partial germination of its seed bank. As with other annuals, Burke's goldfields are adapted to "risky environments" by producing persistent seed banks to offset years of low reproductive success and ensure persistence at a given location without immigration (Baskin *et al.* 1998). It is likely that Burke's goldfields can persist in the seed bank as dormant embryos for an undetermined number of years. Therefore this species may persist undetected for years until conditions are favorable for germination. Although formal studies of Burke's goldfields seed viability have not been conducted, it is reasonable to expect seed banks to persist for extended periods without germination, and individual may be predisposed to variable germination requirements as a survival strategy.

A standard above-ground botanical survey may not accurately reflect the total number of plants at any given time for species with long-lived seed banks (Rice 1989; Given 1994). With this understanding, overall annual plant populations associated with seasonal wetland habitats can fluctuate between abundant to seemingly nonexistent from year to year dependent on a variety of environmental conditions. Therefore, it is difficult to determine when true extirpation has occurred in historically occupied habitat. Furthermore, short-term population may be more indicative of current environmental conditions rather than long-term habitat suitability (Given 1994).

Of the 48 known records of Burke's goldfields, 26 are presumed to remain extant with the majority found on the Santa Rosa Plain. Four populations occur outside of the Santa Rosa Plain, of which only two populations, one in northern Healdsburg and one at the Ployes Winery are extant. This species continues to be threatened with habitat loss, fragmentation, and degradation throughout its range by factors including urbanization, agricultural land use changes, hydrology alterations, and erosion (CNPS 2009; Service 1991; Patterson *et al.* 1994; CH2M Hill 1995; CNDDDB 2010). The only known Mendocino County occurrence is presumably extirpated (CH2M Hill 1995). The largest known occurrence is in Manning Flat on private land in Lake County. This population's habitat is being decimated by extensive gully erosion (CH2M Hill 1995; CNDDDB 2010). A second Lake County population may be threatened by operations associated with the winery property on which it is located (Chan 2001). However, in the past the

winery owners appeared willing to coordinate with the Service and the Corps to avoid and/or minimize further adverse affects (N. Haley, U. S. Army Corps of Engineers, 1998 personal communication).

Sonoma Sunshine

Sonoma sunshine was federally listed as endangered on December 2, 1991 (Service 1991). Critical habitat has not been designated for this species. This species' distribution is confined almost entirely within the Santa Rosa Plain and a comprehensive conservation strategy for the Sonoma County population is included in the Conservation Strategy (Conservation Strategy Team 2005a). Sonoma sunshine is an annual plant in the aster family. This plant is generally described as being less than 11.8 inches tall with alternate, linear leaves (CNPS 1977; Hickman 1993). The lower leaves are entire, and the upper leaves have one to three lobes that are 0.4 to 1.2 inches deep (Hickman 1993). It has yellow daisy-like flower heads, and ray flowers with dark red stigmas and disk flowers with white stigmas and white pollen. The flowers of Sonoma sunshine are self-incompatible. The plant's achenes are 0.1 to 0.15 inches long with small rounded or conic proturbences (papillate) and 4 to 6 strongly angled edges (CNPS 1997; Hickman 1993). This species is often confused with common stickseed (*Blennosperma nanum*), but Sonoma sunshine is more robust and has longer and fewer lobes on the leaves (CNPS 1977).

Sonoma sunshine is found in vernal pools and wet grasslands generally below 330 feet (Hickman 1993). As with Burke's goldfields, this species has been found in seasonal wetlands with variable soil types. In the Sonoma and Cotati valleys, it occurs on nearly level to slightly sloping loam, clay loam, and clay soils (Service 1991). The two concentrations of Sonoma sunshine on the Santa Rosa Plain occur on different soil types (Patterson *et al.* 1994). The plants are found on Huichica loam north of State Route 12 and Wright loam and Clear Lake clay south of State Route 12 (Patterson *et al.* 1994; CNDDDB 2009).

Sonoma sunshine is endemic to Sonoma County, California. In the Cotati Valley, the species ranges from near the Town of Fulton in the north, to Scenic Avenue between Santa Rosa and Cotati in the south. Additionally, the range extends or extended from near Glen Ellen to an area near the junction of State Routes 116 and 121 in the Sonoma Valley. In 2001, two new natural populations were identified north and south of the City of Santa Rosa, increasing the number of previously identified California Natural Diversity Data Base (CNDDDB) occurrences from 26 to 28. Of the 28 occurrences, 21 are presumed to be extant with all but one occurring on the Santa Rosa Plain. The remaining occurrence is located in Glen Ellen. In addition, Sonoma sunshine has been introduced to at least one site on Alton Lane during mitigation for projects. Seven populations within or near the City of Santa Rosa have been extirpated.

Sonoma sunshine continues to be threatened with habitat loss, fragmentation, and degradation throughout its range by factors including urbanization, agricultural land use changes, and hydrology alterations (Patterson *et al.* 1994; CH2M Hill 1995; CNDDDB 2009). Two of five known occurrences have been extirpated in the Sonoma Valley. One was extirpated by habitat

destruction in 1986, and the area is now occupied by a vineyard. At the second site, most seasonal wetland habitat was destroyed by grading for home sites in 1980, while the remainder was converted to vineyard or overtaken by weeds (CNDDDB 2009). Of the presumed extant Sonoma Valley occurrences, one locality has been largely developed. A small area was retained by CDFG when the development took place, but Sonoma sunshine has not been recorded from this area since the subdivision was developed (Service files). A second Sonoma Valley locale is currently found in a pasture. A portion of this occurrence may have been disked, and the landowners of a second portion want to convert the locale to vineyard (C. Wilcox, 1998, personal communication, Service files). The third Sonoma Valley occurrence is in Sonoma Valley Regional Park, which is not managed for conservation (CNDDDB 2009). On the Santa Rosa Plain, one locale has probably been extirpated by completion of a subdivision and another by major land alterations (CNDDDB 2009). Of the presumed extant locales, some are characterized as severely degraded habitat, others are threatened by development, and some have not supported confirmed populations of Sonoma sunshine in recent years (CH2M Hill 1995; CNDDDB 2009).

Sebastopol Meadowfoam

Sebastopol meadowfoam was federally listed as endangered on December 2, 1991 (Service 1991). Critical habitat has not been designated for this species. This species' distribution is confined almost entirely within the Santa Rosa Plain and a comprehensive conservation strategy for the Sonoma County population is included in the Conservation Strategy (Conservation Strategy Team 2005a). Sebastopol meadowfoam is an annual herb with weak, somewhat fleshy, decumbent stems up to 11.8 inches tall. This plant is unique amongst the *Limnanthes* genus because its seedlings have entire leaves. Leaves of mature plants are up to 3.9 inches long and have 3 to 5 leaflets that are narrow and unlobed with rounded tips. The leaves are borne on long petioles, and petiole length, like stem length, appears to be promoted by submergence. Sebastopol meadowfoam has fragrant, white flowers that are borne in the leaf axils typically between April and May. The flowers are bell- or dish-shaped, with 0.47 to 0.71 inches long petals. The sepals are shorter than the petals. The petals turn outward as the nutlets mature. The nutlets are dark brown, 0.12 to 0.16 inch long, and covered with knobby pinkish tubercles (Patterson *et al.* 1994).

Sebastopol meadowfoam is an annual plant. Its seeds germinate after the first significant fall-season rains, and are therefore influenced by annual weather fluctuations. The plants begin development underwater. Growth rates start out slowly but increase as their wetland habitat dries out. Repeated drying and filling of pools in the spring favors development of large plants with many branches and long stems. Flowering typically occurs between March and April. Large plants can produce 20 or more flowers. Flowering may continue as late as mid-June, although in most years the plants set seed and die by early summer (Patterson *et al.* 1994). Each plant can produce up to 100 nutlets (Patterson 1994).

Sebastopol meadowfoam is another species known to exhibit a long-lived seed bank (Jain 1978; Patterson 1994). This was evidenced by a remote historic site where the species remained undetected after multiple years of botanical surveys. During this period, the seasonal wetland habitat was highly degraded by wallowing hogs (*Sus scrofa*). The hogs were removed in the mid-1990's and 12 Sebastopol meadowfoam plants emerged simultaneously in one area the following year. The population expanded rapidly to 60 plants the next year and was larger in subsequent years (Geoff Monk, personal communication with the Service). Long-distance seed dispersal was an improbable explanation for the event which was more appropriately attributed to a long dormant seed bank. This example indicates that lack of Sebastopol meadowfoam during periods of adverse conditions (drought, heavy disturbance, etc.) does not necessarily indicate that the population is extirpated.

This species grows in a variety of seasonal wetland habitats including Northern Basalt Flow and Northern Hardpan vernal pools (Sawyer and Keeler-Wolf 1995); wet swales and meadows; on the banks of streams; and in artificial habitats such as ditches (Wainwright 1984; Patterson 1990; CNDDDB 2009). The surrounding upland plant communities typically include oak savanna, grassland, and marsh in Sonoma County and riparian woodland in Napa County (California Department of Fish and Game 2002). Sebastopol meadowfoam is found growing in both shallow and deep water, but is most frequently found in pools that are 10 to 20 inches deep (Patterson 1990; Patterson *et al.* 1994). This species is typically most abundant at the margins of vernal pools or swales (Pavlik *et al.* 2000, 2001). Most of the Sebastopol meadowfoam found on the Santa Rosa Plain is on Wright loam or Clear Lake clay soils (Patterson *et al.* 1994; CNDDDB 2009), but is found on other soil types, such as Pajaro clay loam, Cotati fine sandy loam, Haire clay loam (Patterson *et al.* 1994), and Blucher fine sandy loam (Wainwright 1984).

Environmental Baseline within the Action Area

As stated in the Conservation Strategy, urban and rural growth on the Santa Rosa Plain has taken place for over one hundred years, and for the past twenty years, urban growth has rapidly encroached into areas inhabited by the listed plants. The loss of seasonal wetlands caused by development on the Santa Rosa Plain has led to declines in the populations listed plants. Voters in the cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol, and the Town of Windsor have established urban growth boundaries for their communities. This is intended to accomplish the goal of city-centered growth, resulting in rural and agricultural land uses being maintained between the urbanized areas. Therefore, it can be reasonably expected that rural land uses will continue into the foreseeable future. There are also areas of publicly owned property and preserves located in the Santa Rosa Plain, which will further protect against development. Some of the areas within these urban growth boundaries, however, include lands inhabited by the listed plant species. Agricultural practices have also disturbed seasonal wetlands, which are habitat for the listed plants on the Santa Rosa Plain. Some agricultural practices, such as irrigated or grazed pasture, have protected habitat from intensive development.

The Conservation Strategy was designed to plan for future cumulative effects from federal and

non-federal actions to listed plant habitat within the Santa Rosa Plain. The Conservation Strategy and the associated interim guidelines are intended to benefit the listed plants by providing a consistent approach for mitigation vital to habitat preservation and the long-term conservation of the species. They are also intended to provide more certainty and efficiency in the project review process. The Conservation Strategy and the interim guidelines provide guidance to focus mitigation efforts on preventing further habitat fragmentation and to establish, to the maximum extent possible, a viable preserve system that will contribute to the long-term conservation and recovery of these listed species.

Burke's Goldfields

Many Burke's goldfields locations on the Santa Rosa Plain has been extirpated due to urbanization and conversion of land to row crops. Burke's goldfields have been nearly extirpated from the Windsor vicinity where it was once abundant (Patterson *et al.* 1994; CH2M Hill 1995). The California Department of Fish and Game (CDFG) Todd Road Reserve is approximately 2 miles southwest the proposed project action area and boasted a 5-10,000 plant population in 1988 (Occurrence #1; CNDDDB 2010). CDFG states that this population of Burke's goldfields is extant yet decreasing.

Caltrans identified 0.24  of suitable habitat in the action area for Burke's goldfields but did not observe this listed plant as a result of a 2009 special-status plant survey (GANDA 2009). Although the Laguna de Santa Rosa Bridge Replacement project is located within the range of Burke's goldfields. Protocol-level surveys conducted in 2005, 2006, and 2009, on a portion of the action area (Village Park Campground) where suitable plant habitat was identified, did not result in the observation of listed plants but did identify at least 0.24 acre of suitable habitat for Burke's goldfields. Burke's goldfields may be represented in the existing seed bank and therefore individual(s) may have been present but not observed during the surveys. Therefore, given the ecology and biology of the species, especially its ability to persist undetected in the seed form, the presence of suitable habitat, and the recent nearby records, it is ly Burke's goldfields inhabit the action area.

Sonoma Sunshine

Sonoma sunshine is known to occur within the vicinity of the proposed project approximately 0.75 miles southeast of the action area on private land (GANDA 2006; Occurrence #15, CNDDDB 2010). The second observation of plants, with two extant populations, is to the north and south of Todd Road, at the "elbow" of southeast Sebastopol, part of the CDFG Laguna de Santa Rosa Ecological Reserve (Occurrence # 8, CNDDDB 2010) and at the Todd-Carinalli mitigation bank, south of the Reserve.  Garcia and Associate plant surveys conducted in 2006 for the CDFG Reserve detected a colony of 100 Sonoma sunshine plants (GANDA 2006 unpublished report). In April 2009, Sonoma sunshine was observed during the rare plant survey, but less abundant than in 2006 (GANDA 2009).

The Laguna de Santa Rosa Bridge Replacement project is located within the range of the Sonoma sunshine. Protocol-level surveys conducted in 2005, 2006, and 2009, on a portion of the action area (Village Park Campground) where suitable plant habitat was identified, did not result in the observation of listed plants but did identify at least 0.24 acre of suitable habitat for Sonoma sunshine. Sonoma sunshine may be represented in the existing seed bank and an individual(s) may have been present but not observed during the surveys. Therefore, given the ecology and biology of the species, especially its ability to persist undetected in the seed form, the presence of suitable habitat, and the recent nearby records, it is likely Sonoma sunshine inhabit the action area.

Sebastopol Meadowfoam

Of the historical records of Sebastopol meadowfoam there are 49 in Sonoma and Napa Counties (CNDDDB 2010). Many of the historic Sebastopol meadowfoam occurrences have not been closely monitored and their current status is unclear. The southern cluster of occurrences extends from Stoney Point Road, approximately 3 miles west to the Laguna de Santa Rosa, and is bounded by Occidental Road to the north and Cotati to the south. The central cluster extends out approximately 1.5 miles on either side of Fulton Road from Occidental Road to River Road. There may be only 10 hydrologically separate populations of Sebastopol meadowfoam in the Santa Rosa Plain (Patterson *et al.* 1994). Six occurrences of this species (Occurrences #'s 1, 10, 24, 25, 29, and 33) are found within two miles of the proposed project according to the CNDDDB (CNDDDB 2010). One occurrence which is not documented in the CNDDDB is located at the south end of the Balletto easement (City of Santa Rosa), which is located about 0.4 miles north of the proposed project area. In April 2009, six Sebastopol meadowfoam plants were counted at that location (GANDA 2009).

Like Burke's goldfields and Sonoma sunshine, Sebastopol meadowfoam has been, and continues to be threatened by habitat loss, habitat degradation, and small population size. Much of this habitat loss is attributed to agricultural conversion, urbanization, and road maintenance. Habitat degradation is often attributed to excessive livestock grazing, alterations in hydrology, and competition from non-native species (in some cases, exacerbated by removal of grazing), off-highway vehicle use, and dumping (Service 1991; Patterson *et al.* 1994; CH2M Hill 1995; CNDDDB 2010).

The Laguna de Santa Rosa Bridge Replacement project is located within the range of the Sebastopol meadowfoam. Protocol-level surveys conducted in 2005, 2006, and 2009, on a portion of the action area (Village Park Campground) where suitable plant habitat was identified, did not result in the observation of listed plants but did identify at least 0.24 acre of suitable habitat for Sebastopol meadowfoam. Sebastopol meadowfoam may be represented in the existing seed bank and an individual(s) may have been present but not observed during the surveys. Therefore, given the ecology and biology of the species, especially its ability to persist undetected in the seed form, the presence of suitable habitat, and the recent nearby records, it is likely Sebastopol meadowfoam inhabit the action area.

Effects of the Proposed Action

As defined by the Conservation Strategy, effects analysis for the three listed plants is based on the location of the action area relative to appropriate wetland habitat within the Santa Rosa Plain. The following effects analysis is based on the interim guidelines for the Conservation Strategy (Conservation Strategy Team 2005b).

Direct Effects

Caltrans has categorized the Laguna de Santa Rosa Bridge Replacement project effects to suitable vernal pool plant habitat as either permanent or temporary. The Conservation Strategy guidelines do not differentiate between temporary and permanent effects (Service 2005), therefore all Laguna de Santa Rosa Bridge Replacement project effects are considered permanent.

The proposed project will eliminate suitable habitat and may cause loss of individual Sebastopol meadowfoam, Sonoma sunshine and Burke's goldfields and their seeds within the seed bank. Implementation of the proposed project will result in direct, permanent effects to approximately 0.23 acre of currently suitable habitat within the action area. The 0.23 acre is the total for 0.0337 acre of effects as a result of utility pole installation and 0.20 acre for bridge widening and construction within suitable vernal pool plant habitat.

Preservation of 0.23 acre of occupied or established habitat and 0.1 acres of established habitat within Service-approved mitigation banks, reserves, or acquired habitat to compensate for the direct loss of habitat would likely benefit the Sebastopol meadowfoam, Burke's goldfield, and Sonoma sunshine by contributing to their overall recovery. Minimal adverse effects may occur on some of the proposed mitigation banks and preserves as part of their establishment and management, but overall these mitigation banks and preserves are anticipated to have a net beneficial effect for the three listed plants. Implementation of a management plan for each of the mitigation banks and preserves likely would ensure that the conservation values of the bank or preserve would be maintained to provide optimal habitat conditions for these listed plants.

Indirect Effects

Vehicle exhaust emissions can include hazardous substances which may concentrate in soils along State Route 12 at Laguna de Santa Rosa Bridge. Heavy metals such as lead, aluminum, iron, cadmium, copper, manganese, titanium, nickel, zinc, and boron are all emitted in vehicle exhaust (Trombulak and Frissell 2000). Concentrations of organic pollutants (e.g., Dioxins, polychlorinated biphenyls) are higher in soils along roads (Benfenati *et al.* 1992). Vehicles may leak hazardous substances such as motor oil and antifreeze. Although the quantity leaked by a given vehicle may be minute, these substances can accumulate on State Route 12 and then get washed into the adjacent suitable vernal pool plant habitat by runoff during rain storms. The effects may be difficult to detect. Caltrans proposes to minimize these risks by implementing a

Storm Water Pollution Prevention Plan (SWPPP), erosion control BMP and a Spill Response Plan, which will consist of refueling, oiling or cleaning of vehicles and equipment a minimum of 50 feet away from the surrounding wetlands; installing coir rolls, straw wattles and/or silt fencing to capture sediment and prevent runoff or other harmful chemicals from entering the wetland; and locating staging, storage and parking areas away from aquatic habitats.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Unauthorized fill of wetlands, urbanization, increases in non-native species, and continued and expanded irrigation of pastures with recycled wastewater discharge, are likely to continue with concomitant adverse effects on Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam. These actions result in additional habitat loss and degradation; increasingly isolated populations (exacerbating the disruption of gene flow patterns); and further reductions in the reproduction, numbers, and distribution of these species which will decrease their ability to respond to stochastic events.

The global average temperature has risen by approximately 0.6 degrees centigrade during the 20th Century (International Panel on Climate Change 2001, 2007; Adger *et al.* 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (International Panel on Climate Change 2001, 2007; Adger *et al.* 2007), and that it is "very likely" that it is largely due to increasing concentrations of greenhouse gases (carbon dioxide, methane, nitrous oxide, and others) in the global atmosphere from burning fossil fuels and other human activities (Cayan 2005, EPA Global Warming webpage <http://yosemite.epa.gov>; Adger *et al.* 2007). Eleven of the twelve years between 1995 and 2006 rank among the twelve warmest years since global temperatures began in 1850 (Adger *et al.* 2007).

The warming trend over the last fifty years is nearly twice that for the last 100 years (Adger *et al.* 2007). Looking forward, under a high emissions scenario, the International Panel on Climate Change estimates that global temperatures will rise another four degrees centigrade by the end of this Century; even under a low emissions growth scenario, the International Panel on Climate Change estimates that the global temperature will go up another 1.8 degrees centigrade (International Panel on Climate Change 2001). The increase in global average temperatures affects certain areas more than others. The western United States, in general, is experiencing more warming than the rest of the Nation, with the 11 western states averaging 1.7 degrees Fahrenheit warmer temperatures than this region's average over the 20th Century (Saunders *et al.* 2008). California, in particular, will suffer significant consequences as a result of global warming (California Climate Action Team 2006).

In California, reduced snowpack may cause more winter flooding and summer drought, as well as higher temperatures in lakes and coastal areas. The incidence of wildfires in California also may increase and the amount of increase is highly dependent upon the extent of global warming. No less certain than the fact of global warming itself is the fact that global warming, unchecked, may harm biodiversity generally and cause the extinction of large numbers of species. If the global mean temperatures exceed a warming of two to three degrees centigrade above pre-industrial levels, twenty to thirty percent of plant and animal species may face an increasingly high risk of extinction (International Panel on Climate Change 2001, 2007).

The mechanisms by which global warming may push already imperiled species closer or over the edge of extinction are multiple. Global warming increases the frequency of extreme weather events, such as heat waves, droughts, and storms (International Panel on Climate Change 2001, 2007; California Climate Action Team 2006; Lenihan *et al.* 2003). Extreme events, in turn may cause mass mortality of individuals and significantly contribute to determining which species will remain or occur in natural habitats. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Conclusion

After reviewing the current status of the Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam, the environmental baseline for the action areas, and the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the Laguna de Santa Rosa Bridge Replacement Project is not likely to jeopardize the continued existence of these three listed vernal pool plant species. We based this determination on the following: (1) the effects analysis and compensation abide by the guidelines of the Conservation Strategy; (2) conservation measures would be implemented to minimize the adverse effects to the listed plants. The loss of suitable habitat within the action area will be minimized by the preservation and management of 0.23 acre of occupied or established habitat and 0.1 acres of established habitat for the listed plants.

INCIDENTAL TAKE STATEMENT

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, protection of listed plants is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed plants or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of listed plants on non-federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can

be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations. We make the following conservation recommendations:

1. Encourage or require the use of appropriate California native species in re-vegetation and habitat enhancement efforts associated with projects authorized by Caltrans.
2. Caltrans should consider establishing functioning preservation and creation conservation banking systems to further the conservation of Burke's goldfields, Sonoma sunshine, Sebastopol meadowfoam, many-flowered navarretia and other appropriate species. Such banking systems also could possibly be utilized for other required mitigation (i.e., seasonal wetlands, etc.) where appropriate.
3. Facilitate educational programs geared toward the importance and conservation of seasonal wetlands.
4. Encourage seed banking in Center for Plant Conservation certified botanic gardens (provided the seed collection does not adversely affect the source populations).
5. Assist the Service in implementing the Conservation Strategy and recovery actions being developed for Burke's goldfields, Sonoma sunshine, many-flowered navarretia and Sebastopol meadowfoam.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action on the proposed Caltrans State Route 12, Laguna de Santa Rosa Bridge Replacement Project in Sonoma County, California. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the effects to Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam, as analyzed in this biological opinion are not exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Mr. James B. Richards

28

If you have any questions regarding this biological opinion for the Laguna de Santa Rosa Bridge Replacement Project please contact Maral Kasparian or Ryan Olah at the letterhead address or at (916) 414-6600.

Sincerely,

A handwritten signature in blue ink that reads "Susan K. Moore". The signature is written in a cursive style with a large initial 'S'.

Susan K. Moore
Field Supervisor

cc:

John Yeakel, Theresa Engle California Department of Transportation, Oakland, California
Melissa Escaron, Suzanne de Leon, Scott Wilson, California Department of Fish and Game,
Yountville, California

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Final Tree Impact Summary for Laguna de Santa Rosa Bridge Replacement Project - EA

PREPARED FOR: Theresa Engle/Caltrans
PREPARED BY: Aviva Rossi/CH2M HILL
COPIES: John Yeakel/Caltrans, Evalyn Sideman/Caltrans, Lilian Acorda/Caltrans
DATE: December 22, 2008

The California Department of Transportation (Caltrans) is in the process of replacing the Laguna de Santa Rosa Bridge (Caltrans Bridge No. 20-0035) on State Route 12 near the town of Sebastopol in Sonoma County, California. A survey of trees that would be impacted by the project was conducted in 2007 by LSA Associates a subcontractor through CH2M HILL to Caltrans (Attachment 1).

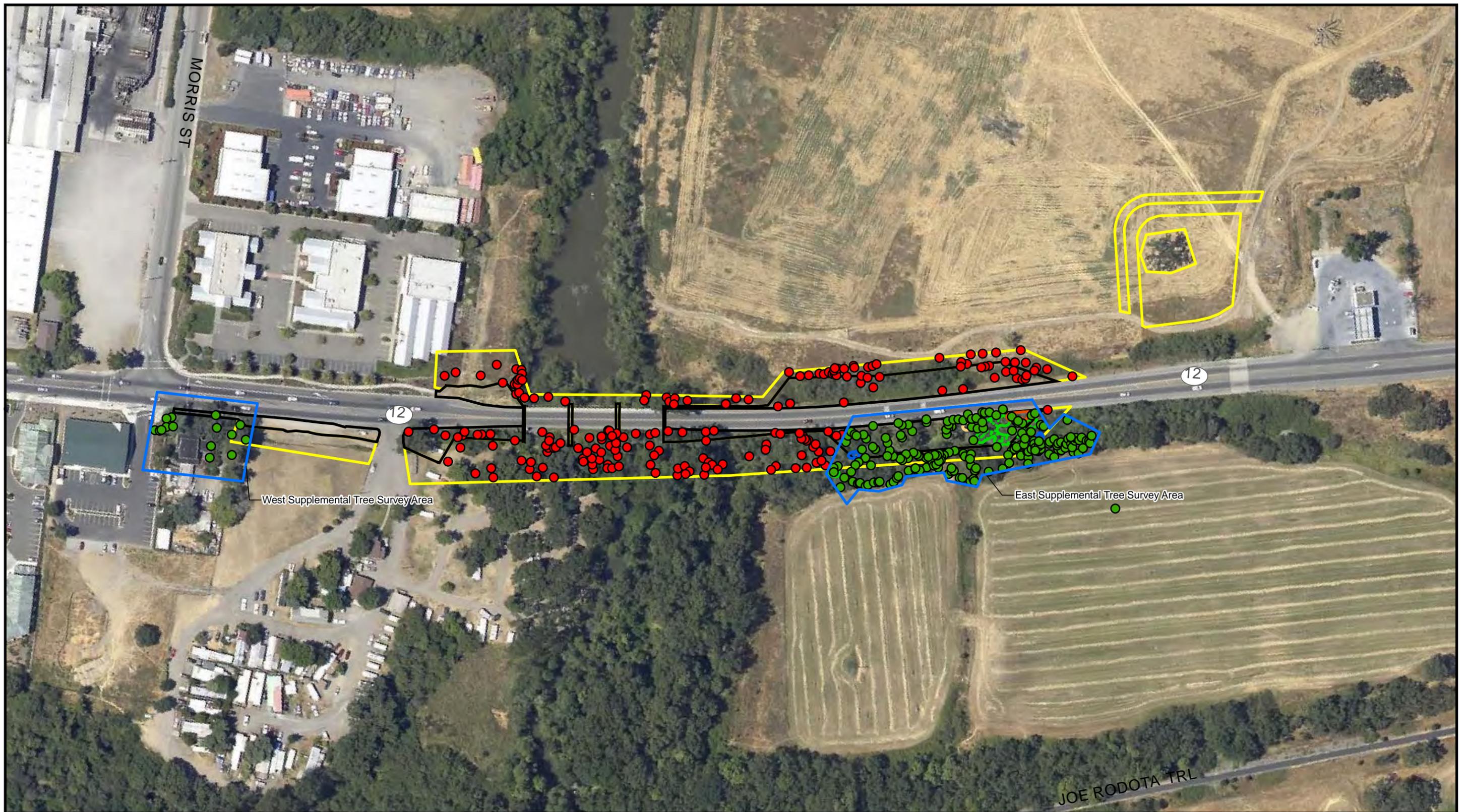
Subsequently, Caltrans revised the project design in September 2008, resulting in an expanded area of temporary impacts along two portions of the project area, and therefore needed to expand the tree survey to inventory these new areas. Garcia and Associates (GANDA), a subcontractor through CH2M HILL to Caltrans, conducted additional tree survey in October 2008 to identify and map the locations of all trees in the revised project areas with a diameter at breast height (dbh) of one inch or greater (Attachment 2). Figure 1 shows the 2008 survey boundaries as well as the existing and new tree locations identified during the 2007 and 2008 surveys.

It was inefficient to determine which trees were identified in the previous survey, near the boundary of the un-surveyed area, in the field. Therefore there was some redundancy in the data points between the 2007 and 2008 surveys, therefore the impact numbers provided in the reports individually cannot be summed for an accurate impact assessment.

CH2M HILL compared the two datasets, and removed duplicate listings, using the more recent GANDA 2008 survey to replace the LSA Associates 2007 data where there was overlap. Therefore the impact calculations provided in this Memorandum (Table 1) include all impact areas and no duplication. Table 1 does not show all trees surveyed, only those within the impact areas. Figure 2 shows the final tree survey data and the roadway design on which the impact assessment is currently based.

On December 11, 2008, Caltrans provided CH2M HILL the categories that the California Department of Fish and Game was using to calculate mitigation requirements for this project. Therefore, this analysis was amended to present the results in those categories (Table 2).

Arroyo willow (*Salix lasiolepis*) and Oregon ash (*Fraxinus latifolia*) both grow in thicket form as well as individual stem form. It is more accurate to map the thickets as polygons, instead of multiple stem trees and record each DBH. The field team mapped polygons around thickets, and those impacts are provided as acres in Table 3.



September, 2008 designs

- Action Area (Project Footprint)
- Action Area (Construction Staging and Access Area)

Laguna De Santa Rosa Bridge Sonoma 12
Tree Survey Data

- Existing Tree Survey Data
- October '08 Supplemental Tree Survey

October '08 Supplemental Shrub Data

- Arroyo Willow Thicket
- Oak Thicket
- Oregon Ash Thicket
- Red Willow Thicket

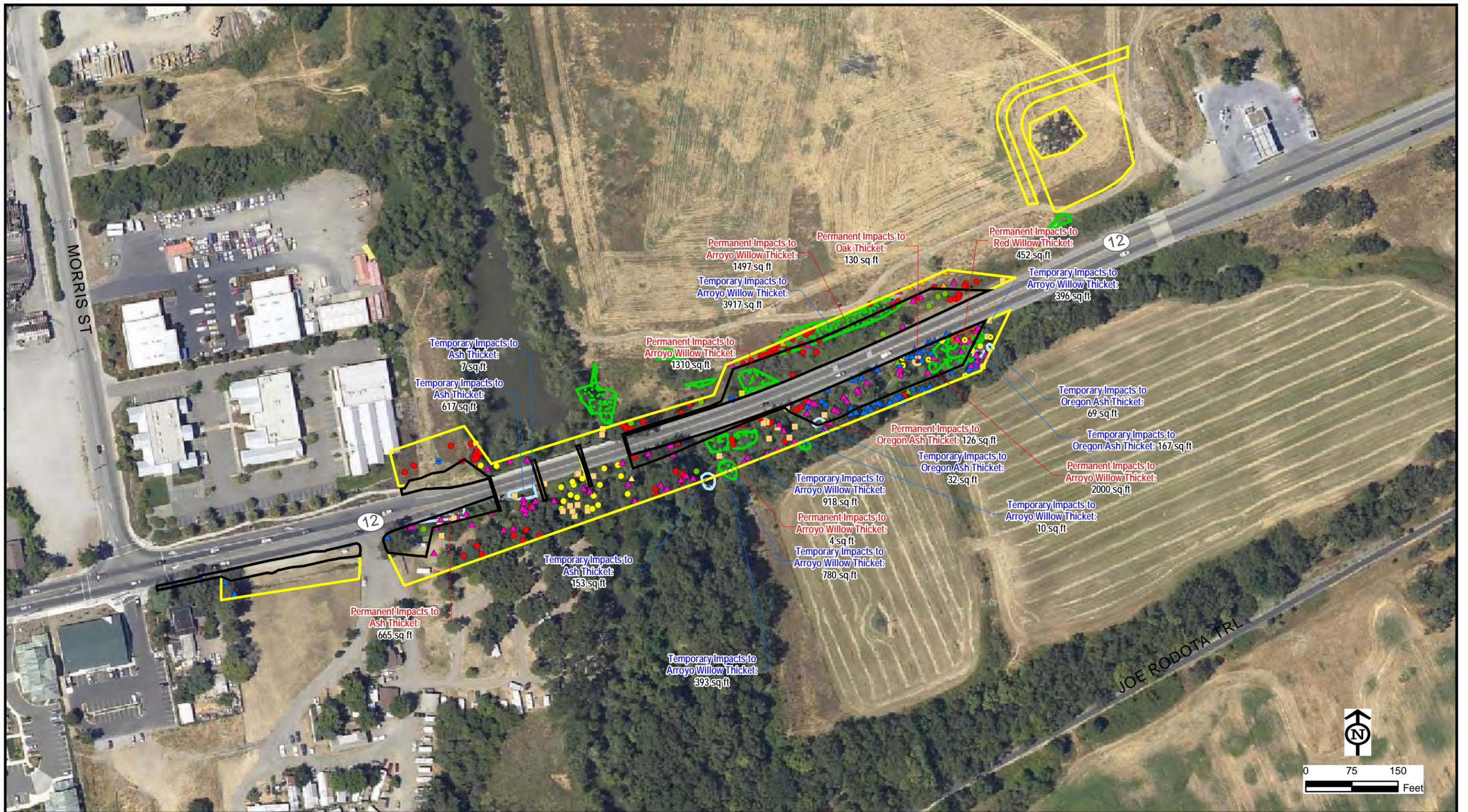


0 75 150
Feet



FIGURE 1
SUPPLEMENTAL TREE SURVEY TO
INCORPORATE SEPTEMBER '08
DESIGN REVISIONS

LAGUNA DE SANTA ROSA BRIDGE REPLACEMENT PROJECT
EA 1A2900 / STATE ROUTE 12 / PM 9.3
SONOMA COUNTY, CA



LEGEND

<ul style="list-style-type: none"> Action Area (Project Footprint) ~Permanent Impacts~ Action Area (Construction Staging and Access Area) ~Potential Impacts~ 	<p>Shrubs</p> <ul style="list-style-type: none"> Arroyo Willow Thicket Oak Thicket Oregon Ash Thicket Red Willow Thicket 	<p>Trees - Common Name</p> <ul style="list-style-type: none"> ■ Apple ■ Apricot ■ Arroyo willow ■ Blackwood acacia ▲ Blue elderberry ● California rose ● Cherry Plum ▲ Garry oak ▲ Coast live oak ▲ Cornus ▲ Hawthorn ▲ Monterey pine ▲ Oregon ash ● Ornamental plum ● Red willow ● Valley oak
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FIGURE 2
IMPACTS TO TREES & THICKETS
SEPTEMBER '08 DESIGNS
 LAGUNA DE SANTA ROSA BRIDGE REPLACEMENT PROJECT
 EA 1A2900 / STATE ROUTE 12 / PM 9.3
 SONOMA COUNTY, CA

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type ²
316	Blackwood acacia	<i>Acacia dealbata</i>		23	Permanent
225	Blackwood acacia	<i>Acacia dealbata</i>		4	Permanent
302	Cornus	<i>Cornus sericea</i>	4	8	Potential
53	Hawthorn	<i>Crataegus suksdorfii</i>		1	Potential
54	Hawthorn	<i>Crataegus suksdorfii</i>		1	Potential
55	Hawthorn	<i>Crataegus suksdorfii</i>		1	Potential
124	Hawthorn	<i>Crataegus suksdorfii</i>		1	Potential
127	Hawthorn	<i>Crataegus suksdorfii</i>		1	Potential
98	Hawthorn	<i>Crataegus suksdorfii</i>		1	Potential
1044	Oregon ash	<i>Fraximus latifolia</i>	4	32	Potential
1085	Oregon ash	<i>Fraximus latifolia</i>	4	23	Potential
1160	Oregon ash	<i>Fraximus latifolia</i>	5	18	Potential
1089	Oregon ash	<i>Fraximus latifolia</i>	5	17	Potential
1098	Oregon ash	<i>Fraximus latifolia</i>	2	15	Potential
1105	Oregon ash	<i>Fraximus latifolia</i>		15	Potential
1102	Oregon ash	<i>Fraximus latifolia</i>	2	14	Potential
1128	Oregon ash	<i>Fraximus latifolia</i>		14	Potential
1139	Oregon ash	<i>Fraximus latifolia</i>		12	Potential
1159	Oregon ash	<i>Fraximus latifolia</i>	4	12	Potential
1070	Oregon ash	<i>Fraximus latifolia</i>		12	Potential
1142	Oregon ash	<i>Fraximus latifolia</i>		11	Potential
1162	Oregon ash	<i>Fraximus latifolia</i>		11	Potential
1082	Oregon ash	<i>Fraximus latifolia</i>		11	Potential
1092	Oregon ash	<i>Fraximus latifolia</i>	2	11	Potential
1150	Oregon ash	<i>Fraximus latifolia</i>		9	Potential
1165	Oregon ash	<i>Fraximus latifolia</i>		9	Potential
1081	Oregon ash	<i>Fraximus latifolia</i>		9	Potential
1114	Oregon ash	<i>Fraximus latifolia</i>		9	Potential
1155	Oregon ash	<i>Fraximus latifolia</i>	3	7	Potential
1104	Oregon ash	<i>Fraximus latifolia</i>		7	Potential
1046	Oregon ash	<i>Fraximus latifolia</i>		6	Potential

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type²
1121	Oregon ash	<i>Fraximus latifolia</i>	3	6	Potential
1156	Oregon ash	<i>Fraximus latifolia</i>		5	Potential
1045	Oregon ash	<i>Fraximus latifolia</i>		4	Potential
1084	Oregon ash	<i>Fraximus latifolia</i>	2	4	Potential
1154	Oregon ash	<i>Fraximus latifolia</i>		2	Potential
1090	Oregon ash	<i>Fraximus latifolia</i>		2	Potential
1164	Oregon ash	<i>Fraximus latifolia</i>		1	Potential
1151	Oregon ash	<i>Fraximus latifolia</i>	2	4	Permanent
1157	Oregon ash	<i>Fraximus latifolia</i>		3	Permanent
1080	Oregon ash	<i>Fraximus latifolia</i>		2	Permanent
241	Oregon ash	<i>Fraxinus latifolia</i>	3	72	Potential
202	Oregon ash	<i>Fraxinus latifolia</i>	6	41	Potential
258	Oregon ash	<i>Fraxinus latifolia</i>	4	40	Potential
236	Oregon ash	<i>Fraxinus latifolia</i>	4	38	Potential
224	Oregon ash	<i>Fraxinus latifolia</i>		30	Potential
235	Oregon ash	<i>Fraxinus latifolia</i>	2	26	Potential
344	Oregon ash	<i>Fraxinus latifolia</i>		24	Potential
234	Oregon ash	<i>Fraxinus latifolia</i>		22	Potential
237	Oregon ash	<i>Fraxinus latifolia</i>	3	20	Potential
238	Oregon ash	<i>Fraxinus latifolia</i>		20	Potential
243	Oregon ash	<i>Fraxinus latifolia</i>	2	20	Potential
305	Oregon ash	<i>Fraxinus latifolia</i>	2	20	Potential
317	Oregon ash	<i>Fraxinus latifolia</i>	2	20	Potential
297	Oregon ash	<i>Fraxinus latifolia</i>	6	19	Potential
303	Oregon ash	<i>Fraxinus latifolia</i>		18	Potential
248	Oregon ash	<i>Fraxinus latifolia</i>	2	14	Potential
318	Oregon ash	<i>Fraxinus latifolia</i>		14	Potential
276	Oregon ash	<i>Fraxinus latifolia</i>	2	12	Potential
311	Oregon ash	<i>Fraxinus latifolia</i>	2	12	Potential
315	Oregon ash	<i>Fraxinus latifolia</i>		12	Potential
347	Oregon ash	<i>Fraxinus latifolia</i>		12	Potential

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type ²
591	Oregon ash	<i>Fraxinus latifolia</i>		12	Potential
249	Oregon ash	<i>Fraxinus latifolia</i>		10	Potential
256	Oregon ash	<i>Fraxinus latifolia</i>		10	Potential
278	Oregon ash	<i>Fraxinus latifolia</i>	5	10	Potential
301	Oregon ash	<i>Fraxinus latifolia</i>	2	10	Potential
319	Oregon ash	<i>Fraxinus latifolia</i>		10	Potential
597	Oregon ash	<i>Fraxinus latifolia</i>		10	Potential
106	Oregon ash	<i>Fraxinus latifolia</i>		10	Potential
594	Oregon ash	<i>Fraxinus latifolia</i>		9	Potential
255	Oregon ash	<i>Fraxinus latifolia</i>		8	Potential
595	Oregon ash	<i>Fraxinus latifolia</i>		8	Potential
592	Oregon ash	<i>Fraxinus latifolia</i>		5	Potential
252	Oregon ash	<i>Fraxinus latifolia</i>		4	Potential
253	Oregon ash	<i>Fraxinus latifolia</i>		4	Potential
296	Oregon ash	<i>Fraxinus latifolia</i>		3	Potential
191	Oregon ash	<i>Fraxinus latifolia</i>	2	2	Potential
97	Oregon ash	<i>Fraxinus latifolia</i>		1	Potential
100	Oregon ash	<i>Fraxinus latifolia</i>		1	Potential
102	Oregon ash	<i>Fraxinus latifolia</i>		1	Potential
60	Oregon ash	<i>Fraxinus latifolia</i>		1	Potential
104	Oregon ash	<i>Fraxinus latifolia</i>		1	Potential
598	Oregon ash	<i>Fraxinus latifolia</i>		1	Potential
544	Oregon ash	<i>Fraxinus latifolia</i>		1	Potential
321	Oregon ash	<i>Fraxinus latifolia</i>		No data	Potential
275	Oregon ash	<i>Fraxinus latifolia</i>	4	16	Permanent
240	Oregon ash	<i>Fraxinus latifolia</i>	2	6	Permanent
250	Oregon ash	<i>Fraxinus latifolia</i>		6	Permanent
131	Oregon ash	<i>Fraxinus latifolia</i>		6	Permanent
596	Oregon ash	<i>Fraxinus latifolia</i>		6	Permanent
585	Oregon ash	<i>Fraxinus latifolia</i>		3	Permanent
113	Apple	<i>Malus sp.</i>		12	Potential

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type ²
356	Monterey pine	<i>Pinus radiata</i>	2	52	Potential
112	Apricot	<i>Prunus armeniaca</i>		6	Potential
1113	Cherry Plum	<i>Prunus ceratifolia</i>	4	36	Potential
1143	Cherry Plum	<i>Prunus ceratifolia</i>	5	14	Potential
1043	Cherry Plum	<i>Prunus ceratifolia</i>		3	Potential
1131	Cherry Plum	<i>Prunus ceratifolia</i>		2	Potential
1172	Cherry Plum	<i>Prunus ceratifolia</i>		1	Permanent
1049	Cherry Plum	<i>Prunus ceratifolia</i>		1	Permanent
223	Ornamental plum	<i>Prunus sp.</i>		20	Potential
435	Ornamental plum	<i>Prunus sp.</i>	2	8	Potential
537	Ornamental plum	<i>Prunus sp.</i>	2	6	Potential
431	Ornamental plum	<i>Prunus sp.</i>		2	Potential
430	Ornamental plum	<i>Prunus sp.</i>		1	Potential
531	Ornamental plum	<i>Prunus sp.</i>		4	Permanent
593	Ornamental plum	<i>Prunus sp.</i>		1	Permanent
108	Ornamental plum	<i>Prunus sp.</i>		1	Permanent
1048	Coast live oak	<i>Quercus agrifolia</i>	2	9	Potential
1052	Coast live oak	<i>Quercus agrifolia</i>	2	7	Potential
1002	Garry oak	<i>Quercus garryana</i>		31	Potential
1066	Garry oak	<i>Quercus garryana</i>	3	17	Potential
1135	Garry oak	<i>Quercus garryana</i>	3	14	Potential
1075	Garry oak	<i>Quercus garryana</i>		14	Potential
1137	Garry oak	<i>Quercus garryana</i>		13	Potential
1042	Garry oak	<i>Quercus garryana</i>		13	Potential
1141	Garry oak	<i>Quercus garryana</i>		8	Potential
1051	Garry oak	<i>Quercus garryana</i>	2	8	Potential
1065	Garry oak	<i>Quercus garryana</i>		8	Potential
1109	Garry oak	<i>Quercus garryana</i>		8	Potential
1088	Garry oak	<i>Quercus garryana</i>		7	Potential
1093	Garry oak	<i>Quercus garryana</i>		7	Potential
1134	Garry oak	<i>Quercus garryana</i>		5	Potential

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type²
1072	Garry oak	<i>Quercus garryana</i>		5	Potential
1100	Garry oak	<i>Quercus garryana</i>		4	Potential
1111	Garry oak	<i>Quercus garryana</i>		4	Potential
1138	Garry oak	<i>Quercus garryana</i>		3	Potential
1055	Garry oak	<i>Quercus garryana</i>		3	Potential
1007	Garry oak	<i>Quercus garryana</i>		3	Potential
1058	Garry oak	<i>Quercus garryana</i>		3	Potential
1073	Garry oak	<i>Quercus garryana</i>		2	Potential
1083	Garry oak	<i>Quercus garryana</i>		2	Potential
1140	Garry oak	<i>Quercus garryana</i>		1	Potential
1074	Garry oak	<i>Quercus garryana</i>		1	Potential
1116	Garry oak	<i>Quercus garryana</i>		1	Potential
1008	Garry oak	<i>Quercus garryana</i>		41	Permanent
599	Garry oak	<i>Quercus garryana</i>		40	Permanent
1091	Garry oak	<i>Quercus garryana</i>		36	Permanent
1118	Garry oak	<i>Quercus garryana</i>	2	30	Permanent
1126	Garry oak	<i>Quercus garryana</i>		30	Permanent
1047	Garry oak	<i>Quercus garryana</i>	4	29	Permanent
1057	Garry oak	<i>Quercus garryana</i>		19	Permanent
1071	Garry oak	<i>Quercus garryana</i>		19	Permanent
1095	Garry oak	<i>Quercus garryana</i>		17	Permanent
1061	Garry oak	<i>Quercus garryana</i>		12	Permanent
1069	Garry oak	<i>Quercus garryana</i>		12	Permanent
1086	Garry oak	<i>Quercus garryana</i>	4	11	Permanent
1136	Garry oak	<i>Quercus garryana</i>		10	Permanent
1001	Garry oak	<i>Quercus garryana</i>		10	Permanent
1067	Garry oak	<i>Quercus garryana</i>		10	Permanent
1060	Garry oak	<i>Quercus garryana</i>		9	Permanent
1107	Garry oak	<i>Quercus garryana</i>		9	Permanent
1117	Garry oak	<i>Quercus garryana</i>		9	Permanent
1000	Garry oak	<i>Quercus garryana</i>		9	Permanent

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type²
1115	Garry oak	<i>Quercus garryana</i>		8	Permanent
1122	Garry oak	<i>Quercus garryana</i>		8	Permanent
1124	Garry oak	<i>Quercus garryana</i>		8	Permanent
1050	Garry oak	<i>Quercus garryana</i>		6	Permanent
1068	Garry oak	<i>Quercus garryana</i>		6	Permanent
1078	Garry oak	<i>Quercus garryana</i>		6	Permanent
1079	Garry oak	<i>Quercus garryana</i>		6	Permanent
1112	Garry oak	<i>Quercus garryana</i>		6	Permanent
1123	Garry oak	<i>Quercus garryana</i>		6	Permanent
1125	Garry oak	<i>Quercus garryana</i>		6	Permanent
1059	Garry oak	<i>Quercus garryana</i>		5	Permanent
1087	Garry oak	<i>Quercus garryana</i>		5	Permanent
1096	Garry oak	<i>Quercus garryana</i>		5	Permanent
1119	Garry oak	<i>Quercus garryana</i>		5	Permanent
1054	Garry oak	<i>Quercus garryana</i>		4	Permanent
1076	Garry oak	<i>Quercus garryana</i>		4	Permanent
1064	Garry oak	<i>Quercus garryana</i>		3	Permanent
1077	Garry oak	<i>Quercus garryana</i>		3	Permanent
1110	Garry oak	<i>Quercus garryana</i>		3	Permanent
233	Valley oak	<i>Quercus lobata</i>		70	Potential
230	Valley oak	<i>Quercus lobata</i>		54	Potential
312	Valley oak	<i>Quercus lobata</i>		52	Potential
313	Valley oak	<i>Quercus lobata</i>		52	Potential
254	Valley oak	<i>Quercus lobata</i>	3	48	Potential
246	Valley oak	<i>Quercus lobata</i>	2	40	Potential
309	Valley oak	<i>Quercus lobata</i>		20	Potential
310	Valley oak	<i>Quercus lobata</i>		18	Potential
129	Valley oak	<i>Quercus lobata</i>	3	18	Potential
528	Valley oak	<i>Quercus lobata</i>		18	Potential
348	Valley oak	<i>Quercus lobata</i>		14	Potential
361	Valley oak	<i>Quercus lobata</i>	3	14	Potential

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type²
96	Valley oak	<i>Quercus lobata</i>		10	Potential
199	Valley oak	<i>Quercus lobata</i>		10	Potential
432	Valley oak	<i>Quercus lobata</i>	2	8	Potential
433	Valley oak	<i>Quercus lobata</i>	2	8	Potential
434	Valley oak	<i>Quercus lobata</i>	2	8	Potential
196	Valley oak	<i>Quercus lobata</i>	2	8	Potential
346	Valley oak	<i>Quercus lobata</i>		8	Potential
116	Valley oak	<i>Quercus lobata</i>	2	8	Potential
119	Valley oak	<i>Quercus lobata</i>	4	8	Potential
1053	Valley oak	<i>Quercus lobata</i>	2	7	Potential
117	Valley oak	<i>Quercus lobata</i>	3	7	Potential
95	Valley oak	<i>Quercus lobata</i>		6	Potential
195	Valley oak	<i>Quercus lobata</i>		6	Potential
198	Valley oak	<i>Quercus lobata</i>		6	Potential
103	Valley oak	<i>Quercus lobata</i>		6	Potential
105	Valley oak	<i>Quercus lobata</i>		6	Potential
109	Valley oak	<i>Quercus lobata</i>		6	Potential
125	Valley oak	<i>Quercus lobata</i>		6	Potential
114	Valley oak	<i>Quercus lobata</i>		6	Potential
339	Valley oak	<i>Quercus lobata</i>		4	Potential
354	Valley oak	<i>Quercus lobata</i>		4	Potential
357	Valley oak	<i>Quercus lobata</i>		4	Potential
121	Valley oak	<i>Quercus lobata</i>		4	Potential
123	Valley oak	<i>Quercus lobata</i>		4	Potential
535	Valley oak	<i>Quercus lobata</i>		4	Potential
193	Valley oak	<i>Quercus lobata</i>		3	Potential
200	Valley oak	<i>Quercus lobata</i>		3	Potential
189	Valley oak	<i>Quercus lobata</i>		2	Potential
194	Valley oak	<i>Quercus lobata</i>		2	Potential
130	Valley oak	<i>Quercus lobata</i>	2	2	Potential
204	Valley oak	<i>Quercus lobata</i>		1	Potential

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type²
206	Valley oak	<i>Quercus lobata</i>		1	Potential
353	Valley oak	<i>Quercus lobata</i>		1	Potential
118	Valley oak	<i>Quercus lobata</i>		1	Potential
120	Valley oak	<i>Quercus lobata</i>		1	Potential
122	Valley oak	<i>Quercus lobata</i>		1	Potential
128	Valley oak	<i>Quercus lobata</i>		1	Potential
132	Valley oak	<i>Quercus lobata</i>		1	Potential
133	Valley oak	<i>Quercus lobata</i>		1	Potential
137	Valley oak	<i>Quercus lobata</i>		1	Potential
532	Valley oak	<i>Quercus lobata</i>		1	Potential
561	Valley oak	<i>Quercus lobata</i>		1	Potential
228	Valley oak	<i>Quercus lobata</i>	2	52	Permanent
115	Valley oak	<i>Quercus lobata</i>	10	40	Permanent
533	Valley oak	<i>Quercus lobata</i>	2	38	Permanent
244	Valley oak	<i>Quercus lobata</i>		36	Permanent
314	Valley oak	<i>Quercus lobata</i>		32	Permanent
229	Valley oak	<i>Quercus lobata</i>		28	Permanent
247	Valley oak	<i>Quercus lobata</i>		26	Permanent
534	Valley oak	<i>Quercus lobata</i>		24	Permanent
340	Valley oak	<i>Quercus lobata</i>	4	22	Permanent
358	Valley oak	<i>Quercus lobata</i>	4	22	Permanent
320	Valley oak	<i>Quercus lobata</i>		12	Permanent
134	Valley oak	<i>Quercus lobata</i>	2	12	Permanent
111	Valley oak	<i>Quercus lobata</i>	2	12	Permanent
436	Valley oak	<i>Quercus lobata</i>		10	Permanent
437	Valley oak	<i>Quercus lobata</i>	2	8	Permanent
110	Valley oak	<i>Quercus lobata</i>		6	Permanent
197	Valley oak	<i>Quercus lobata</i>		3	Permanent
359	Valley oak	<i>Quercus lobata</i>		2	Permanent
152	Valley oak	<i>Quercus lobata</i>		1	Permanent
153	Valley oak	<i>Quercus lobata</i>		1	Permanent

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type ²
192	Valley oak	<i>Quercus lobata</i>		1	Permanent
529	Valley oak	<i>Quercus lobata</i>		1	Permanent
99	California rose	<i>Rosa californica</i>		1	Permanent
101	California rose	<i>Rosa californica</i>		1	Permanent
268	Red willow	<i>Salix laevigata</i>	5	40	Potential
304	Red willow	<i>Salix laevigata</i>	4	26	Potential
282	Red willow	<i>Salix laevigata</i>	3	24	Potential
1153	Red willow	<i>Salix laevigata</i>	2	15	Potential
201	Red willow	<i>Salix laevigata</i>		12	Potential
271	Red willow	<i>Salix laevigata</i>		10	Potential
272	Red willow	<i>Salix laevigata</i>		10	Potential
277	Red willow	<i>Salix laevigata</i>		10	Potential
284	Red willow	<i>Salix laevigata</i>	2	10	Potential
299	Red willow	<i>Salix laevigata</i>	2	9	Potential
190	Red willow	<i>Salix laevigata</i>		8	Potential
273	Red willow	<i>Salix laevigata</i>	2	8	Potential
288	Red willow	<i>Salix laevigata</i>		8	Potential
280	Red willow	<i>Salix laevigata</i>		6	Potential
281	Red willow	<i>Salix laevigata</i>		6	Potential
287	Red willow	<i>Salix laevigata</i>		6	Potential
1130	Red willow	<i>Salix laevigata</i>		4	Potential
267	Red willow	<i>Salix laevigata</i>		2	Potential
266	Red willow	<i>Salix laevigata</i>	5	38	Permanent
300	Red willow	<i>Salix laevigata</i>	5	28	Permanent
203	Red willow	<i>Salix laevigata</i>	2	24	Permanent
274	Red willow	<i>Salix laevigata</i>	2	16	Permanent
1163	Red willow	<i>Salix laevigata</i>	2	6	Permanent
264	Red willow	<i>Salix laevigata</i>		4	Permanent
341	Arroyo willow	<i>Salix lasiolepis</i>	8	21	Potential
251	Arroyo willow	<i>Salix lasiolepis</i>		18	Potential
355	Arroyo willow	<i>Salix lasiolepis</i>	4	15	Potential

Table 1. List of Impacted Trees (Laguna de Santa Rosa Bridge Replacement Project)

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Anticipated Impact Type ²
527	Arroyo willow	<i>Salix lasiolepis</i>		14	Potential
239	Arroyo willow	<i>Salix lasiolepis</i>		12	Potential
265	Arroyo willow	<i>Salix lasiolepis</i>		12	Potential
270	Arroyo willow	<i>Salix lasiolepis</i>	2	11	Potential
352	Arroyo willow	<i>Salix lasiolepis</i>	4	10	Potential
262	Arroyo willow	<i>Salix lasiolepis</i>	2	9	Potential
438	Arroyo willow	<i>Salix lasiolepis</i>	6	6	Potential
382	Arroyo willow	<i>Salix lasiolepis</i>		6	Potential
226	Arroyo willow	<i>Salix lasiolepis</i>		5	Potential
1106	Arroyo willow	<i>Salix lasiolepis</i>	4	4	Potential
283	Arroyo willow	<i>Salix lasiolepis</i>		4	Potential
227	Arroyo willow	<i>Salix lasiolepis</i>		3	Potential
360	Arroyo willow	<i>Salix lasiolepis</i>		3	Potential
286	Arroyo willow	<i>Salix lasiolepis</i>		2	Potential
345	Arroyo willow	<i>Salix lasiolepis</i>		2	Potential
349	Arroyo willow	<i>Salix lasiolepis</i>		2	Potential
350	Arroyo willow	<i>Salix lasiolepis</i>	2	2	Potential
343	Arroyo willow	<i>Salix lasiolepis</i>		No data	Potential
279	Arroyo willow	<i>Salix lasiolepis</i>	9	35	Permanent
351	Arroyo willow	<i>Salix lasiolepis</i>	6	31	Permanent
1161	Arroyo willow	<i>Salix lasiolepis</i>	6	19	Permanent
257	Arroyo willow	<i>Salix lasiolepis</i>		8	Permanent
269	Arroyo willow	<i>Salix lasiolepis</i>		8	Permanent
525	Arroyo willow	<i>Salix lasiolepis</i>	2	8	Permanent
1145	Arroyo willow	<i>Salix lasiolepis</i>	2	7	Permanent
263	Arroyo willow	<i>Salix lasiolepis</i>	2	6	Permanent
285	Arroyo willow	<i>Salix lasiolepis</i>	3	6	Permanent
205	Blue elderberry	<i>Sambucus mexicana</i>		1	Permanent

NOTES:

¹ The tree identification numbers are not sequential in all cases, because some of the trees identified during the field effort were determined to be outside of the Project environmental footprint (EF) and due to multiple survey efforts.

² Permanent and Potential impacts were determined based upon the boundaries of the project footprint and the construction access areas, as shown in the design drawings dated September 03, 2008. Potential impacts indicate that the tree is located within the construction access area (between the catchline and the proposed or existing right-of-way), and extent of impacts is not known at this time. Actual impacts will be tracked during construction, and mitigated accordingly.

Table 2. Summary of Impacts to Trees by Size Class

Common Name	Size Class (in.)	Number of Trees per Impact Type ¹	
		Permanent Impact	Potential Impact
Native Riparian (excluding oaks)	>/=4	21	95
Non-Native Riparian Tree	>/=4	3	8
Oaks	>/=4	51	55
Riparian Understory (native and non-native, excluding oaks)	<4	10	29
Oaks	<4	9	26

NOTES:

¹ Impact Types:

Permanent = Tree is located in the project footprint (within the catchline) and will be permanently impacted.

Potential = Tree is located within the construction access area (between the catchline and the proposed or existing right-of-way), and extent of impacts is not known at this time. Actual impacts will be tracked during construction, and mitigated accordingly.

Table 3. Summary of Impacts to Thickets (Laguna de Santa Rosa Bridge Replacement Project)

Common Name	Scientific Name	Permanent Impact	Potential Impact
		acres	acres
Oregon ash	<i>Fraxinus latifolia</i>	0.02	0.02
Arroyo willow	<i>Salix lasiolepis</i>	0.11	0.15
Red willow	<i>Salix laevigata</i>	0.01	0
Oregon oak	<i>Quercus garryana</i>	0.003	0

Attachment 1 – 2007 Tree Survey Memorandum

Tree Survey Results for the State Route 12 Laguna de Santa Rosa Bridge Replacement Project

TO: John Yeakel/Caltrans District 04
Theresa Engle/Caltrans District 04

FROM: CH2M HILL

DATE: December 3, 2007

Introduction

The California Department of Transportation (Caltrans) is proposing to replace the Laguna de Santa Rosa bridge (Caltrans Bridge Number 20-0035), located at kilometer post (KP) 15.5 (postmile [PM] 9.6) on State Route (SR) 12. The proposed Laguna de Santa Rosa Bridge Replacement Project (Project) is located on the Santa Rosa Plain, east of the City of Sebastopol in Sonoma County, California. The proposed Project is within the Sebastopol 7½' United States Geological Survey (USGS) quadrangle (Township 7N, Range 9W; 38.40348° N/122.81616° W).

LSA Associates, Inc. (LSA), as a subconsultant through CH2M HILL to Caltrans, conducted a tree survey to identify, map, and measure the diameter of trees that will potentially be removed or otherwise impacted during implementation of the Project. This technical memorandum summarizes the methods and results of the surveys.

Methods

Timothy Milliken/LSA, certified arborist, conducted the tree survey on May 29, June 1, June 20, and October 23, 2007. The survey was conducted within the Project Environmental Footprint (EF), which is comprised of both the Project footprint, and construction staging and access areas (as shown on the design drawings dated September 22, 2007) (Figure 1, contained in Attachment A). The following tasks were completed during the survey: (1) mapping the location of all trees, including willow thickets; (2) identification of each tree to species level; (3) measurement of the diameter at breast height (DBH) of each tree; and (4) documentation of the location and DBH of each tree using a global positioning system (GPS [Trimble GeoXT]) device.

The tree survey was conducted to support the Biological Resources Department, as well as other environmental departments within Caltrans (e.g., Visual Resources and Landscape Architecture). Therefore, it addresses a broader range of species (and includes shrubs and thickets) than would be required for biological documentation purposes alone.

Data Collection Methodology

The DBH of each tree was measured at 1.37 m (4.5 ft) above the natural grade using either a Biltmore stick or a diameter tape. All DBH measurements were taken in inches and later converted to the metric standard (centimeters [cm]). Trees or shrubs having a DBH less than 2.5 cm (1 inch) were arbitrarily assigned a 2.5 cm DBH. If an individual tree had multiple trunks, the combined diameter of all trunks was recorded.

A GPS reading of the location of each tree was obtained at the closest possible point to the trunk. However, because of the presence of poison oak and Himalayan blackberry in some locations, this point was not recorded at a standard position (e.g., road side of the trunk). Trees with their main trunk located outside of the EF, but with their drip-line present within the EF, were included in the survey.

In some areas, thickets of Himalayan blackberry and poison oak prevented direct access to trees growing within the thicket. To the extent possible, the DBH of these trees was estimated, and manual offsets were used to record the tree location. In especially dense thickets (or where access was otherwise precluded), the perimeter of each thicket was recorded with the GPS. The number of individual trees was not recorded in areas where this methodology was applied.

Following completion of the survey, the GPS coordinates were post-processed to differentially correct the recorded satellite positions in order to improve the accuracy of the data to a sub-meter level. The post-processed information was summarized and is presented in Tables 1 through 5 (contained in Attachment B).

Data Quality Control Methodology

The tree survey data from all survey dates were compiled into a single geographic information system (GIS) database and electronically overlain on a recent aerial photograph from the Digital Highway Inventory Photography Program (DHIPP). The survey data were compared to the aerial photographic base maps to verify that trees were not inadvertently missed during the survey.

Impact Analysis

The Project Footprint and Construction Staging and Access Area boundaries (as shown on the design drawings dated September 22, 2007) were added to the GIS database and used to identify the potential Project-related tree impacts. Trees with the main trunk located within the Project Footprint were determined to be permanently impacted. Undefined impacts were considered to be those trees with either the main trunk within the Construction Staging or Access Area or a portion of the drip line within the Construction Staging or Access Area (but the main trunk located outside the EF).

Results

The results of the tree survey are shown in Figures 2 and 3 (Attachment A), and are presented in Tables 1 through 3 (Attachment B). Table 1 includes the list of individual trees that were recorded during the survey. Table 2 summarizes the impacted trees by species, and Table 3 summarizes the impacted area of thickets.

A total of 385 individual trees were mapped within the Project EF. In addition, twelve thickets were mapped where individual tree data was impracticable to obtain. The mapped trees represent 19 different species, including 13 that are native to this region of California, one that is native to other regions of California, and 5 that are ornamental or agricultural varieties. Two of the species (blackwood acacia [*Acacia dealbata*] and white poplar [*Populus alba*]) are considered invasive weeds (Cal-IPC 2006).

As listed in Table 2, the trees observed and measured in the survey are (listed in order of prevalence): 164 valley oak (*Quercus lobata*); 87 Oregon ash (*Fraxinus latifolia*); 32 red willow (*Salix laevigata*); 30 arroyo willow (*Salix lasiolepis*); 13 box elder (*Acer negundo*); 7 Garry oak (*Quercus garryana*); 5 ornamental plum (*Prunus* sp.); 3 California walnut (*Juglans hindsii*); 2 blackwood acacia (*Acacia dealbata*); 2 blue elderberry (*Sambucus mexicana*); 1 coast live oak (*Quercus agrifolia*); 1 cornus (*Cornus sericea* subsp. *sericea*); 1 apple (*Malus* sp.); 1 Monterey pine (*Pinus radiata*); 1 white poplar (*Populus alba*); 1 apricot (*Prunus armeniaca*); and 1 black oak (*Quercus kelloggii*). Additionally there are 33 individual shrubs including 32 hawthorn (*Crateagus suksdorfii*) and 1 California rose (*Rosa californica*).

Figure 3 shows the location of arroyo willow (*Salix lasiolepis*) and Oregon ash (*Fraxinus latifolia*) thickets where an exact tree count was impracticable to obtain due to impenetrable vegetation. These stands are composed of 9 thickets of arroyo willow (1,252 m² [0.31 acre]) and 3 thickets of Oregon ash (162 m² [0.04 acre]).

Two native plant restoration areas occur north of Highway 12 on each side of the Laguna de Santa Rosa. These areas contain approximately 120 planted native trees and shrubs, most of which have a DBH no greater than 2.5 cm (1 inch). Of these, 7 of the trees, including 6 valley oak and 1 hawthorn, appeared to be dead. Trees located within the restoration area are indicated as such in Table 1.

Impacts

As previously described, the EF, which is comprised of the Project Footprint and Construction Staging and Access Area (as shown on the design drawings dated September 22, 2007 – see Figure 1) were used as the basis for assessing potential impacts to trees. Three impact categories were identified and are defined as follows:

1. **Permanent Impact:** Permanent impacts will occur in all areas within the Project Footprint (i.e., within the catchline), and include removal or damage resulting in mortality of a tree.
2. **Undefined Impact:** The Construction Staging and Access Area is an area of potential impact that occurs between the catchline and the proposed or existing right-of-way (ROW). Some trees located within the Construction Staging and Access Area may be permanently impacted (e.g., removed) or temporarily impacted (e.g., trimmed), depending on specific construction needs. These undefined impacts will be identified and tracked during construction, and mitigated accordingly.
3. **No Impact:** Trees that occur beyond the proposed or existing ROW are not expected to be impacted by the proposed Project.

Tables 2 and 3 present the number of trees and thickets, respectively, which are expected to be impacted by the proposed Project. Table 4 lists the anticipated impacts to native oaks per size class.

Permanent Impacts

Seventy-four (74) trees (approximately 19 percent of the trees identified in the EF) will be permanently impacted by the Project, including blackwood acacia (2), Oregon ash (18), apple (1), Monterey pine (1), apricot (1), ornamental plum (4), Garry oak (1), valley oak (24), red willow (8), and arroyo willow (14) (Figure 2 and Table 2). Impacts to native oaks are summarized, by size class, in Table 4.

In addition, 122 m² (0.03 acre) of Oregon ash thicket and 184 m² (0.05 acre) of arroyo willow thicket will be permanently impacted (Figure 3 and Table 3).

Undefined Impacts

Three hundred and eleven (311) trees (approximately 81 percent of the trees identified in the EF) occur in the Construction Staging and Access Area. It is not yet known how many of these trees will be permanently or temporarily impacted. Of these 311 trees, approximately 120 are native trees that were newly planted within the native plant restoration area.

In addition to the trees, approximately 1,070 m² (0.26 acre) of arroyo willow thicket habitat and 40 m² (0.01 acre) of Oregon ash thicket habitat is present in the Construction Staging and Access Area (Figure 3 and Table 3).

Because the extent and type of impact within the Construction Staging and Access Area will depend on specific construction needs that cannot be predicted at this time, the extent and type of impacts to trees in this area will be identified and tracked during construction. The results will be provided to the appropriate resource agencies and the mitigation requirements will be revised accordingly.

Permitting and Regulatory Requirements

This section provides a brief summary of the regulations that are applicable to the proposed tree removal.

California Department of Fish and Game

The California Department of Fish and Game (CDFG) regulates activities within the bed and bank of creeks or streams, including adjacent riparian habitat, under Section 1600 of the California Fish and Game Code. As such, tree removal associated with this Project would require a Section 1602 Streambed Alteration Agreement.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements international treaties between the U.S. and other nations, and is devised to protect migratory birds, any of their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations by permit. The State of California has

incorporated the protection of birds of prey in Sections 3800, 3513, and 3503.5 of the California Fish and Game Code.

Tree removal required by this Project should adhere to the recommendations of the MBTA to avoid impacts to birds protected by the MBTA. Specifically, it is recommended that potential nest trees be removed during the non-nesting season. In cases where trees cannot be removed during the appropriate season, pre-construction nesting surveys should occur prior to the onset of construction activities to identify and remove nearby bird nests (or otherwise prevent nesting), as necessary, outside the nesting season.

Local

The Project is located within the City of Sebastopol, in unincorporated Sonoma County. Local ordinances regarding tree impacts in these communities are summarized in Table 6. Table 4 presents anticipated impacts to native oaks, and Table 5 presents the anticipated impacts to other tree categories pertinent to these regulations.

Recommendations

1. The City of Sebastopol should be consulted to determine specific permit and mitigation requirements, to ensure compliance with the City and County tree ordinances.
2. Several large valley oaks (e.g., Tree #230 and 233) occur within the Construction Staging and Access Area. If possible, these trees should be marked with construction fencing, and avoided during construction.

References

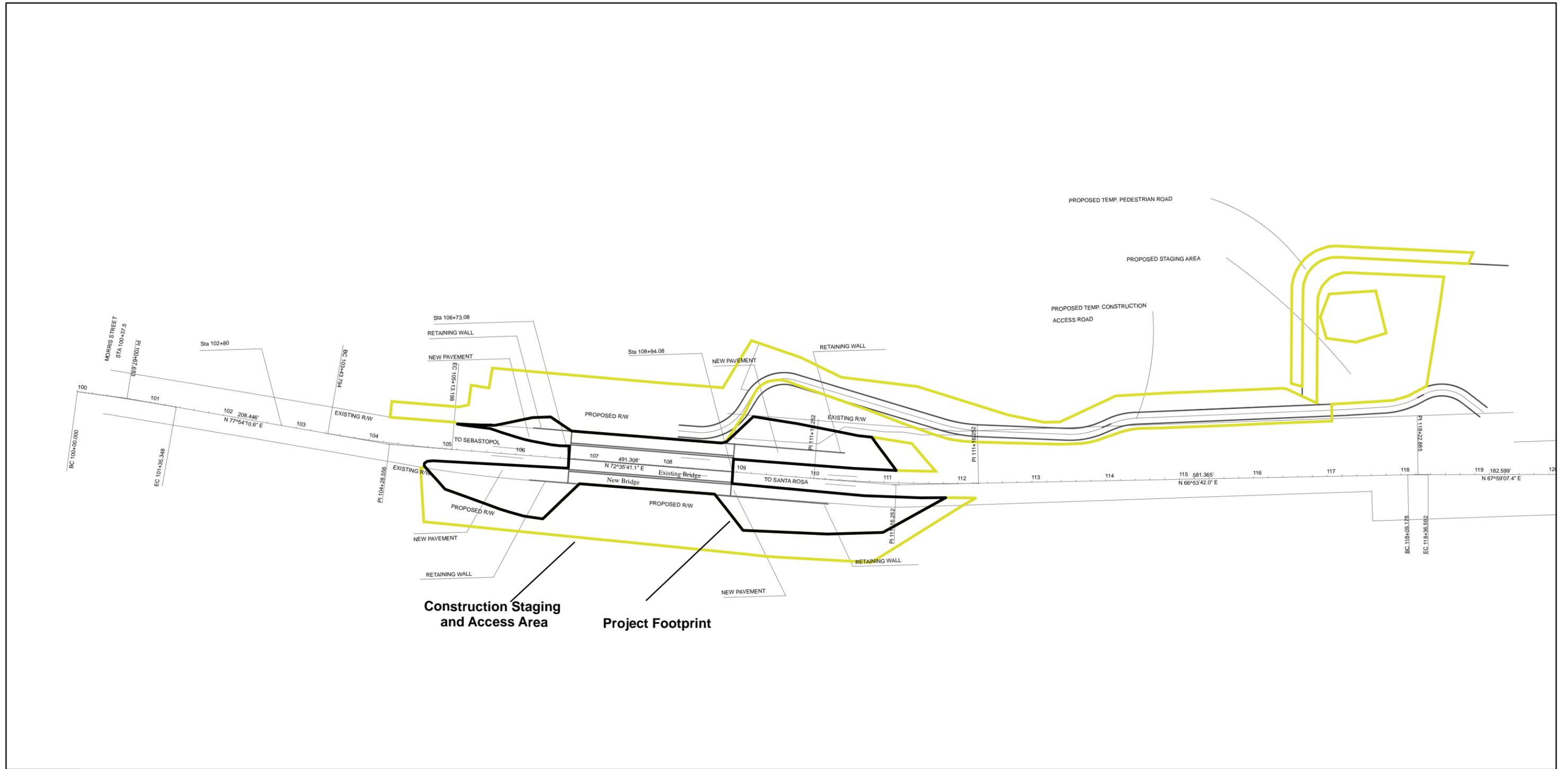
California Invasive Plant Council (Cal-IPC). 2006. *California Invasive Plant Inventory*. Cal-IPC Publication 2006-02. Berkeley, CA. Online: <http://www.cal-ipc.org/ip/inventory/index.php>

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Attachment A
Figures

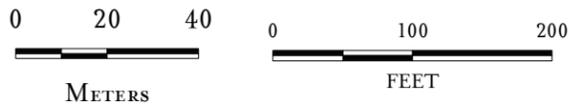
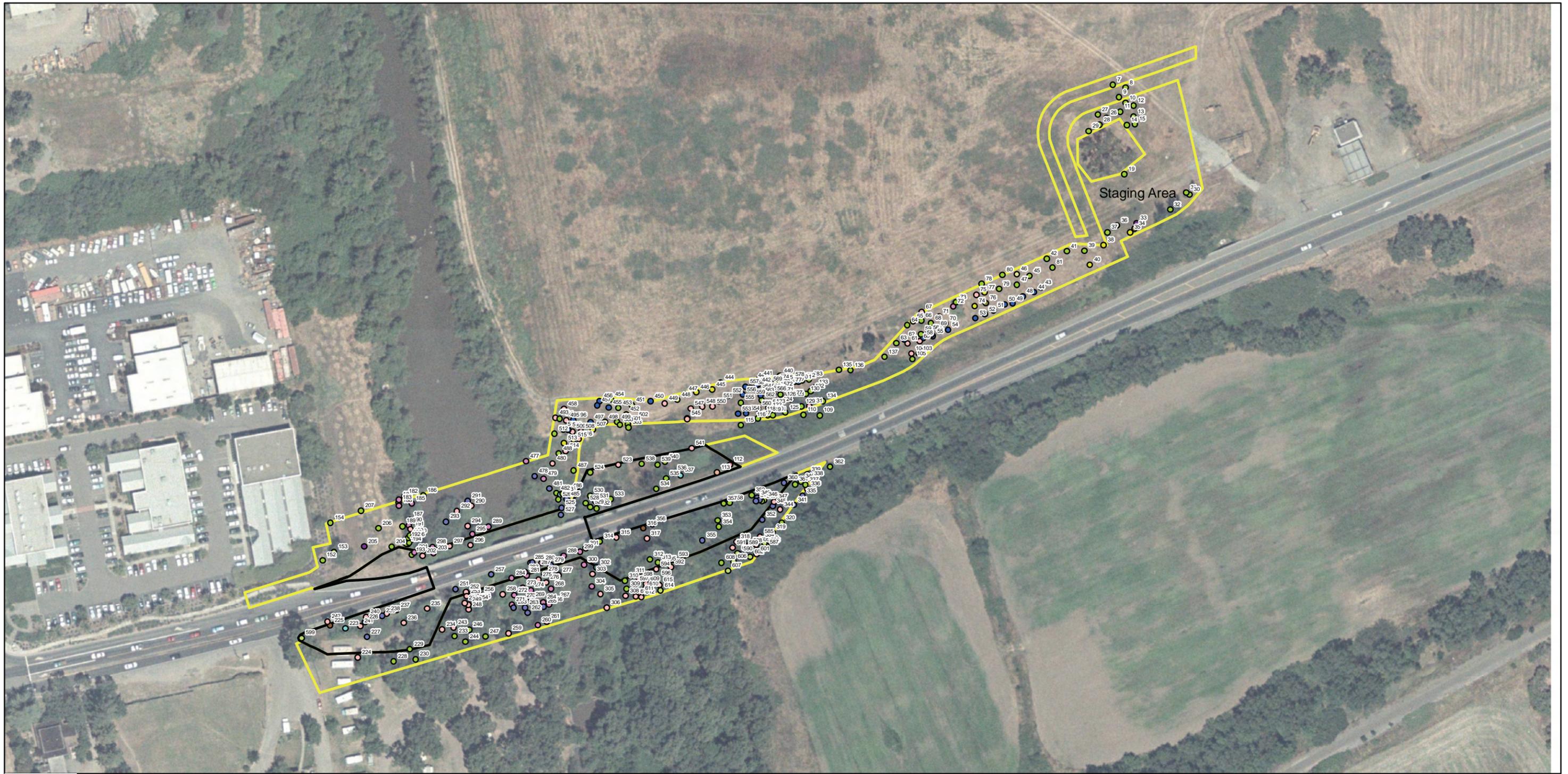


- PROJECT FOOTPRINT
- CONSTRUCTION STAGING AND ACCESS AREA

FIGURE 1

Laguna de Santa Rosa Bridge (No. 20-0035) Replacement Project
 04-SON-12- KP 15.5 (PM 9.3)
 EA 1A-2900
 Federal Project No. 2218-14

Project Layout



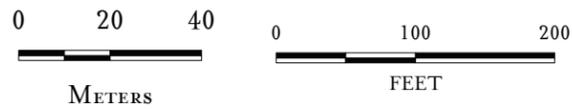
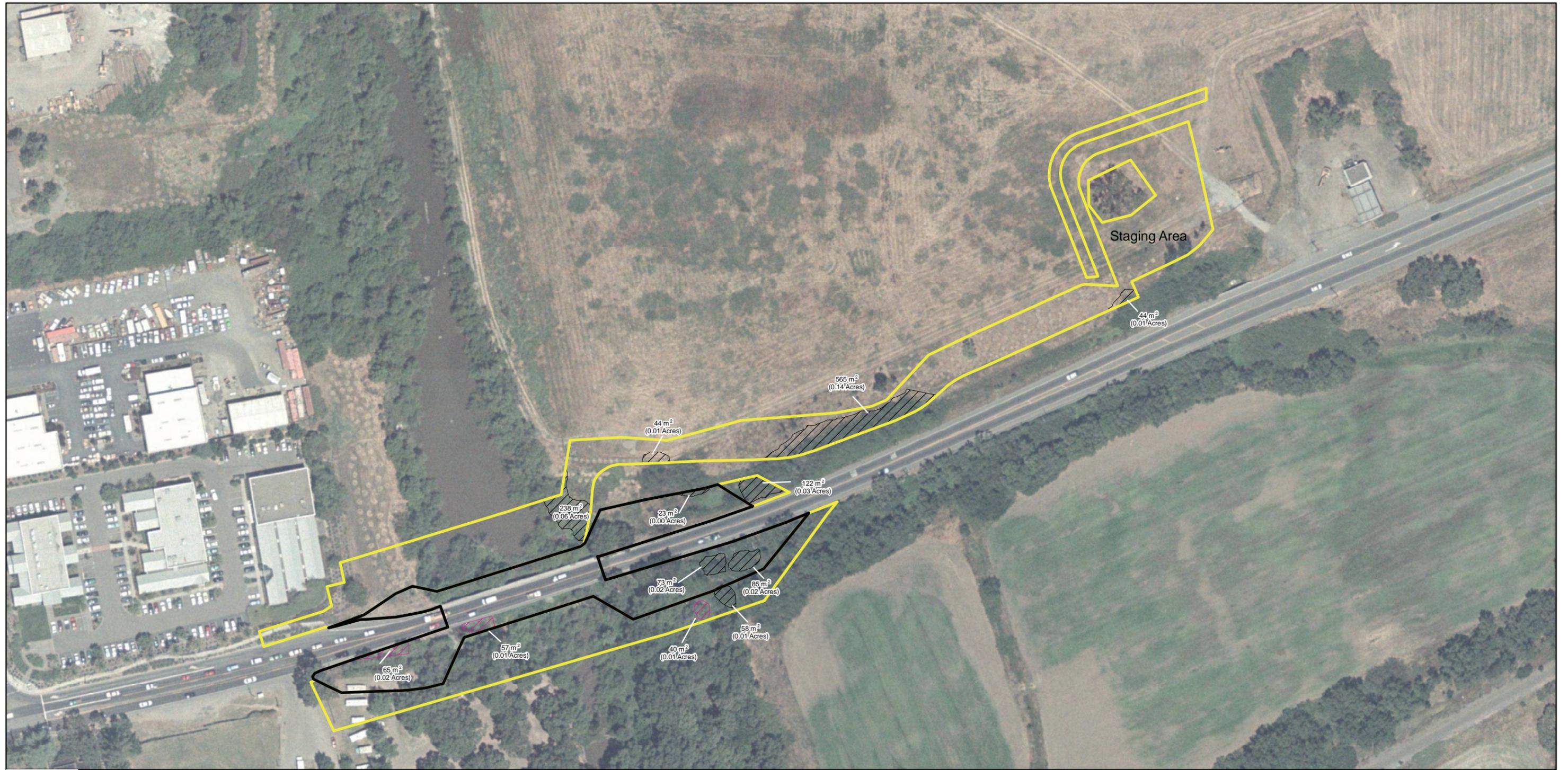
- | | | | | |
|--------------------------------------|------------------|-------------------|-----------------|--------------|
| PROJECT FOOTPRINT | BLACK OAK | CALIFORNIA WALNUT | MONTEREY PINE | WHITE POPLAR |
| CONSTRUCTION STAGING AND ACCESS AREA | BLACKWOOD ACACIA | COAST LIVE OAK | OREGON ASH | |
| APPLE | BLUE ELDERBERRY | CORNUS | ORNAMENTAL PLUM | |
| APRICOT | BOX ELDER | GARRY OAK | RED WILLOW | |
| ARROYO WILLOW | CALIFORNIA ROSE | HAWTHORN | VALLEY OAK | |

FIGURE 2

Laguna de Santa Rosa Bridge (No. 20-0035) Replacement
 04-SON-12- KP 15.5 (PM 9.3)
 EA 1A-2900
 Federal Project No. 2218-14

Location of Impacted Trees

Source: Aerial Photography from GlobeXplorer (06/2000)
 I:\CHM0701\GIS\Maps\TreeSurvey\Figure2_TreeSurveyTrees.mxd (11/12/07)



- PROJECT FOOTPRINT
- CONSTRUCTION STAGING AND ACCESS AREA
- ARROYO WILLOW THICKET (1252 m², 0.31 ACRES)
- ASH THICKET (162 m², 0.04 ACRES)

FIGURE 3

Laguna de Santa Rosa Bridge (No. 20-0035) Replacement
 04-SON-12- KP 15.5 (PM 9.3)
 EA 1A-2900
 Federal Project No. 2218-14

Location of Impacted Thickets

Attachment B
Tables

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
7	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area, dead	Undefined
8	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area, dead	Undefined
9	Valley oak	<i>Quercus lobata</i>	2	2	5.1	Restored area	Undefined
10	Valley oak	<i>Quercus lobata</i>	4	4	10.2	Restored area	Undefined
11	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
12	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area, dead	Undefined
13	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
14	Valley oak	<i>Quercus lobata</i>	3	3	7.6	Restored area	Undefined
15	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
19	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
26	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area, dead	Undefined
27	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
28	Valley oak	<i>Quercus lobata</i>	2	2	5.1	Restored area	Undefined
29	Valley oak	<i>Quercus lobata</i>	2	2	5.1	Restored area	Undefined
30	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
31	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
32	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
33	Blue elderberry	<i>Sambucus mexicana</i>	1	1	2.5	Restored area, shrub	Undefined
34	California walnut	<i>Juglans hindsii</i>	1	1	2.5	Restored area	Undefined
35	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
36	California walnut	<i>Juglans hindsii</i>	1	1	2.5	Restored area	Undefined
37	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
38	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
39	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
40	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
41	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area, dead	Undefined
42	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area, shrub	Undefined
43	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
44	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
45	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
46	Coast live oak	<i>Quercus agrifolia</i>	1	1	2.5		Undefined
47	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
48	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
49	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
50	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
51	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
52	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
53	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
54	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
55	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
56	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
57	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
58	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
59	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area, dead	Undefined
60	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
61	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
62	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub, dead	Undefined
63	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
64	Valley oak	<i>Quercus lobata</i>	1	2	5.1	Restored area	Undefined
65	Valley oak	<i>Quercus lobata</i>	1	2	5.1	Restored area	Undefined
66	Valley oak	<i>Quercus lobata</i>	1	2	5.1	Restored area	Undefined
67	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
68	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
69	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
70	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
71	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
72	Red willow	<i>Salix laevigata</i>	3	20	50.8		Undefined
73	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
74	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
75	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
76	California walnut	<i>Juglans hindsii</i>	1	1	2.5	Restored area	Undefined
77	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
78	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
79	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
80	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
81	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
103	Valley oak	<i>Quercus lobata</i>	1	6	15.2		Undefined
104	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
105	Valley oak	<i>Quercus lobata</i>	1	6	15.2	In poison oak	Undefined
109	Valley oak	<i>Quercus lobata</i>	1	6	15.2		Undefined
110	Valley oak	<i>Quercus lobata</i>	1	6	15.2		Undefined
112	Apricot	<i>Prunus armeniaca</i>	1	6	15.2		Permanent
113	Apple	<i>Malus sp.</i>	1	12	30.5		Permanent
115	Valley oak	<i>Quercus lobata</i>	10	40	101.6		Undefined
116	Valley oak	<i>Quercus lobata</i>	2	8	20.3		Undefined
117	Valley oak	<i>Quercus lobata</i>	3	7	17.8		Undefined
118	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
119	Valley oak	<i>Quercus lobata</i>	4	8	20.3		Undefined
120	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
121	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Undefined
122	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
123	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Undefined
124	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
125	Valley oak	<i>Quercus lobata</i>	1	6	15.2		Undefined
126	Valley oak	<i>Quercus lobata</i>	1	3	7.6		Undefined
127	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
128	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
129	Valley oak	<i>Quercus lobata</i>	3	18	45.7		Undefined
130	Valley oak	<i>Quercus lobata</i>	2	2	5.1		Undefined
131	Oregon ash	<i>Fraxinus latifolia</i>	1	6	15.2		Undefined
132	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
133	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
134	Valley oak	<i>Quercus lobata</i>	2	12	30.5		Undefined
135	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
136	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Undefined
137	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
152	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
153	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
154	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
182	Valley oak	<i>Quercus lobata</i>	1	6	15.2		Undefined
183	Valley oak	<i>Quercus lobata</i>	2	4	10.2		Undefined
184	Red willow	<i>Salix laevigata</i>	1	6	15.2		Undefined
185	Red willow	<i>Salix laevigata</i>	3	30	76.2		Undefined
186	Valley oak	<i>Quercus lobata</i>	2	13	33.0		Undefined
187	Valley oak	<i>Quercus lobata</i>	1	6	15.2		Undefined
188	Red willow	<i>Salix laevigata</i>	1	6	15.2		Undefined
189	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
190	Red willow	<i>Salix laevigata</i>	1	8	20.3		Undefined
191	Oregon ash	<i>Fraxinus latifolia</i>	2	2	5.1		Undefined
192	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Shrub	Undefined
193	Valley oak	<i>Quercus lobata</i>	1	3	7.6		Permanent
194	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
195	Valley oak	<i>Quercus lobata</i>	1	6	15.2		Undefined
196	Valley oak	<i>Quercus lobata</i>	2	8	20.3		Undefined
197	Valley oak	<i>Quercus lobata</i>	1	3	7.6		Undefined
198	Valley oak	<i>Quercus lobata</i>	1	6	15.2		Undefined
199	Valley oak	<i>Quercus lobata</i>	1	10	25.4		Undefined
200	Valley oak	<i>Quercus lobata</i>	1	3	7.6		Undefined
201	Red willow	<i>Salix laevigata</i>	1	12	30.5	In water	Permanent
202	Oregon ash	<i>Fraxinus latifolia</i>	6	41	104.1		Permanent
203	Red willow	<i>Salix laevigata</i>	2	24	61.0		Permanent
204	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
205	Blue elderberry	<i>Sambucus mexicana</i>	1	1	2.5	Restored area, shrub	Undefined
206	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined
207	Valley oak	<i>Quercus lobata</i>	1	1	2.5	Restored area	Undefined

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
223	Ornamental plum	<i>Prunus sp.</i>	1	20	50.8		Permanent
224	Oregon ash	<i>Fraxinus latifolia</i>	1	30	76.2		Undefined
225	Blackwood acacia	<i>Acacia dealbata</i>	1	4	10.2		Permanent
226	Arroyo willow	<i>Salix lasiolepis</i>	1	5	12.7		Permanent
227	Arroyo willow	<i>Salix lasiolepis</i>	1	3	7.6	Shrub	Permanent
228	Valley oak	<i>Quercus lobata</i>	2	52	132.1		Undefined
229	Valley oak	<i>Quercus lobata</i>	1	28	71.1		Permanent
230	Valley oak	<i>Quercus lobata</i>	1	54	137.2		Undefined
233	Valley oak	<i>Quercus lobata</i>	1	70	177.8		Undefined
234	Oregon ash	<i>Fraxinus latifolia</i>	1	22	55.9		Undefined
235	Oregon ash	<i>Fraxinus latifolia</i>	2	26	66.0		Permanent
236	Oregon ash	<i>Fraxinus latifolia</i>	4	38	96.5	Cluster	Permanent
237	Oregon ash	<i>Fraxinus latifolia</i>	3	20	50.8		Permanent
238	Oregon ash	<i>Fraxinus latifolia</i>	1	20	50.8		Permanent
239	Arroyo willow	<i>Salix lasiolepis</i>	1	12	30.5		Permanent
240	Oregon ash	<i>Fraxinus latifolia</i>	2	6	15.2		Permanent
241	Oregon ash	<i>Fraxinus latifolia</i>	3	72	182.9		Permanent
242	Oregon ash	<i>Fraxinus latifolia</i>	1	12	30.5		Permanent
243	Oregon ash	<i>Fraxinus latifolia</i>	2	20	50.8		Undefined
244	Valley oak	<i>Quercus lobata</i>	1	36	91.4		Undefined
246	Valley oak	<i>Quercus lobata</i>	2	40	101.6		Undefined
247	Valley oak	<i>Quercus lobata</i>	1	26	66.0		Undefined
248	Oregon ash	<i>Fraxinus latifolia</i>	2	14	35.6		Undefined
249	Oregon ash	<i>Fraxinus latifolia</i>	1	10	25.4		Undefined
250	Oregon ash	<i>Fraxinus latifolia</i>	1	6	15.2		Undefined
251	Arroyo willow	<i>Salix lasiolepis</i>	1	18	45.7		Permanent
252	Oregon ash	<i>Fraxinus latifolia</i>	1	4	10.2		Permanent
253	Oregon ash	<i>Fraxinus latifolia</i>	1	4	10.2		Undefined
254	Valley oak	<i>Quercus lobata</i>	3	48	121.9		Undefined
255	Oregon ash	<i>Fraxinus latifolia</i>	1	8	20.3		Undefined
256	Oregon ash	<i>Fraxinus latifolia</i>	1	10	25.4		Undefined
257	Arroyo willow	<i>Salix lasiolepis</i>	1	8	20.3		Permanent
258	Oregon ash	<i>Fraxinus latifolia</i>	4	40	101.6		Undefined
259	Oregon ash	<i>Fraxinus latifolia</i>	3	40	101.6		Undefined
260	Red willow	<i>Salix laevigata</i>	1	8	20.3		Undefined
261	Red willow	<i>Salix laevigata</i>	2	23	58.4		Undefined
262	Arroyo willow	<i>Salix lasiolepis</i>	2	9	22.9		Undefined
263	Arroyo willow	<i>Salix lasiolepis</i>	2	6	15.2		Undefined
264	Red willow	<i>Salix laevigata</i>	1	4	10.2		Undefined
265	Arroyo willow	<i>Salix lasiolepis</i>	1	12	30.5	Horizontal	Undefined
266	Red willow	<i>Salix laevigata</i>	5	38	96.5		Undefined
267	Red willow	<i>Salix laevigata</i>	1	2	5.1		Undefined

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
268	Red willow	<i>Salix laevigata</i>	5	40	101.6		Undefined
269	Arroyo willow	<i>Salix lasiolepis</i>	1	8	20.3		Undefined
270	Arroyo willow	<i>Salix lasiolepis</i>	2	11	27.9		Undefined
271	Red willow	<i>Salix laevigata</i>	1	10	25.4		Undefined
272	Red willow	<i>Salix laevigata</i>	1	10	25.4	Leans	Undefined
273	Red willow	<i>Salix laevigata</i>	2	8	20.3		Undefined
274	Red willow	<i>Salix laevigata</i>	2	16	40.6		Undefined
275	Oregon ash	<i>Fraxinus latifolia</i>	4	16	40.6		Undefined
276	Oregon ash	<i>Fraxinus latifolia</i>	2	12	30.5		Undefined
277	Red willow	<i>Salix laevigata</i>	1	10	25.4		Undefined
278	Oregon ash	<i>Fraxinus latifolia</i>	5	10	25.4		Undefined
279	Arroyo willow	<i>Salix lasiolepis</i>	9	35	88.9	Clump	Permanent
280	Red willow	<i>Salix laevigata</i>	1	6	15.2		Permanent
281	Red willow	<i>Salix laevigata</i>	1	6	15.2		Undefined
282	Red willow	<i>Salix laevigata</i>	3	24	61.0		Permanent
283	Arroyo willow	<i>Salix lasiolepis</i>	1	4	10.2		Undefined
284	Red willow	<i>Salix laevigata</i>	2	10	25.4		Permanent
285	Arroyo willow	<i>Salix lasiolepis</i>	3	6	15.2		Permanent
286	Arroyo willow	<i>Salix lasiolepis</i>	1	2	5.1		Permanent
287	Red willow	<i>Salix laevigata</i>	1	6	15.2		Permanent
288	Red willow	<i>Salix laevigata</i>	1	8	20.3		Permanent
289	Red willow	<i>Salix laevigata</i>	2	26	66.0		Undefined
290	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5		Undefined
291	Arroyo willow	<i>Salix lasiolepis</i>	1	1	2.5	Shrubby	Undefined
292	Oregon ash	<i>Fraxinus latifolia</i>	8	70	177.8		Undefined
293	Arroyo willow	<i>Salix lasiolepis</i>	18	160	406.4		Undefined
294	Oregon ash	<i>Fraxinus latifolia</i>	2	6	15.2		Undefined
295	Red willow	<i>Salix laevigata</i>	2	28	71.1		Undefined
296	Oregon ash	<i>Fraxinus latifolia</i>	1	3	7.6		Permanent
297	Oregon ash	<i>Fraxinus latifolia</i>	6	19	48.3		Permanent
298	Red willow	<i>Salix laevigata</i>	2	18	45.7		Undefined
299	Red willow	<i>Salix laevigata</i>	2	9	22.9		Permanent
300	Red willow	<i>Salix laevigata</i>	5	28	71.1	At water, poison oak	Undefined
301	Oregon ash	<i>Fraxinus latifolia</i>	2	10	25.4		Permanent
302	Cornus	<i>Cornus sericea</i>	4	8	20.3	Shrubby	Undefined
303	Oregon ash	<i>Fraxinus latifolia</i>	1	18	45.7		Undefined
304	Red willow	<i>Salix laevigata</i>	4	26	66.0	At water, poison oak	Undefined
305	Oregon ash	<i>Fraxinus latifolia</i>	2	20	50.8	At water, poison oak	Undefined
306	Oregon ash	<i>Fraxinus latifolia</i>	3	20	50.8	In poison oak	Undefined
308	Oregon ash	<i>Fraxinus latifolia</i>	2	10	25.4		Undefined
309	Valley oak	<i>Quercus lobata</i>	1	20	50.8		Undefined
310	Valley oak	<i>Quercus lobata</i>	1	18	45.7		Undefined

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
311	Oregon ash	<i>Fraxinus latifolia</i>	2	12	30.5		Permanent
312	Valley oak	<i>Quercus lobata</i>	1	52	132.1		Permanent
313	Valley oak	<i>Quercus lobata</i>	1	52	132.1		Permanent
314	Valley oak	<i>Quercus lobata</i>	1	32	81.3		Permanent
315	Oregon ash	<i>Fraxinus latifolia</i>	1	12	30.5		Permanent
316	Blackwood acacia	<i>Acacia dealbata</i>	1	23	58.4		Permanent
317	Oregon ash	<i>Fraxinus latifolia</i>	2	20	50.8		Permanent
318	Oregon ash	<i>Fraxinus latifolia</i>	1	14	35.6	In poison oak	Undefined
319	Oregon ash	<i>Fraxinus latifolia</i>	1	10	25.4		Undefined
320	Valley oak	<i>Quercus lobata</i>	1	12	30.5		Undefined
335	Arroyo willow	<i>Salix lasiolepis</i>	1	2	5.1	Clump	Undefined
336	Oregon ash	<i>Fraxinus latifolia</i>	2	20	50.8		Undefined
337	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Undefined
338	Oregon ash	<i>Fraxinus latifolia</i>	3	20	50.8		Undefined
339	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Undefined
340	Valley oak	<i>Quercus lobata</i>	4	22	55.9	Clump	Undefined
341	Arroyo willow	<i>Salix lasiolepis</i>	8	21	53.3	Clump	Undefined
344	Oregon ash	<i>Fraxinus latifolia</i>	1	24	61.0		Undefined
345	Arroyo willow	<i>Salix lasiolepis</i>	1	2	5.1		Undefined
346	Valley oak	<i>Quercus lobata</i>	1	8	20.3		Permanent
347	Oregon ash	<i>Fraxinus latifolia</i>	1	12	30.5		Undefined
348	Valley oak	<i>Quercus lobata</i>	1	14	35.6		Permanent
349	Arroyo willow	<i>Salix lasiolepis</i>	1	2	5.1	Clump	Permanent
350	Arroyo willow	<i>Salix lasiolepis</i>	2	2	5.1	Clump	Permanent
351	Arroyo willow	<i>Salix lasiolepis</i>	6	31	78.7	Clump	Permanent
352	Arroyo willow	<i>Salix lasiolepis</i>	4	10	25.4	Clump	Undefined
353	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Permanent
354	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Permanent
355	Arroyo willow	<i>Salix lasiolepis</i>	4	15	38.1		Permanent
356	Monterey pine	<i>Pinus radiata</i>	2	52	132.1		Permanent
357	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Permanent
358	Valley oak	<i>Quercus lobata</i>	4	22	55.9		Permanent
359	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Permanent
360	Arroyo willow	<i>Salix lasiolepis</i>	1	3	7.6		Permanent
361	Valley oak	<i>Quercus lobata</i>	3	14	35.6		Undefined
362	Valley oak	<i>Quercus lobata</i>	4	7	17.8		Undefined
440	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
441	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
442	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
443	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
444	California rose	<i>Rosa californica</i>	1	1	2.5	Restored area, shrub	Undefined
445	Box elder	<i>Acer negundo</i>	1	3	7.6	Restored area	Undefined

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
446	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
447	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
448	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
449	Oregon ash	<i>Fraxinus latifolia</i>	1	3	7.6	Restored area	Undefined
450	Hawthorn	<i>Crataegus suksdorfii</i>	1	3	7.6	Restored area	Undefined
451	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
452	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
453	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
454	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
455	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
456	Hawthorn	<i>Crataegus suksdorfii</i>	1	2	5.1	Restored area, shrub	Undefined
457	Hawthorn	<i>Crataegus suksdorfii</i>	1	2	5.1	Restored area, shrub	Undefined
458	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
477	Red willow	<i>Salix laevigata</i>	4	64	162.6		Undefined
478	Arroyo willow	<i>Salix lasiolepis</i>	4	20	50.8		Undefined
479	Red willow	<i>Salix laevigata</i>	1	20	50.8		Undefined
480	Oregon ash	<i>Fraxinus latifolia</i>	1	6	15.2		Undefined
481	Arroyo willow	<i>Salix lasiolepis</i>	2	12	30.5		Undefined
482	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
483	Ornamental plum	<i>Prunus sp.</i>	1	1	2.5		Undefined
484	Valley oak	<i>Quercus lobata</i>	2	1	2.5		Undefined
485	Arroyo willow	<i>Salix lasiolepis</i>	1	2	5.1		Undefined
486	Valley oak	<i>Quercus lobata</i>	3	3	7.6		Undefined
487	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Undefined
488	Valley oak	<i>Quercus lobata</i>	2	2	5.1		Undefined
493	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5		Undefined
494	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
495	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
496	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
497	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
498	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
499	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
500	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
501	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
502	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
503	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Undefined
507	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
508	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
509	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
510	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
511	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
512	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
513	Box elder	<i>Acer negundo</i>	1	1	2.5		Undefined
514	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
515	Box elder	<i>Acer negundo</i>	1	1	2.5	Restored area	Undefined
516	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
523	Oregon ash	<i>Fraxinus latifolia</i>	1	2	5.1	Restored area	Permanent
524	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Permanent
525	Arroyo willow	<i>Salix lasiolepis</i>	2	8	20.3		Undefined
526	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
527	Arroyo willow	<i>Salix lasiolepis</i>	1	14	35.6		Permanent
528	Valley oak	<i>Quercus lobata</i>	1	18	45.7		Permanent
529	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Permanent
530	Valley oak	<i>Quercus lobata</i>	1	14	35.6		Permanent
531	Ornamental plum	<i>Prunus sp.</i>	1	4	10.2		Permanent
532	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Permanent
533	Valley oak	<i>Quercus lobata</i>	2	38	96.5		Permanent
534	Valley oak	<i>Quercus lobata</i>	1	24	61.0		Permanent
535	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Permanent
536	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Permanent
537	Ornamental plum	<i>Prunus sp.</i>	2	6	15.2		Permanent
538	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Permanent
539	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Permanent
540	Valley oak	<i>Quercus lobata</i>	2	7	17.8		Permanent
541	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Permanent
545	Box elder	<i>Acer negundo</i>	1	4	10.2	Restored area	Undefined
547	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
548	Oregon ash	<i>Fraxinus latifolia</i>	1	4	10.2	Restored area	Undefined
549	Oregon ash	<i>Fraxinus latifolia</i>	1	4	10.2	Restored area	Undefined
550	Oregon ash	<i>Fraxinus latifolia</i>	1	4	10.2	Restored area	Undefined
551	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
552	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5	Restored area	Undefined
553	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
554	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
555	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
556	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
557	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
558	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
559	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area	Undefined
560	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
561	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
562	Valley oak	<i>Quercus lobata</i>	1	4	10.2		Undefined
563	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
564	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
565	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
566	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
567	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
568	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
569	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
570	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
571	Valley oak	<i>Quercus lobata</i>	2	3	7.6		Undefined
572	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
573	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
574	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
575	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
576	Valley oak	<i>Quercus lobata</i>	1	2	5.1		Undefined
577	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
578	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
579	White poplar	<i>Populus alba</i>	2	2	5.1		Undefined
580	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
581	Hawthorn	<i>Crataegus suksdorfii</i>	1	1	2.5	Restored area, shrub	Undefined
582	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
583	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
584	Oregon ash	<i>Fraxinus latifolia</i>	1	12	30.5		Undefined
585	Oregon ash	<i>Fraxinus latifolia</i>	1	3	7.6		Undefined
586	Valley oak	<i>Quercus lobata</i>	1	10	25.4		Undefined
587	Black oak	<i>Quercus kelloggii</i>	1	12	30.5	Canopy in footprint	Undefined
588	Oregon ash	<i>Fraxinus latifolia</i>	1	3	7.6		Undefined
589	Valley oak	<i>Quercus lobata</i>	1	12	30.5		Undefined
590	Valley oak	<i>Quercus lobata</i>	1	14	35.6	Canopy in foot print	Undefined
591	Oregon ash	<i>Fraxinus latifolia</i>	1	12	30.5		Undefined
592	Oregon ash	<i>Fraxinus latifolia</i>	1	5	12.7		Undefined
593	Ornamental plum	<i>Prunus sp.</i>	1	1	2.5		Permanent
594	Oregon ash	<i>Fraxinus latifolia</i>	1	9	22.9		Undefined
595	Oregon ash	<i>Fraxinus latifolia</i>	1	8	20.3		Permanent
596	Oregon ash	<i>Fraxinus latifolia</i>	1	6	15.2		Undefined
597	Oregon ash	<i>Fraxinus latifolia</i>	1	10	25.4		Undefined
598	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5		Undefined
599	Garry oak	<i>Quercus garryana</i>	1	40	101.6		Permanent
601	Oregon ash	<i>Fraxinus latifolia</i>	1	16	40.6		Undefined
602	Garry oak	<i>Quercus garryana</i>	1	18	45.7		Undefined
603	Garry oak	<i>Quercus garryana</i>	1	8	20.3		Undefined
604	Garry oak	<i>Quercus garryana</i>	1	7	17.8		Undefined
605	Oregon ash	<i>Fraxinus latifolia</i>	2	10	25.4		Undefined
606	Garry oak	<i>Quercus garryana</i>	1	8	20.3		Undefined
607	Garry oak	<i>Quercus garryana</i>	1	18	45.7		Undefined

TABLE 1
List of Impacted Trees
Laguna de Santa Rosa Bridge Replacement Project

Tree ID ¹	Common Name	Scientific Name	No. of Stems	Total DBH (in)	Total DBH (cm)	Notes	Anticipated Impact Type ²
608	Valley oak	<i>Quercus lobata</i>	1	1	2.5		Undefined
609	Oregon ash	<i>Fraxinus latifolia</i>	1	1	2.5		Undefined
610	Oregon ash	<i>Fraxinus latifolia</i>	1	8	20.3		Undefined
611	Oregon ash	<i>Fraxinus latifolia</i>	1	6	15.2		Undefined
612	Oregon ash	<i>Fraxinus latifolia</i>	1	11	27.9		Undefined
613	Oregon ash	<i>Fraxinus latifolia</i>	1	10	25.4		Undefined
614	Garry oak	<i>Quercus garryana</i>	1	6	15.2		Undefined
615	Oregon ash	<i>Fraxinus latifolia</i>	1	6	15.2		Undefined

Notes:

DBH = diameter at breast height

¹ The tree identification numbers are not sequential in all cases, because some of the trees identified during the field effort were determined to be outside of the Project environmental footprint (EF). See also Figure 2.

² Permanent and undefined impacts were determined based upon the boundaries of the Project footprint and the construction access areas, as shown in the design drawings dated September 22, 2007.

Permanent impacts = Tree is located in the Project footprint (within the catchline) and will be permanently impacted.

Undefined impacts = Tree is located within the Construction Staging and Access Area (between the catchline and the proposed or existing right-of-way), and extent of impacts is not known at this time. Actual impacts will be tracked during construction, and mitigated accordingly.

TABLE 2
 Summary of Tree Impacts
 Laguna de Santa Rosa Bridge Replacement Project

Common name	Scientific Name	Native to the Project Region ¹	Total Number of Impacted Trees	Number of Trees per Impact Type ²	
				Permanent Impact	Undefined Impact
Apple	<i>Malus sp.</i>	NN	1	1	0
Apricot	<i>Prunus armeniaca</i>	NN	1	1	0
Arroyo willow	<i>Salix lasiolepis</i>	N	30	14	16
Black oak	<i>Quercus kelloggii</i>	N	1	0	1
Blackwood acacia	<i>Acacia dealbata</i>	NN	2	2	0
Blue elderberry	<i>Sambucus mexicana</i>	N	2	0	2
Box elder	<i>Acer negundo</i>	N	13	0	13
California rose	<i>Rosa californica</i>	N	1	0	1
California walnut	<i>Juglans hindsii</i>	N	3	0	3
Coast live oak	<i>Quercus agrifolia</i>	N	1	0	1
Cornus	<i>Cornus sericea</i>	N	1	0	1
Garry oak	<i>Quercus garryana</i>	N	7	1	6
Hawthorn	<i>Crataegus suksdorfii</i>	N	32	0	32
Monterey pine	<i>Pinus radiata</i>	NC	1	1	0
Oregon ash	<i>Fraxinus latifolia</i>	N	87	18	69
Ornamental plum	<i>Prunus sp.</i>	NN	5	4	1
Red willow	<i>Salix laevigata</i>	N	32	8	24
Valley oak	<i>Quercus lobata</i>	N	164	24	140
White poplar	<i>Populus alba</i>	NN	1	0	1
TOTAL		--	385	74	311
Percent native to Project location			97%	88%	99%

Notes:

¹ N = Tree native to region; NN = Tree not native to California; NC = Tree native to California, but not native to region

² Impact Types:

Permanent = Tree is located in the Project footprint (within the catchline) and will be permanently impacted.

Undefined = Tree is located within the Construction Staging and Access Area (between the catchline and the proposed or existing right-of-way), and extent of impacts is not known at this time. Actual impacts will be tracked during construction, and mitigated accordingly.

TABLE 3
Summary of Impacts to Thickets
Laguna de Santa Rosa Bridge Replacement Project

Common Name	Scientific Name	Permanent Impact ¹		Undefined Impact ²	
		acres	m ²	acres	m ²
Oregon ash	<i>Fraxinus latifolia</i>	0.03	122	0.01	40
Arroyo willow	<i>Salix lasiolepis</i>	0.05	184	0.26	1,070

Notes:

¹ Permanent impact = Tree is located in the Project footprint (within the catchline) and will be permanently impacted.

² Undefined impact = Tree is located within the Construction Staging and Access Area (between the catchline and the proposed or existing right-of-way), and extent of impacts is not known at this time. Actual impacts will be tracked during construction, and mitigated accordingly.

TABLE 4
Summary of Impacts to Native Oak Trees
Laguna de Santa Rosa Bridge Replacement Project

Common Name	Scientific Name	Size Class cm (in)	Number of Trees per Impact Type ¹	
			Permanent Impact	Undefined Impact
Coast live oak	<i>Quercus agrifolia</i>	2.5 – 23 (1" - 9")	0	1
Garry oak	<i>Quercus garryana</i>	2.5 – 23 (1" - 9")	0	4
Garry oak	<i>Quercus garryana</i>	51 - 150 (20" – 59")	1	2
Black oak	<i>Quercus kelloggii</i>	25 - 48 (10" - 19")	0	1
Valley oak	<i>Quercus lobata</i>	2.5 - 23 (1" - 9")	14	120
Valley oak	<i>Quercus lobata</i>	25 – 48 (10" - 19")	3	10
Valley oak	<i>Quercus lobata</i>	51 – 150 (20" - 59")	7	9
Valley oak	<i>Quercus lobata</i>	> 152 (> 60")	0	1

Notes:

¹ Impact Types:

Permanent = Tree is located in the Project footprint (within the catchline) and will be permanently impacted.

Undefined = Tree is located within the construction access area (between the catchline and the proposed or existing right-of-way), and extent of impacts is not known at this time. Actual impacts will be tracked during construction, and mitigated accordingly.

TABLE 5
 Impacts to Other Tree Categories Pertinent to County Regulations
Laguna de Santa Rosa Bridge Replacement Project

Common Name	Scientific Name	Category	Number of Trees per Impact Type ¹	
			Permanent Impact	Undefined Impact
All species	N/A	>23cm (9") DBH	38	77
Valley oak	<i>Quercus lobata</i>	All size classes	24	140
Garry oak	<i>Quercus garryana</i>	All size classes	1	6

Notes:

¹ Impact Types:

Permanent = Tree is located in the Project footprint (within the catchline) and will be permanently impacted.

Undefined = Tree is located within the Construction Staging and Access Area (between the catchline and the proposed or existing right-of-way), and extent of impacts is not known at this time. Actual impacts will be tracked during construction, and mitigated accordingly.

TABLE 6
 Tree Ordinance Table
Laguna de Santa Rosa Bridge Replacement Project

Ordinance	Tree Removal/Pruning Ordinance	Mitigation or Permitting Requirements
City of Sebastopol Municipal Code	A tree removal permit will be required for removals within the city of Sebastopol for the following: a) On single-family residential properties, trees which have a DBH of 20" or more or b) On multifamily residential commercial, or industrial property, removal of protected native trees with a DBH of 10" or more or any other tree with a minimum of DBH of 20". A permit is NOT required to prune 1/3 or less of a tree crown or remove an escaped exotic (i.e., acacia, albizia, tamarisk, etc.).	A Tree Protection plan in addition to the Permit is required by the City. In addition to the other requirements of the plan, it is noted that the following mitigation be a part of all plans: parking vehicles, storage, etc. or toxic substances placed under the dripline of trees which are designated to remain on site and any trees that are designated to remain on site will be fenced.
Sonoma County Municipal Code	Sonoma County Heritage or Landmark Tree Ordinance. Trees covered under this county this ordinance include trees identified as Landmark or Heritage trees by the county due to their age, size, rarity, shape, location, or historical significance.	Removal or possible damage to any Heritage or Landmark Tree requires a permit. Exclusions include: trees within incorporated city limits, trees on U.S. or state lands, removal authorized by the U.S., State, or county of Sonoma. (Ord. No. 3651, 1986)
Sonoma County General Plan Open Space Element	<p>Policy RC-5c – “Tree Protection and Replacement Ordinance Site plans and improvement plans must show all trees with a diameter at least 9 inches and which are to be retained or removed. The perimeter of retained trees is to be marked clearly in the field and avoided by grading, trenching, paving and structures. Removed trees are to be replaced by planting on the site or elsewhere the same "arboreal value" of the same species.</p> <p>Policy RC-5f, 5g and 5h - No county permit or approval is required, but a “Notice of Intention” must be filed which shows the trees to be removed, planted and/or preserved. Requires mitigating the loss of valley oaks in areas zoned as important “Valley Oak Habitat.”</p> <p>Zoning Ordinance Article 67 - As per Section 5.1 of the resource conservation element of the general plan the Valley Oak Habitat Combining District protects all valley oak woodlands.</p>	<p>Policy RC-5c - Requires minimizing the removal of oak, madrone, redwood, maple and bay trees and replacing removed trees by planting on the site or elsewhere. This applies only to projects requiring discretionary approval by the county and does not include agricultural uses and timber harvest plans.</p> <p>Policy RC-5f, 5g and 5h - Mitigation requires planting seedlings, preserving other valley oaks or paying an in-lieu mitigation fee tree planting to be used for tree planting and preservation.</p> <p>Zoning Ordinance Article 67 - Mitigation required for any valley oak with a DBH of 60" or greater includes retaining or replanting valley oaks or paying an in-lieu fee to the county valley oak planting program. The landowner has the sole discretion to choose the mitigation measure mitigation undertaken. The mitigation measure must be completed within one year. Trees with a DBH greater than 20" either retention of a similar oak or replacement of 16 new trees, or a combination of retention or replacement. The in lieu fee is \$50.</p>

Sources:

City of Sebastopol Municipal Code, 2006

The Code of the County of Sonoma, State of California, 2006.

Sonoma County Permit and Resources Management Department, Santa Rosa, CA, 1989 Sonoma County General Plan, revised 1998: <http://www.sonoma-county.org/prmd/index.htm>

Attachment 2 – 2008 Tree Survey Memorandum



**Garcia and Associates
One Saunders Avenue
San Anselmo, CA 94960
Phone: (415) 458-5803 Fax: (415) 458-5829**

To: Aviva Rossi

From: Rob Aramayo

Date: 6 November 2008

RE: Tree Survey for the Caltrans Replacement of the Laguna de Santa Rosa Bridge.

INTRODUCTION

The California Department of Transportation (Caltrans) is in the process of replacing the Laguna de Santa Rosa Bridge (Caltrans Bridge No. 20-0035) on State Route (SR) 12 near the town of Sebastopol in Sonoma County, California. A survey of trees that would be impacted by the project was conducted in 2007 by LSA Associates. Subsequently, Caltrans revised the project design, resulting in an expanded area of temporary impacts along two portions of the project area, and therefore needed to expand the tree survey to inventory these new areas.

Garcia and Associates (GANDA), a subcontractor through CH2M HILL to Caltrans, conducted this expanded tree survey in October 2008 to identify and map the location of all trees in the unsurveyed impact areas with a diameter at breast height (dbh) of one inch or greater. This technical memorandum summarizes the methods and results of the surveys.

METHODS

Ann Howald and Rob Aramayo of GANDA conducted this tree survey on October 22nd and 24th, 2008. The survey focused on three areas where the temporary impacts of the project were being expanded, and therefore could impact existing trees. The first of these new areas was located at the southwest corner of the project, near the intersection of SR 12 and Morris Street. The second and third locations were contiguous on the southeastern portion of the project area.

Aerial photographs with overlays of the project boundaries and specific areas of interest were used to locate the western and eastern extent of the areas to be surveyed. During the field survey

it was inefficient to determine which trees had been identified in boundary of the previous survey area and un-surveyed area. Therefore the team surveyed every tree from the road margin out to the southern extent of the new project area within the western and eastern extent of the new impact areas. This data is intended to replace the previous tree inventory data within the areas that were surveyed.

Within these three areas, all trees with a diameter (measured at breast height DBH [4.5 feet above grade]) of one inch or greater were identified, measured and counted. Trees with multiple stems were reported as the sum of the individual stem diameters. Thickets, particularly willow thickets (*Salix* sp.), were recorded as thickets and the individual stems were not counted; instead, the overall size of the thicket was measured. Datasheets with all trees measured are presented in Appendix A.

Thickets were recorded as a single point referring to the center of the thicket, and the length and width of the thicket measured or estimated and entered into the notes for that point, since the vegetation was too dense to record the boundary as a polygon—both in terms of getting through the ground vegetation and maintaining the GPS signal.

The location of all trees and thickets were recorded with a Trimble GeoXT 2003 Pocket PC version 4.20.0 loaded with Trimble TerraSync version 3.01. Whenever possible the location of the trees was recorded with the GPS unit held next to the tree. However, in many cases the tree canopy was too dense to record a position directly. In these instances, the position of the tree was entered as an offset position, where the bearing was measured with a compass and the distance to the tree was measured with a Bushnell rangefinder.

Following completion of the survey, the GPS coordinates were post-processed to correct the recorded satellite positions in order to improve the accuracy to one meter. The post-processed information is presented in Appendix B.

RESULTS

A total of 208 individual trees and 15 thickets were surveyed. Garry Oak (*Quercus garryana*, GUGA) was the most abundant species with 118 trees counted. Other species included 46 Oregon Ash (*Fraxinus latifolia*, FRLA), 16 Valley Oak (*Quercus lobata*, QULO), 14 Arroyo Willow (*Salix lasiolepis*, SALAS), 13 Cherry Plums (*Prunus ceratifolia*, PRCE), 5 Coast Live Oak (*Quercus agrifolia*, QUAG), 5 Red Willow (*Salix laevigata*, SALAE), 2 coast redwoods (*Sequoia sempervirens*, SESE), 2 Canary Island Date Palms (*Phoenix canariensis*, PHCA), and 1 Deodar Cedar (*Cedrus deodora*, CEDE). Thickets were primarily willow and ash, with one Garry Oak forming a thicket.

APPENDIX A

Field Notes

Laguna Bridge Tree Survey WEST END AREA (near Morris St. intersection)
FILE 1

Tree ID	Name	# stems	DBH (in.)	Comments
001	QUGA <i>Quercus garryana</i>	1	10	Village Plk native?
002	QUGA <i>QUERCUS GARRYANA</i>	4	31	Village Plk "
003	SESE <i>Sequoia sempervirens</i>	1	63	corner property, planted
004	SESE	1	44	" "
005	QUGA	1	3	" naturalized?
006	PHCA <i>Phoenix conchensis</i>	1	37	" planted
007	PHCA	1	33	" "
008	QUGA	1	41	" native?
009	CEDE <i>Cedrus deodara</i>	1	40	" planted
010	QULO <i>Quercus lobata</i>	1	3	" naturalized?
011	QUGA	1	2	" "
012	QUGA	2	4	" "
013	QULO	1	5	landscaped area at corner
014	QUGA	1	7	"
015	QUGA	1	2	"
016				

EAST END AREA

FILE 2

Tree ID	Name	# stems	DBH (in.)	Comments
016	SW CORNER	—	—	Survey area Edge of field - edge of sawyer area
017	SALAS <i>Salix lasiolepis</i>	thicket	15' diam.	S-edge of field
018	QUGA	1	2	"
019	QUGA	2	8	"
020	QUGA	1	5	"
021	QUGA	1	3	"
022	QUGA	1	4	"
023	QUGA	1	2	"
024	QUGA LO	1	1	"
025	QULO	2	15	"
026	QULO	1	2	"
027	QUGA	1	3	"
028	QUGA	1	3	"
029	QUGA	2	5	"
030	QUGA	2	6	"
031	QUGA	1	6	"
032	QUGA	1	2	"
033	QUGA	1	4	"
034	QUGA	1	2	"
035	QUAG <i>Quercus agrifolia</i>	1	5	" next to power line utility pole
036	QUGA	1	9	" "
037	QUGA	1	2	S-edge of field
038	QUGA	1	4	" 2nd row back
039	QUGA	1	2	"

PRUNUS CERASIFERA
 FRAXINUS LATIFOLIA
 Laguna Bridge Tree Survey EAST END

OCT 22, 2008
 WEDS

Tree ID	Name	# stems	DBH (in.)	Comments
040	QU GA	2	4	SE edge of field - mark fence
041	QU GA	1	4	"
042	QU GA	1	13	edge of ditch/drainage
043	PRCE <i>Prunus cerasifera</i>	1	3	"
044	FRLA <i>Fraxinus latifolia</i>	4	32	"
045	FRLA	1	4	"
046	FRLA	1	6	"
047	QU GA	4	29	Edge of the Aug 12
048	QU AG	2	9	"
049	PRCE	1	1	"
050	QU GA	1	6	"
051	QU GA	2	8	"
052	QU AG	2	7	S edge of ditch
053	QU LO	2	7	"
054	QU GA	1	4	" no flag
055	QU GA	1	3	" no flag
056	QU GA	1	3	" no flag
057	QU GA	1	19	"
058	QU GA	1	3	"
059	QU GA	2	5	" no flag
060	QU GA	1	9	"
061	QU GA	1	12	"
062	QU GA	1	1	" no flag
063	QU GA	1	1	" "
064	QU GA	1	3	"
065	QU GA	1	8	"
066	QU GA	3	17	"
067	QU GA	1	10	" no flag
068	QU GA	1	6	" no flag
069	QU GA	1	12	" "
070	FRLA	1	12	ditch
071	QU GA	1	19	N side ditch/drainage
072	QU GA	1	5	N side ditch
073	QU GA	1	2	"
074	QU GA	1	1	"
075	QU GA	1	14	S side ditch no flag
076	QU GA	1	4	" "
077	QU GA	1	3	" "
078	QU GA	1	6	" "
079	QU GA	1	6	" "
080	FRLA	1	2	in Ditch
081	FRLA	1	9	"
082	FRLA	1	11	"
083	QU GA	1	2	N side near rd
084	FRLA	2	4	ditch

OCT 22, 2008
WEDS

Laguna Bridge Tree Survey EAST END

Tree ID	Name	# stems	DBH (in.)	Comments
085	FRLA	4	23	N edge ditch
086	QUGA	4	11	"
087	QUGA	1	5	"
088	QUGA	1	7	"
089	FRLA	5	17	in Ditch
090	FRLA	1	2	in Ditch
091	QUGA	1	36	S edge big tree no flag
092	FRLA	2	11	in Ditch
093	QUGA	1	7	S edge of ditch no flag
094	QUGA	1	10	" "
095	QUGA	1	17	" "
096	QUGA	1	5	" "
097	SALAS	Thicket	10' in diam	" "
098	FRLA	2	15	in Ditch
099	QUGA	5	19	N slope no flag
100	QUGA	1	4	"
101	QUGA	1	5	"
102	FRLA	2	14	"
103	FRLA	Thicket	15 X 8	in Ditch
104	FRLA	1	7	N side no flag
105	FRLA	1	15	"
106	SALAS	4	4	low Ditch
↑				
WEST OF ADJACENT DRAINAGE W/ WILLOWS				
EAST OF ADJACENT DRAINAGE W/ WILLOWS				
↓				
GRP GRP	EAST EDGE OF SURVEY AREA along field edge			
107	QUGA	1	9	N side of ditch
108	QUGA	Thicket	12' X 8'	"
109	QUGA	1	8	"
110	QUGA	1	3	"
111	QUGA	1	4	"
112	QUGA	1	6	"
113	PRCE	4	36	"
114	FRLA	1	9	in Ditch
115	QUGA	1	8	S edge no flag
116	QUGA	1	1	S edge "
117	QUGA	1	9	" "
118	QUGA	2	30	" "
119	QUGA	1	5	" "
120	SALAS	Thicket	35' X 15'	in Ditch "
121	FRLA	3	6	" "
122	QUGA	1	8	in Ditch in PO. "
123	QUGA	1	6	N bank no flag "
124	QUGA	1	8	" "

24 OCT 2008
FRI

Laguna Bridge Tree Survey EAST END
FILE - R102408A

Tree ID	Name	# stems	DBH (in.)	Comments
134	QUGA	1	5	IN DRAINAGE S-SIDE
135	QUGA	4	14	"
136	QUGA	1	10	"
137	QUGA	1	13	"
138	QUGA	1	3	"
139	QUGA FRLA	1	12	"
140	QUGA	1	1	"
141	QUGA	1	8	"
142	FRLA	1	11	"
143	PRCE	5	14	S EDGE OF FENCE: no flag
144	FRLA	4	10	"
145	SALAS	2	7	" HORIZONTAL
146	QUGA	1	7	ON FENCELINE no flag
147	QUGA	1	3	DRAINAGE S SIDE
148	SALAE	4	17	"
149	QUGA	2	14	FENCELINE no flag
150	FRLA	1	9	S EDGE DRAINAGE no flag
151	FRLA	2	4	" "
152	FRLA	thicket	3 x 5 m	DRAINAGE
153	SALAE	2	15	"
154	FRLA	1	2	"
155	FRLA	3	7	" N SIDE
156	FRLA	1	5	" "
157	FRLA	1	3	" "
158	SALAE	thicket	12 x 6 m	NEAR HWY no flag
159	FRLA	4	12	"
160	FRLA	5	18	"
161	SALAS	6	19	DRAINAGE DITCH
162	FRLA	1	11	"
163	SALAE	2	6	DRAINAGE
164	FRLA	1	1	"
165	FRLA	1	9	S SIDE DR
166	FRLA	1	5	S SIDE
167	FRLA	2	10	"
168	QUGA	1	6	"
169	PRCE	1	2	"
170	SALAS	thicket	6 x 3	"
171	FRLA	thicket	3 x 3	"
172	PRCE	1	1	DRAINAGE
173	QUGA	1	12	S SIDE no flag
174	FRLA	1	5	"
175	FRLA	3	15	" no flag
176	QUGA	1	14	"
177	QULO	2	8	" FENCE no flag
178	FRLA	1	16	"

no flag
no flag

OCT 24, 2008
FRI

Laguna Bridge Tree Survey EAST END

Tree ID	Name	# stems	DBH (in.)	Comments
179	SALAS	thicket	22 X 5	along MW4 12 no flag
180	PRCE	1	4	S NEAR FENCE
181	QULO	1	5	"
182	QUGA	1	5	"
183	FRLA	2	10	"
184	QUGA	1	2	AT FENCE
185	QUAG	2	10	NEAR FENCE
186	FRLA	2	9	S DRAINAGE
187	QUGA	1	2	NEAR FENCE
188	QUGA	1	2	"
189	QUGA	1	22	S DRAINAGE
190	QUGA	1	7	"
191	FRLA	1	7	"
192	PRCE	1	3	"
193	QUGA	1	3	FENCE
194	QUGA	1	10	"
195	QUGA	1	11	S DRAINAGE
196	FRLA	1	6	FENCE
197	QUGA	1	13	"
198	QUAG	1	8	"
199	QUGA	1	6	"
200	QUGA	1	5	S DRAINAGE
201	FRLA	1	4	"
202	PRCE	3	3	OUTSIDE FENCE
203	PRCE	2	2	"
204	QULO	1	2	"
205	SALAS	thicket	3 m	"
206	QULO	1	1	"
207	PRCE	5	6	"
208	QUGA	1	5	" no flag
209	PRCE	1	1	"
210	QUGA	1	2	"
211	QUGA	3	2	"
212	QULO	1	1	"
213	QUGA	1	2	" no flag
214	SALAS	thicket	15 X 8	"
215	QUGA	1	3	" no flag
216	QUGA	1	4	"
217	SALAS	thicket	19 X 7	"
218	QULO	1	5	"
219	QUGA	1	3	"
220	QULO	1	4	"
221	QULO	1	1	"
222	QULO	1	4	"
223	QULO	1	4	"
224	QUGA	1	1	"

QUGA
SESE
PHCA
CEDE
QULO
SALAS
QUAG
PRCE
FRLA
SALAE

GARRY OAK Oregon oak
COAST REDWOOD
CANARY ISLAND DATE PALM
DEODAR CEDAR
VALLEY OAK
ARROYO WILLOW
COAST LIVE OAK
CHERRY PLUM
OREGON ASH
RED WILLOW

APPENDIX B

EXCELL SPREADSHEET WITH GPS DATA

West Parcel									
ID_Num	Sp_Code	DBH	Comment	Northing	Easting	GPS Date	GPS Time	Feat Name	Datafile
1	quga	10		4250528.102	515850.543	10/22/2008	08:25:56am	Tree_Sur	R102209A.SSF
2	quga	31	4 stems	4250534.043	515846.777	10/22/2008	08:33:24am	Tree_Sur	R102209A.SSF
3	sese	63		4250528.171	515844.106	10/22/2008	08:35:59am	Tree_Sur	R102209A.SSF
4	sese	44		4250518.228	515846.679	10/22/2008	08:38:22am	Tree_Sur	R102209A.SSF
5	quga	3		4250513.878	515836.936	10/22/2008	08:42:18am	Tree_Sur	R102209A.SSF
6	phca	37		4250519.801	515835.98	10/22/2008	08:45:53am	Tree_Sur	R102209A.SSF
7	phca	33		4250529.258	515836.159	10/22/2008	08:49:15am	Tree_Sur	R102209A.SSF
8	quga	41		4250534.265	515833.006	10/22/2008	08:50:47am	Tree_Sur	R102209A.SSF
9	cede	40		4250527.488	515813.042	10/22/2008	08:57:38am	Tree_Sur	R102209A.SSF
10	qulo	3		4250525.086	515810.527	10/22/2008	08:59:57am	Tree_Sur	R102209A.SSF
11	quga	2		4250521.937	515811.821	10/22/2008	09:03:46am	Tree_Sur	R102209A.SSF
12	quga	4		4250522.797	515815.341	10/22/2008	09:05:09am	Tree_Sur	R102209A.SSF
13	qulo	5		4250517.849	515806.646	10/22/2008	09:13:03am	Tree_Sur	R102209A.SSF
14	quga	7		4250519.081	515809.383	10/22/2008	09:13:56am	Tree_Sur	R102209A.SSF
15	quga	2		4250519.41	515809.924	10/22/2008	09:16:30am	Tree_Sur	R102209A.SSF
East Parcel -- Trees									
ID_Num	Sp_Code	DBH	Comment	Northing	Easting	GPS Date	GPS Time	Feat Name	Datafile
18	quga	2		4250603.206	516139.063	10/22/2008	10:54:10am	Tree_Sur	R102211A.SSF
19	quga	8	2 stems	4250602.581	516143.516	10/22/2008	10:55:18am	Tree_Sur	R102211A.SSF
20	quga	5		4250602.823	516146.216	10/22/2008	10:58:17am	Tree_Sur	R102211A.SSF
21	quga	3		4250603.272	516146.888	10/22/2008	10:59:41am	Tree_Sur	R102211A.SSF
22	quga	4		4250604.119	516146.954	10/22/2008	11:01:58am	Tree_Sur	R102211A.SSF
23	quga	2		4250603.094	516150.294	10/22/2008	11:03:54am	Tree_Sur	R102211A.SSF
24	qulo	1		4250604.144	516151.249	10/22/2008	11:05:04am	Tree_Sur	R102211A.SSF
25	qulo	5	2 stems	4250606.027	516153.78	10/22/2008	11:07:18am	Tree_Sur	R102211A.SSF
26	qulo	2		4250607.489	516155.459	10/22/2008	11:08:09am	Tree_Sur	R102211A.SSF
27	quga	3		4250607.772	516155.982	10/22/2008	11:09:32am	Tree_Sur	R102211A.SSF
28	quga	3		4250608.071	516161.353	10/22/2008	11:10:55am	Tree_Sur	R102211A.SSF
29	quga	5	2 stems	4250608.815	516162.916	10/22/2008	11:12:32am	Tree_Sur	R102211A.SSF
30	quga	6	2 stems	4250612.092	516163.277	10/22/2008	11:13:50am	Tree_Sur	R102211A.SSF
31	quga	6		4250613.195	516163.765	10/22/2008	11:16:01am	Tree_Sur	R102211A.SSF
32	quga	2		4250617.052	516168.128	10/22/2008	11:17:21am	Tree_Sur	R102211A.SSF
33	quga	4		4250619.26	516171.24	10/22/2008	11:18:31am	Tree_Sur	R102211A.SSF
34	quga	2		4250618.982	516170.962	10/22/2008	11:19:44am	Tree_Sur	R102211A.SSF
35	quag	5		4250618.53	516172.182	10/22/2008	11:20:37am	Tree_Sur	R102211A.SSF
36	quga	9		4250621.324	516175.916	10/22/2008	11:22:14am	Tree_Sur	R102211A.SSF
37	quga	2		4250623.208	516181.419	10/22/2008	11:24:09am	Tree_Sur	R102211A.SSF
38	quga	4		4250624.715	516178.088	10/22/2008	11:25:02am	Tree_Sur	R102211A.SSF
39	quga	2		4250623.102	516179.203	10/22/2008	11:26:13am	Tree_Sur	R102211A.SSF
40	quga	4	2 stems	4250624.193	516180.111	10/22/2008	11:30:23am	Tree_Sur	R102211A.SSF
41	quga	4		4250624.761	516187.993	10/22/2008	11:33:09am	Tree_Sur	R102211A.SSF
42	quga	13		4250633.291	516186.396	10/22/2008	11:38:05am	Tree_Sur	R102211A.SSF
43	prce	3		4250643.934	516181.382	10/22/2008	11:42:20am	Tree_Sur	R102211A.SSF
44	frla	32	4 stems	4250643.351	516180.196	10/22/2008	11:43:50am	Tree_Sur	R102211A.SSF
45	frla	4		4250640.017	516180.761	10/22/2008	11:45:07am	Tree_Sur	R102211A.SSF
46	frla	6		4250642.033	516179.638	10/22/2008	11:46:29am	Tree_Sur	R102211A.SSF
47	quga	29	4 stems	4250645.075	516180.142	10/22/2008	11:48:42am	Tree_Sur	R102211A.SSF
48	quag	9	2 stems	4250646.063	516179.153	10/22/2008	11:50:38am	Tree_Sur	R102211A.SSF
49	prce	1		4250648.247	516181.252	10/22/2008	11:51:48am	Tree_Sur	R102211A.SSF
50	quga	6		4250648.816	516183.481	10/22/2008	11:52:55am	Tree_Sur	R102211A.SSF
51	quga	8	2 stes	4250648.902	516185.808	10/22/2008	11:54:16am	Tree_Sur	R102211A.SSF
52	quag	7	2 stems	4250631.79	516184.233	10/22/2008	12:15:06pm	Tree_Sur	R102211A.SSF
53	qulo	7	2 stems	4250629.96	516182.521	10/22/2008	12:16:57pm	Tree_Sur	R102211A.SSF
54	quga	4		4250628.592	516181.604	10/22/2008	12:17:53pm	Tree_Sur	R102211A.SSF
55	quga	3		4250627.195	516181.456	10/22/2008	12:18:47pm	Tree_Sur	R102211A.SSF
56	quga	3		4250626.283	516180.739	10/22/2008	12:20:03pm	Tree_Sur	R102211A.SSF
57	quga	19		4250629.601	516179.935	10/22/2008	12:21:31pm	Tree_Sur	R102211A.SSF
58	quga	3		4250628.432	516179.021	10/22/2008	12:22:41pm	Tree_Sur	R102211A.SSF
59	quga	5	2 stems	4250628.295	516177.827	10/22/2008	12:23:47pm	Tree_Sur	R102211A.SSF

60	quga	9		4250626.049	516174.454	10/22/2008	12:24:32pm	Tree_Sur	R102211A.SSF
61	quga	12		4250626.56	516175.157	10/22/2008	12:25:44pm	Tree_Sur	R102211A.SSF
62	quga	1		4250618.854	516173.205	10/22/2008	12:28:54pm	Tree_Sur	R102211A.SSF
63	quga	1		4250619.313	516171.088	10/22/2008	12:30:26pm	Tree_Sur	R102211A.SSF
64	quga	3		4250625.932	516170.469	10/22/2008	12:31:08pm	Tree_Sur	R102211A.SSF
65	quga	8		4250625.252	516170.226	10/22/2008	12:32:44pm	Tree_Sur	R102211A.SSF
66	quga	17	3 stems	4250625.85	516169.15	10/22/2008	12:33:59pm	Tree_Sur	R102211A.SSF
67	quga	10		4250626.129	516167.312	10/22/2008	12:35:16pm	Tree_Sur	R102211A.SSF
68	quga	6		4250623.141	516166.079	10/22/2008	12:37:24pm	Tree_Sur	R102211A.SSF
69	quga	12		4250624.347	516164.387	10/22/2008	12:38:41pm	Tree_Sur	R102211A.SSF
70	frla	12		4250636.164	516163.609	10/22/2008	12:40:43pm	Tree_Sur	R102211A.SSF
71	quga	19		4250638.765	516160.832	10/22/2008	12:42:09pm	Tree_Sur	R102211A.SSF
72	quga	5		4250637.275	516157.68	10/22/2008	12:43:52pm	Tree_Sur	R102211A.SSF
73	quga	2		4250642.88	516168.907	10/22/2008	12:45:14pm	Tree_Sur	R102211A.SSF
74	quga	1		4250643.897	516168.417	10/22/2008	12:46:52pm	Tree_Sur	R102211A.SSF
75	quga	14		4250620.99	516163.681	10/22/2008	12:49:22pm	Tree_Sur	R102211A.SSF
76	quga	4		4250621.455	516162.29	10/22/2008	12:52:05pm	Tree_Sur	R102211A.SSF
77	quga	3		4250621.572	516158.396	10/22/2008	12:54:47pm	Tree_Sur	R102211A.SSF
78	quga	6		4250623.614	516155.967	10/22/2008	12:55:59pm	Tree_Sur	R102211A.SSF
79	quga	6		4250620.625	516155.789	10/22/2008	12:56:50pm	Tree_Sur	R102211A.SSF
80	frla	2		4250626.697	516153.81	10/22/2008	12:57:48pm	Tree_Sur	R102211A.SSF
81	frla	9		4250631.714	516159.985	10/22/2008	12:58:57pm	Tree_Sur	R102211A.SSF
82	frla	11		4250632.425	516158.839	10/22/2008	01:01:07pm	Tree_Sur	R102211A.SSF
83	quga	2		4250637.635	516156.113	10/22/2008	01:02:19pm	Tree_Sur	R102211A.SSF
84	frla	4	2 stems	4250622.077	516149.242	10/22/2008	01:07:03pm	Tree_Sur	R102211A.SSF
85	frla	23	4 stems	4250628.033	516150.845	10/22/2008	01:08:23pm	Tree_Sur	R102211A.SSF
86	quga	11	4 stems	4250632.244	516144.74	10/22/2008	01:11:18pm	Tree_Sur	R102211A.SSF
87	quga	5		4250625.558	516143.229	10/22/2008	01:13:30pm	Tree_Sur	R102211A.SSF
88	quga	7		4250627.129	516141.371	10/22/2008	01:15:14pm	Tree_Sur	R102211A.SSF
89	frla	17	5 stems off a domned tree	4250623.006	516147.573	10/22/2008	01:16:57pm	Tree_Sur	R102211A.SSF
90	frla	2		4250616.471	516145.926	10/22/2008	01:20:58pm	Tree_Sur	R102211A.SSF
91	quga	36		4250613.955	516149.533	10/22/2008	01:21:31pm	Tree_Sur	R102211A.SSF
92	frla	11	2 sremes	4250613.57	516143.465	10/22/2008	01:24:03pm	Tree_Sur	R102211A.SSF
93	quga	7		4250612.053	516142.398	10/22/2008	01:26:20pm	Tree_Sur	R102211A.SSF
94	quga	10		4250607.827	516141.191	10/22/2008	01:27:42pm	Tree_Sur	R102211A.SSF
95	quga	17		4250608.161	516134.123	10/22/2008	01:28:23pm	Tree_Sur	R102211A.SSF
96	quga	5		4250607.015	516132.366	10/22/2008	01:29:44pm	Tree_Sur	R102211A.SSF
98	frla	15	2 stems	4250620.965	516134.233	10/22/2008	01:33:10pm	Tree_Sur	R102211A.SSF
99	quga	19	5 stems	4250626.975	516130.838	10/22/2008	01:34:55pm	Tree_Sur	R102211A.SSF
100	quga	4		4250624.225	516133.861	10/22/2008	01:36:22pm	Tree_Sur	R102211A.SSF
101	quga	5		4250628.392	516133.417	10/22/2008	01:37:51pm	Tree_Sur	R102211A.SSF
102	frla	14	2 stems	4250626.87	516134.985	10/22/2008	01:39:40pm	Tree_Sur	R102211A.SSF
104	frla	7		4250625.836	516137.014	10/22/2008	01:43:36pm	Tree_Sur	R102211A.SSF
105	frla	15		4250625.53	516138.026	10/22/2008	01:44:14pm	Tree_Sur	R102211A.SSF
106	salas	4	4 stems	4250619.776	516142.818	10/22/2008	01:45:26pm	Tree_Sur	R102211A.SSF
107	quga	9		4250647.763	516191.381	10/22/2008	02:07:12pm	Tree_Sur	R102211A.SSF
109	quga	8		4250651.003	516189.211	10/22/2008	02:11:53pm	Tree_Sur	R102211A.SSF
110	quga	3		4250652.841	516187.432	10/22/2008	02:13:10pm	Tree_Sur	R102211A.SSF
111	quga	4		4250651.384	516190.138	10/22/2008	02:15:47pm	Tree_Sur	R102211A.SSF
112	quga	6		4250652.63	516191.763	10/22/2008	02:16:44pm	Tree_Sur	R102211A.SSF
113	prce	36	4 main stems	4250647.638	516193.95	10/22/2008	02:18:46pm	Tree_Sur	R102211A.SSF
114	frla	9		4250641.699	516193.995	10/22/2008	02:20:25pm	Tree_Sur	R102211A.SSF
115	quga	8		4250633.704	516191.241	10/22/2008	02:21:54pm	Tree_Sur	R102211A.SSF
116	quga	1		4250632.716	516192.656	10/22/2008	02:23:08pm	Tree_Sur	R102211A.SSF
117	quga	9		4250632.558	516194.646	10/22/2008	02:23:57pm	Tree_Sur	R102211A.SSF
118	quga	30	2 stems	4250634.231	516194.71	10/22/2008	02:24:37pm	Tree_Sur	R102211A.SSF
119	quga	5		4250632.229	516195.399	10/22/2008	02:26:10pm	Tree_Sur	R102211A.SSF
121	frla	6	3 stems	4250648.808	516196.698	10/22/2008	02:30:10pm	Tree_Sur	R102211A.SSF
122	quga	8		4250651.68	516195.535	10/22/2008	02:35:53pm	Tree_Sur	R102211A.SSF
123	quga	6		4250656.039	516193.836	10/22/2008	02:36:14pm	Tree_Sur	R102211A.SSF
124	quga	8		4250656.009	516194.984	10/22/2008	02:37:25pm	Tree_Sur	R102211A.SSF
125	quga	6		4250657.119	516197.027	10/22/2008	02:38:29pm	Tree_Sur	R102211A.SSF
126	quga	30		4250660.667	516202.844	10/22/2008	02:40:34pm	Tree_Sur	R102211A.SSF
127	quga	9		4250641.949	516205.889	10/22/2008	02:44:48pm	Tree_Sur	R102211A.SSF
128	frla	14		4250658.702	516208.166	10/22/2008	02:47:19pm	Tree_Sur	R102211A.SSF
130	salae	4		4250656.947	516200.854	10/22/2008	02:50:09pm	Tree_Sur	R102211A.SSF
131	prce	2		4250657.65	516211.826	10/22/2008	02:52:40pm	Tree_Sur	R102211A.SSF
133	quga	6		4250631.508	516271.668	10/22/2008	02:56:29pm	Tree_Sur	R102211A.SSF
134	quga	5		4250644.964	516214.093	10/24/2008	07:46:52am	Tree_Sur	R102408A.SSF
135	quga	14	3 stems	4250643.753	516214.114	10/24/2008	07:48:22am	Tree_Sur	R102408A.SSF
136	quga	10		4250642.369	516213.511	10/24/2008	07:49:28am	Tree_Sur	R102408A.SSF
137	quga	13		4250643.603	516214.435	10/24/2008	07:51:30am	Tree_Sur	R102408A.SSF
138	quga	3		4250644.547	516217.13	10/24/2008	07:53:45am	Tree_Sur	R102408A.SSF
139	frla	12		4250645.198	516218.318	10/24/2008	07:55:24am	Tree_Sur	R102408A.SSF
140	quga	1		4250645.938	516217.508	10/24/2008	07:56:14am	Tree_Sur	R102408A.SSF
141	quga	8		4250646.451	516217.206	10/24/2008	07:57:26am	Tree_Sur	R102408A.SSF
142	frla	11		4250645.622	516214.913	10/24/2008	07:58:30am	Tree_Sur	R102408A.SSF
143	prce	14	5 stems	4250639.805	516212.492	10/24/2008	08:03:29am	Tree_Sur	R102408A.SSF
144	frla	10	4 stems	4250641.896	516218.615	10/24/2008	08:07:35am	Tree_Sur	R102408A.SSF
145	salas	7	2 stems	4250644.706	516221.007	10/24/2008	08:09:44am	Tree_Sur	R102408A.SSF
146	quga	7		4250642.222	516222.385	10/24/2008	08:11:04am	Tree_Sur	R102408A.SSF
147	quga	3		4250645.133	516221.572	10/24/2008	08:11:55am	Tree_Sur	R102408A.SSF
148	salae	17	4 stems	4250646.425	516222.703	10/24/2008	08:13:21am	Tree_Sur	R102408A.SSF
149	quga	14	2 stems	4250646.361	516226.131	10/24/2008	08:15:43am	Tree_Sur	R102408A.SSF
150	frla	9		4250650.691	516222.533	10/24/2008	08:25:55am	Tree_Sur	R102408A.SSF
151	frla	4	2 stems	4250647.423	516218.193	10/24/2008	08:27:19am	Tree_Sur	R102408A.SSF
153	salae	15	2 stems	4250652.339	516215.658	10/24/2008	08:29:58am	Tree_Sur	R102408A.SSF
154	frla	2		4250652.199	516210.705	10/24/2008	08:32:43am	Tree_Sur	R102408A.SSF
155	frla	7	3 stems	4250657.07	516211.191	10/24/2008	08:34:47am	Tree_Sur	R102408A.SSF
156	frla	5		4250656.878	516212.222	10/24/2008	08:35:44am	Tree_Sur	R102408A.SSF
157	frla	3		4250657.219	516214.334	10/24/2008	08:36:44am	Tree_Sur	R102408A.SSF
159	frla	12	4 stems	4250662.837	516217.543	10/24/2008	08:42:49am	Tree_Sur	R102408A.SSF
160	frla	18	5 stems	4250663.959	516218.832	10/24/2008	08:43:42am	Tree_Sur	R102408A.SSF

PRELIMINARY SITE INVESTIGATION REPORT



PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 4
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6671 BRISA STREET
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GEOCON PROJECT NO. E8560-06-26
CALTRANS EA 04-1A2901
CALTRANS PROJECT # 04-0000-0482-1

SEPTEMBER 2012

6.0 CONCLUSIONS

Waste classifications are evaluated based on the 90% UCL of the lead content for the relevant excavation depths; this has historically been considered sufficient to satisfy a good faith effort by the EPA as discussed in SW-846. Risk assessment characterization is based on the 95% UCL of the lead content in the waste for the relevant depths; this is in accordance with the Risk Assessment Guidance for Superfund (RAGS) Volume 1 Documentation for Exposure Assessment. Per Caltrans, the 90% UCLs are to be used to evaluate onsite reuse and the 95% UCLs are to be used to evaluate offsite disposal.

6.1 Lead

6.1.1 EB SR-12 West of Bridge (Borings B1 to B9)

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and predicted WET lead concentrations for data collected from this portion of the Site. Weighted averages are calculated by using the total lead concentration for each depth interval as the value for the underlying soil (unless a sample was collected from an underlying depth interval). The total and WET lead calculations are summarized below and in Table 6a.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 2.5 ft	87.3	3.5	93.1	Non-hazardous
<i>Underlying soil (2.5 to 6.0 ft)</i>	<i>65.6</i>	<i>2.6</i>	<i>72.1</i>	<i>Non-hazardous</i>
0 to 5.5 ft	77.3	3.1	83.6	Non-hazardous
<i>Underlying soil (5.5 to 6.0 ft)</i>	<i>46.1</i>	<i>1.8</i>	<i>50.9</i>	<i>Non-hazardous</i>
0 to 6.0 ft	74.7	3.0	80.8	Non-hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 6.0 feet would be classified as non-hazardous based on lead content since the 90% UCL-predicted WET lead concentration is less than the lead STLC of 5.0 mg/l.

6.1.2 EB SR-12 East of Bridge - Western Portion (Borings B10 to B12)

The total lead maximum concentration of 9.1 mg/kg is less than the TTLC of 1,000 mg/kg and less than 50 mg/kg (i.e., less than ten times the STLC of 5 mg/l). Accordingly, soil would be classified as non-hazardous based on lead content.

6.1.3 EB SR-12 East of Bridge - Eastern Portion (Borings B13 to B15)

The following table summarizes the predicted waste classification for excavated soil based on the maximum total lead and predicted WET lead concentrations for data collected from this portion of the Site. Weighted averages are calculated by using the total lead concentration for each depth interval as the value for the underlying soil (unless a sample was collected from an underlying depth interval). The total and WET lead calculations are summarized below and in Table 6b.

Excavation Depth	Maximum Total Lead (mg/kg)	Maximum Predicted WET Lead (mg/l)	Waste Classification
0 to 2.5 ft	200	8.0	Hazardous
<i>Underlying soil (2.5 to 6.0 ft)</i>	<i>413</i>	<i>16.6</i>	<i>Hazardous</i>
0 to 5.5 ft	331	13.3	Hazardous
<i>Underlying soil (5.5 to 6.0 ft)</i>	<i>250</i>	<i>10.0</i>	<i>Hazardous</i>
0 to 6.0 ft	324	13.0	Hazardous

Based on the data presented in the above table, soil excavated to a depth of 6.0 feet would be classified as a California hazardous waste since the maximum -predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results, soil excavated to a depth of 6.0 feet would not be classified as a RCRA hazardous waste. Based on the reported DI-WET and pH results, soil excavated from 0 to 6.0 feet may be reused onsite (as Caltrans Type Y-1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement.

6.1.4 WB SR-12 East of Bridge (Borings B16 to B21)

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and predicted WET lead concentrations for data collected from this portion of the Site. Weighted averages are calculated by using the total lead concentration for each depth interval as the value for the underlying soil (unless a sample was collected from an underlying depth interval). The total and WET lead calculations are summarized below and in Table 6c.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 2.5 ft	73.5	2.9	81.2	Non-hazardous
<i>Underlying soil (2.5 to 6.0 ft)</i>	75.9	3.0	80.1	<i>Non-hazardous</i>
0 to 5.5 ft	77.4	3.1	83.2	Non-hazardous
<i>Underlying soil (5.5 to 6.0 ft)</i>	46.9	1.9	52.0	<i>Non-hazardous</i>
0 to 6.0 ft	74.9	3.0	80.6	Non-hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 6.0 feet would be classified as non-hazardous based on lead content since the 90% UCL-predicted WET lead concentration is less than the lead STLC of 5.0 mg/l.

6.1.5 WB SR-12 West of Bridge (Borings B22 to B24)

The total lead 90% UCL concentration of 24.1 mg/kg is less than the TTLC of 1,000 mg/kg and less than 50 mg/kg (i.e., less than ten times the STLC of 5 mg/l). Accordingly, soil would be classified as non-hazardous based on lead content.

6.2 CAM 17 Metals and Hexavalent Chromium in Soil

The CAM 17 metals and hexavalent chromium concentrations in site soil were compared to ESLs. Arsenic, lead, nickel, and vanadium were reported with concentrations equal to or greater than their respective residential land use ESL values. ESLs and published background concentrations for these elements are summarized in the table below:

Metal	95% UCL	RESIDENTIAL ESL	COMMERCIAL/ INDUSTRIAL ESL	CONSTRUCTION EXPOSURE ESL	PUBLISHED BACKGROUND MEAN ¹	PUBLISHED BACKGROUND RANGE ¹
Arsenic	2.42	0.39	1.6	15	3.5	0.6 to 11.0
Lead	68.0	200	750	750	23.9	12.4-97.1
Nickel	51.8	150	150	260	57	9 to 509
Vanadium	25.6	16	200	770	112	39 to 288

Concentrations reported in milligrams per kilogram (mg/kg)

¹ Kearney Foundation of Soil Science, March 1996

The 95% UCL arsenic value for soil samples collected at the site is greater than the residential and commercial land use ESLs; however, it is less than the construction exposure ESL and within the published background range. The SFRWQCB *November 2007 Update to Environmental Screening Levels (ESLs) Technical Document* states that ambient background concentrations of arsenic typically

exceed risk-based screening levels. In such instances, it may be more appropriate to compare site data to regionally specific established background levels.

The 95% UCL lead concentration for soil samples collected at the site is less than the residential land use ESL and within the published background range.

The 95% UCL nickel concentration for soil samples collected at the site is less than the residential land use ESL and within the published background range.

The 95% UCL vanadium concentration for soil samples collected at the site is greater than the residential land use ESL; however, it is less than the commercial/industrial land use ESL and within the published background range.

Offsite reuse or disposal of excavated soil may be restricted based on metals content.

6.3 Organic Compounds in Soil

Organic concentrations in soil were compared to ESLs.

TPHg, BTEX, MTBE, or VOCs were not detected at or above the laboratory reporting limits.

TPHd was reported at concentrations ranging from 2.1 mg/kg to 2,600 mg/kg, above the residential and commercial/industrial land use ESLs, but below the construction exposure ESL. TPHd has a calculated 95% UCL concentration of 612 mg/kg.

TPHmo was reported at 4.5 mg/kg to 8,800 mg/kg, above the residential land use ESL of 370 mg/kg and the industrial land use ESL of 2,500 mg/kg but below the construction exposure ESL. TPHmo has a calculated 95% UCL concentration of 2,129 mg/kg. Organic compounds results for soil samples and corresponding ESL values are presented in Table 4.

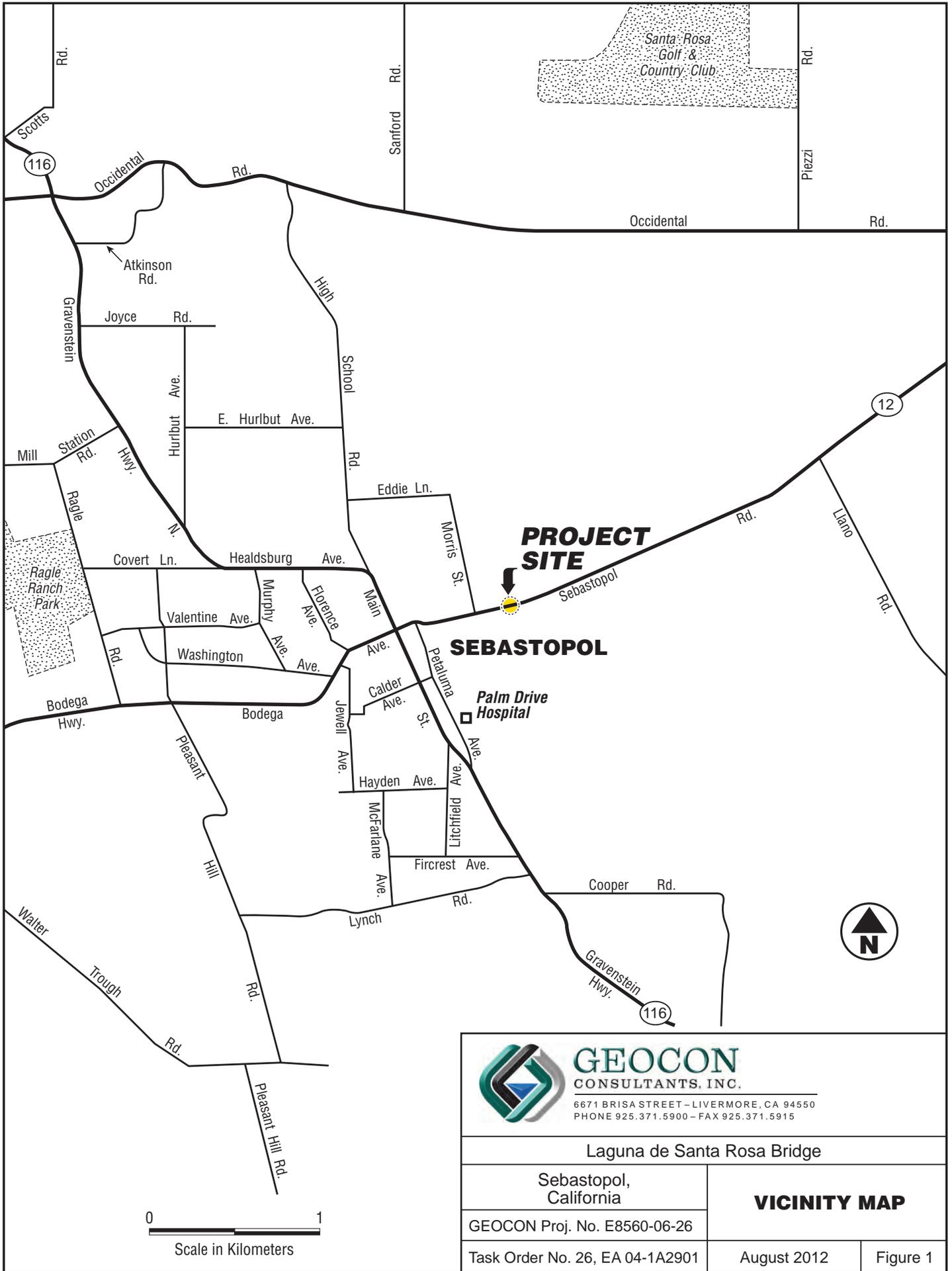
Based on the reported TPHd and TPHmo concentrations, offsite reuse or disposal of excavated soil may be restricted based on TPH content depending on proposed use. Additionally, onsite reuse of soil containing TPH in excess of commercial/industrial ESLs requires RWQCB concurrence.

6.4 Organic Compounds in Groundwater

The water sample collected from borings B10-GW was analyzed for organic compounds. TPHg, BTEX, MTBE or VOCs were not detected at or above laboratory reporting limits. Organic compounds results for the water samples and corresponding ESL values are summarized in Table 5.

6.5 Worker Protection

The contractor(s) should prepare a project-specific health and safety plan to prevent or minimize worker exposure to metals and hydrocarbons in soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of soil.



GEOCON
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Laguna de Santa Rosa Bridge

Sebastopol,
California

VICINITY MAP

GEOCON Proj. No. E8560-06-26

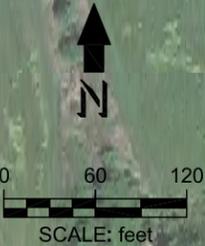
Task Order No. 26, EA 04-1A2901

August 2012

Figure 1



LEGEND:
 ● Boring Location



6671 BRISA STREET, LIVERMORE, CA 94550; PHONE 925 371-5900 - FAX 925 371-5915

Laguna de Santa Rosa Bridge, SR12

Sebastopol,
 Sonoma County, CA

SITE PLAN

GEOCON Proj. No. E8560-06-26

EA No. 04-0000-0482-1

August 2012

Figure 2

TABLE 1
Boring Coordinates
SR-12 Laguna de Santa Rosa Bridge
Sonoma County, California

Boring	Northing	Easting
B1	1,909,596.239	6,327,006.830
B2	1,909,608.089	6,327,068.069
B3	1,909,622.226	6,327,134.487
B4	1,909,633.268	6,327,197.718
B5	1,909,649.181	6,327,253.634
B6	1,909,665.398	6,327,322.299
B7	1,909,680.353	6,327,383.150
B8	1,909,697.660	6,327,448.861
B9	1,909,716.210	6,327,512.714
B10	1,909,821.572	6,327,851.201
B11	1,909,845.983	6,327,917.096
B12	1,909,878.087	6,327,989.498
B13	1,909,905.614	6,328,061.388
B14	1,909,936.198	6,328,129.037
B15	1,909,963.648	6,328,197.530
B16	1,910,019.649	6,328,233.758
B17	1,909,974.662	6,328,142.048
B18	1,909,926.931	6,328,031.265
B19	1,909,897.112	6,327,942.650
B20	1,909,873.136	6,327,874.310
B21	1,909,850.935	6,327,807.745
B22	1,909,740.901	6,327,441.645
B23	1,909,743.082	6,327,418.725
B24	1,909,745.901	6,327,391.589

Coordinates shown in NAD 83, Zone 2, feet

TABLE 2
Summary of Lead and pH Results
SR-12 Laguna de Santa Rosa Bridge
Sonoma County, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B1-0	0-0.5	59	2.5			---
B1-2.5	2.5-3.0	2.9	---	---	---	6.4
B1-5.5	5.5-6.0	2.9	---	---	---	---
B2-0	0-0.5	130	6.4	<0.50	<0.50	---
B2-2.5	2.5-3.0	11	---	---	---	---
B2-5.5	5.5-6.0	9.5	---	---	---	6.7
B3-0	0-0.5	75	3.2			---
B3-2.5	2.5-3.0	48	---	---	---	---
B3-5.5	5.5-6.0	4.8	---	---	---	---
B4-0	0-0.5	12	---	---	---	7.4
B4-2.5	2.5-3.0	50	1.9	---	---	---
B4-5.5	5.5-6.0	2.4	---	---	---	---
B5-0	0-0.5	21	---	---	---	---
B5-2.5	2.5-3.0	3.7	---	---	---	7.1
B5-5.5	5.5-6.0	4.9	---	---	---	---
B6-0	0-0.5	5.1	---	---	---	---
B6-2.5	2.5-3.0	19	---	---	---	---
B6-5.5	5.5-6.0	1.7	---	---	---	---
B7-0	0-0.5	140	6.7	<0.50	<0.50	6.4
B7-2.5	2.5-3.0	27	---	---	---	---
B7-5.5	5.5-6.0	5.1	---	---	---	---
B8-0	0-0.5	120	9.6	<0.50	<0.50	---
B8-2.5	2.5-3.0	150	8.5	<0.50	<0.50	---
B8-5.5	5.5-6.0	68	2.8	---	---	7.1
B9-0	0-0.5	32	---	---	---	---
B9-2.5	2.5-3.0	120	4.5	---	---	---
B9-4	4.0-4.5	140	9.1	<0.50	0.63	---
B10-0	0-0.5	4.4	---	---	---	---
B10-2.5	2.5-3.0	3.1	---	---	---	---
B10-5.5	5.5-6.0	5.0	---	---	---	---
B11-0	0-0.5	9.1	---	---	---	---
B11-2.5	2.5-3.0	7.1	---	---	---	---
B11-5.5	5.5-6.0	3.4	---	---	---	---

TABLE 2
Summary of Lead and pH Results
SR-12 Laguna de Santa Rosa Bridge
Sonoma County, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B12-0	0-0.5	8.2	---	---	---	7.2
B12-2.5	2.5-3.0	8.7	---	---	---	---
B12-5.5	5.5-6.0	6.2	---	---	---	---
B13-0	0-0.5	68	2.9	---	---	---
B13-2.5	2.5-3.0	440	16	<0.50	1.1	---
B13-5.5	5.5-6.0	250	9.4	<0.50	0.58	---
B14-0	0-0.5	130	4.7	---	---	6.6
B14-2.5	2.5-3.0	120	4.3	---	---	---
B14-4	4.5-5.0	140	8.8	<0.50	<0.50	---
B15-0	0-0.5	200	3.1	---	---	---
B15-2.5	2.5-3.0	180	7.8	<0.50	0.65	---
B15-5.5	5.5-6.0	48	---	---	---	7.0
B16-0	0-0.5	19	---	---	---	---
B16-2.5	2.5-3.0	75	1.9	---	---	---
B16-5.5	5.5-6.0	7.7	---	---	---	---
B17-0	0-0.5	9.0	---	---	---	---
B17-2.5	2.5-3.0	47	---	---	---	7.1
B17-5.5	5.5-6.0	14	---	---	---	---
B18-0	0-0.5	37	---	---	---	---
B18-2.5	2.5-3.0	67	1.6	---	---	---
B18-5.5	5.5-6.0	16	---	---	---	---
B19-0	0-0.5	140	5.3	<0.50	<0.50	6.6
B19-2.5	2.5-3.0	59	2.1	---	---	---
B19-5.5	5.5-6.0	33	---	---	---	---
B20-0	0-0.5	81	2.1	---	---	---
B20-2.5	2.5-3.0	120	5.1	<0.50	<0.50	---
B20-5.5	5.5-6.0	100	3.6	---	---	7.0
B21-0	0-0.5	5.8	---	---	---	---
B21-2.5	2.5-3.0	5.9	---	---	---	---
B21-5.5	5.5-6.0	5.7	---	---	---	---
B22-0	0-0.5	11	---	---	---	---
B22-2.5	2.5-3.0	7.3	---	---	---	---
B22-5.5	5.5-6.0	4.3	---	---	---	---
B23-0	0-0.5	13	---	---	---	10
B23-2.5	2.5-3.0	6.6	---	---	---	---
B23-5.5	5.5-6.0	4.7	---	---	---	---

TABLE 2
Summary of Lead and pH Results
SR-12 Laguna de Santa Rosa Bridge
Sonoma County, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	DI-WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B24-0	0-0.5	12	---	---	---	6.7
B24-2.5	2.5-3.0	48	---	---	---	---
B24-3.5	5.5-6.0	26	---	---	---	---

Hazardous Waste Criteria

TTL (mg/kg)	1,000	---	---	---	---
STL (mg/l)	---	5.0	---	---	---
TCLP (mg/l)	---	---	---	5.0	---

QA/QC Samples	Date Collected	Total Lead (mg/l)
RB	7/10/2012	<0.005

Notes:

- mg/kg = Milligrams per kilogram
- mg/l = Milligrams per liter
- = Not analyzed or no standard
- <5.0 = Not detected above the laboratory reporting limit
- WET = Waste Extraction Test using citric acid as the extraction fluid
- DI-WET = Waste Extraction Test using deionized water as the extraction fluid
- TCLP = Toxicity Characteristic Leaching Procedure
- TTL = Total Threshold Limit Concentration
- STL = Soluble Threshold Limit Concentration
- RB = Rinse Blank

TABLE 3
Summary of CAM 17 Metals and Hexavalent Chromium Results - Soil
Laguna de Santa Rosa Bridge
Sonoma County, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Hexavalent Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
B1-0	0-0.5	<2.0	4.8	69	<1.0	<1.0	30	---	11	29	59	<0.10	<1.0	32	<1.0	<1.0	<1.0	27	110
B1-5.5	5.5-6.0	---	---	---	---	---	---	<1.0	---	---	---	---	---	---	---	---	---	---	---
B2-2.5	2.5-3.0	<2.0	3.5	63	<1.0	<1.0	52 <1.0	---	7.7	5.4	11	<0.10	<1.0	33	<1.0	<1.0	<1.0	35	32
B3-5.5	5.5-6.0	<2.0	1.1	35	<1.0	<1.0	18	---	5.2	3.8	4.8	<0.10	<1.0	8.9	<1.0	<1.0	<1.0	18	9.6
B4-0	0-0.5	<2.0	<1.0	49	<1.0	<1.0	16	---	7.9	19	12	<0.10	<1.0	21	<1.0	<1.0	<1.0	35	49
B5-0	0-0.5	---	---	---	---	---	---	1.6	---	---	---	---	---	---	---	---	---	---	---
B5-2.5	2.5-3.0	<2.0	<1.0	84	<1.0	<1.0	12	---	4.4	5.1	3.7	<0.10	<1.0	9.4	<1.0	<1.0	<1.0	11	29
B6-5.5	5.5-6.0	<2.0	<1.0	20	<1.0	<1.0	8.3	---	<1.0	2.9	1.7	<0.10	<1.0	4.6	<1.0	<1.0	<1.0	4.4	150
B7-0	0-0.5	<2.0	3.1	110	<1.0	<1.0	22	---	7.7	25	140	0.14	<1.0	26	<1.0	<1.0	<1.0	21	120
B8-2.5	2.5-3.0	<2.0	2.3	53	<1.0	<1.0	22	---	7.3	16	150	<0.10	<1.0	25	<1.0	<1.0	<1.0	21	49
B9-2.5	2.5-3.0	---	---	---	---	---	---	<1.0	---	---	---	---	---	---	---	---	---	---	---
B9-4	4.0-4.5	<2.0	3.4	72	<1.0	<1.0	19	---	7.2	15	140	<0.10	<1.0	27	<1.0	<1.0	<1.0	19	70
B10-0	0-0.5	<2.0	1.2	83	<1.0	<1.0	21	---	9.4	14	4.4	<0.10	<1.0	39	<1.0	<1.0	<1.0	26	24
B11-0	0-0.5	---	---	---	---	---	---	<1.0	---	---	---	---	---	---	---	---	---	---	---
B11-2.5	2.5-3.0	<2.0	1.1	84	<1.0	<1.0	21	---	7.2	12	7.1	<0.10	<1.0	32	<1.0	<1.0	<1.0	18	21
B12-5.5	5.5-6.0	<2.0	<1.0	57	<1.0	<1.0	29	---	4.4	6.6	6.2	<0.10	<1.0	20	<1.0	<1.0	<1.0	18	17
B13-0	0-0.5	<2.0	1.1	52	<1.0	<1.0	22	---	6.8	16	68	<0.10	<1.0	27	<1.0	<1.0	<1.0	17	53
B14-2.5	2.5-3.0	<2.0	2.4	140	<1.0	<1.0	21	---	16	17	120	<0.10	<1.0	43	<1.0	<1.0	<1.0	17	46
B14-4	4.0-4.5	---	---	---	---	---	---	6.0	---	---	---	---	---	---	---	---	---	---	---
B15-5.5	5.5-6.0	<2.0	3.6	80	<1.0	<1.0	140 <1.0	---	17	10	48	<0.10	<1.0	220 <1.0	<1.0	<1.0	<1.0	23	49

TABLE 3
Summary of CAM 17 Metals and Hexavalent Chromium Results - Soil
Laguna de Santa Rosa Bridge
Sonoma County, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Hexavalent Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
B17-0	0-0.5	<10	<5.0	10	<5.0	<5.0	5.8	---	<5.0	<10	9.0	<0.10	<5.0	6.9	<5.0	<5.0	<5.0	5.8	13
B17-2.5	2.5-3.0	---	---	---	---	---	---	<1.0	---	---	---	---	---	---	---	---	---	---	---
B18-2.5	2.5-3.0	<2.0	1.7	89	<1.0	<1.0	19	---	7.8	11	67	<0.10	<1.0	21	<1.0	<1.0	<1.0	16	36
B19-5.5	5.5-6.0	<2.0	1.6	110	<1.0	<1.0	25	---	13	12	33	<0.10	<1.0	29	<1.0	<1.0	<1.0	23	33
B20-0	0-0.5	---	---	---	---	---	---	2.0	---	---	---	---	---	---	---	---	---	---	---
B21-0	0-0.5	<2.0	1.4	110	<1.0	<1.0	34	---	11	12	5.8	<0.10	<1.0	59	<1.0	<1.0	<1.0	29	27
B22-0	0-0.5	---	---	---	---	---	---	7.8	---	---	---	---	---	---	---	---	---	---	---
B22-2.5	2.5-3.0	<2.0	2.7	110	<1.0	<1.0	28	---	5.9	12	7.3	<0.10	<1.0	35	<1.0	<1.0	<1.0	37	36
B23-5.5	5.5-6.0	<2.0	2.2	140	<1.0	<1.0	33	---	8.4	13	4.7	<0.10	<1.0	40	<1.0	<1.0	<1.0	43	34
<u>ESLs</u>																			
Residential Land Use		6.3	0.39	750	4.0	1.7	750	8,000	40	230	200	1.3	40	150	10	20	1.3	16	600
Comm/Ind Land Use		40	1.6	1,500	8.0	7.4	750	8,000	80	230	750	10	40	150	10	40	16	200	600
Construction Exposure		310	15	2,600	98	39	1,200,000	530	94	310,000	750	58	78	260	3,900	3,900	62	770	230,000
<u>Hazardous Waste Criteria</u>																			
TTL		500	500	10,000	75	100	2,500*	500	8,000	2,500	1,000	20	3,500	2,000	100	500	700	2,400	5,000
STLC		15	5.0	100	0.75	1.0	5.0*	5.0	80	25	5.0	0.2	350	20	1.0	5.0	7.0	24	250
TCLP		---	5.0	100	---	1.0	6.0	6.0**	---	---	5.0	0.2	---	---	1.0	5.0	---	---	---

Notes:

Results are shown in milligrams per kilogram (mg/kg).

* Values listed for chromium are for Chromium III, as there is no standard for total chromium

**Value listed for Hexavalent Chromium is for total chromium, as there is no standard for Hexavalent Chromium.

< = Analyte was not detected above the laboratory reporting limit.

ESLs = Environmental Screening Levels, Tables A and K-3, SFRWQCB, Revised May 2008.

TTL = total threshold limit concentration

STLC = soluble threshold limit concentration

TCLP = toxicity characteristic leaching procedure

--- = not analyzed or no standard exists for this compound

Values shown in italics represent WET analysis results

TABLE 4
Summary of Organics Results - Soil
Laguna de Santa Rosa Bridge
Sonoma County, California

Sample ID	Sample Depth (ft)	TPHd (mg/kg)	TPHmo (mg/kg)	TPHg (mg/kg)	BTEX (µg/kg)	MTBE (µg/kg)	VOCs (µg/kg)
B1-0	0-0.5	160	580	---	---	---	---
B1-2.5	2.5-3.0	2.8	5.7	---	---	---	---
B3-0	0-0.5	86	280	---	---	---	---
B3-2.5	2.5-3.0	6.1	17	---	---	---	---
B5-0	0-0.5	32	99	---	---	---	---
B5-2.5	2.5-3.0	2.1	4.5	---	---	---	---
B6-8	8.0-8.5	---	---	<1.0	ND	<5.0	ND
B6-13	13-13.5	---	---	<1.0	ND	<5.0	ND
B6-19	19-19.5	---	---	<1.0	ND	<5.0	ND
B7-0	0-0.5	240	680	---	---	---	---
B7-2.5	2.5-3.0	11	23	---	---	---	---
B7-5.5	5.5-6.0	2.6	5.9	---	---	---	---
B9-0	0-0.5	2,100	7,000	---	---	---	---
B9-2.5	2.5-3.0	2,600	8,800	---	---	---	---
B10-0	0-0.5	7.3	14	---	---	---	---
B10-2.5	2.5-3.0	5.3	15	---	---	---	---
B10-5.5	5.5-6.0	5.0	8.2	---	---	---	---
B10-10	10-10.5	---	---	<1.0	ND	<5.0	ND
B11-0	0-0.5	5.6	13	---	---	---	---
B11-2.5	2.5-3.0	170	550	---	---	---	---

TABLE 4
Summary of Organics Results - Soil
Laguna de Santa Rosa Bridge
Sonoma County, California

Sample ID	Sample Depth (ft)	TPHd (mg/kg)	TPHmo (mg/kg)	TPHg (mg/kg)	BTEX (µg/kg)	MTBE (µg/kg)	VOCs (µg/kg)
B12-0	0-0.5	620	1,500	---	---	---	---
B12-2.5	2.5-3.0	6.0	11	---	---	---	---
B14-0	0-0.5	2,000	7,400	---	---	---	---
B14-2.5	2.5-3.0	430	1,400	---	---	---	---
B16-0	0-0.5	97	360	---	---	---	---
B16-2.5	2.5-3.0	370	1,200	---	---	---	---
B18-0	0-0.5	290	870	---	---	---	---
B18-2.5	2.5-3.0	11	32	---	---	---	---
B18-5.5	5.5-6.0	6.4	5.5	---	---	---	---
B19-0	0-0.5	2,300	8,400	---	---	---	---
B19-2.5	2.5-3.0	110	360	---	---	---	---
B20-0	0-0.5	1,100	4,500	---	---	---	---
B20-2.5	2.5-3.0	100	360	---	---	---	---
B21-10	10-10.5	---	---	<1.0	ND	<5.0	ND
B22-0	0-0.5	220	780	---	---	---	---
B22-2.5	2.5-3.0	220	670	---	---	---	---
B23-10	10-10.5	---	---	<1.0	ND	<5.0	ND
B24-0	0-0.5	39	120	---	---	---	---
B24-2.5	2.5-3.0	8.5	22	---	---	---	---

TABLE 4
Summary of Organics Results - Soil
Laguna de Santa Rosa Bridge
Sonoma County, California

Sample ID	Sample Depth (ft)	TPHd (mg/kg)	TPHmo (mg/kg)	TPHg (mg/kg)	BTEX (µg/kg)	MTBE (µg/kg)	VOCs (µg/kg)
ESLs							
	Residential	83	370	83	---	23	---
	Commercial/Industrial	83	2,500	83	---	23	---
	Construction Exposure	4,200	12,000	4,200	---	2.80E+06	---
QA/QC Samples	Date Collected						
TRIP BLANK	7/10/2012	---	---	0.05 (mg/l)	---		---

Notes:
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
TPHd = Total petroleum hydrocarbons as diesel
TPHmo = Total petroleum hydrocarbons as motor oil
TPHg = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and xylenes
VOCs = Volatile organic compounds
ND = Not detected above the stated laboratory reporting limit
--- = Not analyzed or no standard exists for this compound
ESLs = Environmental Screening Levels

TABLE 5
Summary of Organics Results - Groundwater
Laguna de Santa Rosa Bridge
Sonoma County, California

Sample ID	TPHg (mg/l)	BTEX (µg/l)	MTBE (µg/l)	VOCs (µg/l)
B10-GW	<0.05	ND	<0.50	ND
Trip Blank	0.05	---	---	---
<u>ESLs</u>				
GW is current/potential source	0.10	---	5.0	---
GW not current/potential source	0.21	---	1,800	---
Surface Water - Freshwater	0.10	---	5.0	---
Surface Water - Marine	0.21	---	180	---
Surface Water - Estuarine	0.21	---	180	---

Notes:

- mg/l = milligrams per liter
- µg/l = micrograms per liter
- TPHg = Total petroleum hydrocarbons as gasoline
- BTEX = Benzene, toluene, ethylbenzene, and xylenes
- MTBE = Methyl tert-butyl ether
- VOCs = Volatile Organic Compounds
- < = Not detected at or above the stated laboratory reporting limit
- ND = None detected
- ESLs = Environmental Screening Levels

TABLE 6a
Summary of Lead Statistical Analysis
Laguna de Santa Rosa Bridge
Sonoma County, California

EB SR-12 West of Bridge (borings B1 to B9)

TOTAL LEAD

	90% UCL	95% UCL
0 ft	87.3	93.1
2.5 ft	68.9	75.6
5.5 ft	46.1	50.9

EXCAVATION SCENARIOS

Excavation Depth	Weighted Averages		95% UCL Total Lead (mg/kg)
	90% UCL Total Lead (mg/kg)	WET Lead* (mg/l)	
0 to 2.5 ft	87.3	3.5	93.1
<i>Underlying Soil (2.5 to 6.0 ft)</i>	65.6	2.6	72.1
0 to 5.5 ft	77.3	3.1	83.6
<i>Underlying Soil (5.5 to 6.0 ft)</i>	46.1	1.8	50.9
0 to 6.0 ft	74.7	3.0	80.8

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

* = WET lead concentrations are predicted using slope of regression line,
where y = predicted WET lead and x = total lead.

Regression Line Slope: $y = 0.0401 x$

TABLE 6b
Summary of Lead Statistical Analysis
Laguna de Santa Rosa Bridge
Sonoma County, California

EB SR-12 East of Bridge - Eastern Portion (borings B13 to B15)

TOTAL LEAD

	Maximum
0 ft	200
2.5 ft	440
5.5 ft	250

EXCAVATION SCENARIOS

Excavation Depth	Weighted Averages	
	Maximum Total Lead (mg/kg)	WET Lead* (mg/l)
0 to 2.5 ft <i>Underlying Soil (2.5 to 6.0 ft)</i>	200 413	8.0 16.6
0 to 5.5 ft <i>Underlying Soil (5.5 to 6.0 ft)</i>	331 250	13.3 10.0
0 to 6.0 ft	324	13.0

Notes:

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

* = WET lead concentrations are predicted using slope of regression line,
where y = predicted WET lead and x = total lead.

Regression Line Slope: $y = 0.0401 x$

TABLE 6c
Summary of Lead Statistical Analysis
Laguna de Santa Rosa Bridge
Sonoma County, California

WB SR-12 East of Bridge (borings B16 to B21)

TOTAL LEAD

	90% UCL	95% UCL
0 ft	73.5	81.2
2.5 ft	80.7	84.8
5.5 ft	46.9	52.0

EXCAVATION SCENARIOS

Excavation Depth	Weighted Averages		95% UCL Total Lead (mg/kg)
	90% UCL Total Lead (mg/kg)	WET Lead* (mg/l)	
0 to 2.5 ft	73.5	2.9	81.2
<i>Underlying Soil (2.5 to 6.0 ft)</i>	75.9	3.0	80.1
0 to 5.5 ft	77.4	3.1	83.2
<i>Underlying Soil (5.5 to 6.0 ft)</i>	46.9	1.9	52.0
0 to 6.0 ft	74.9	3.0	80.6

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)

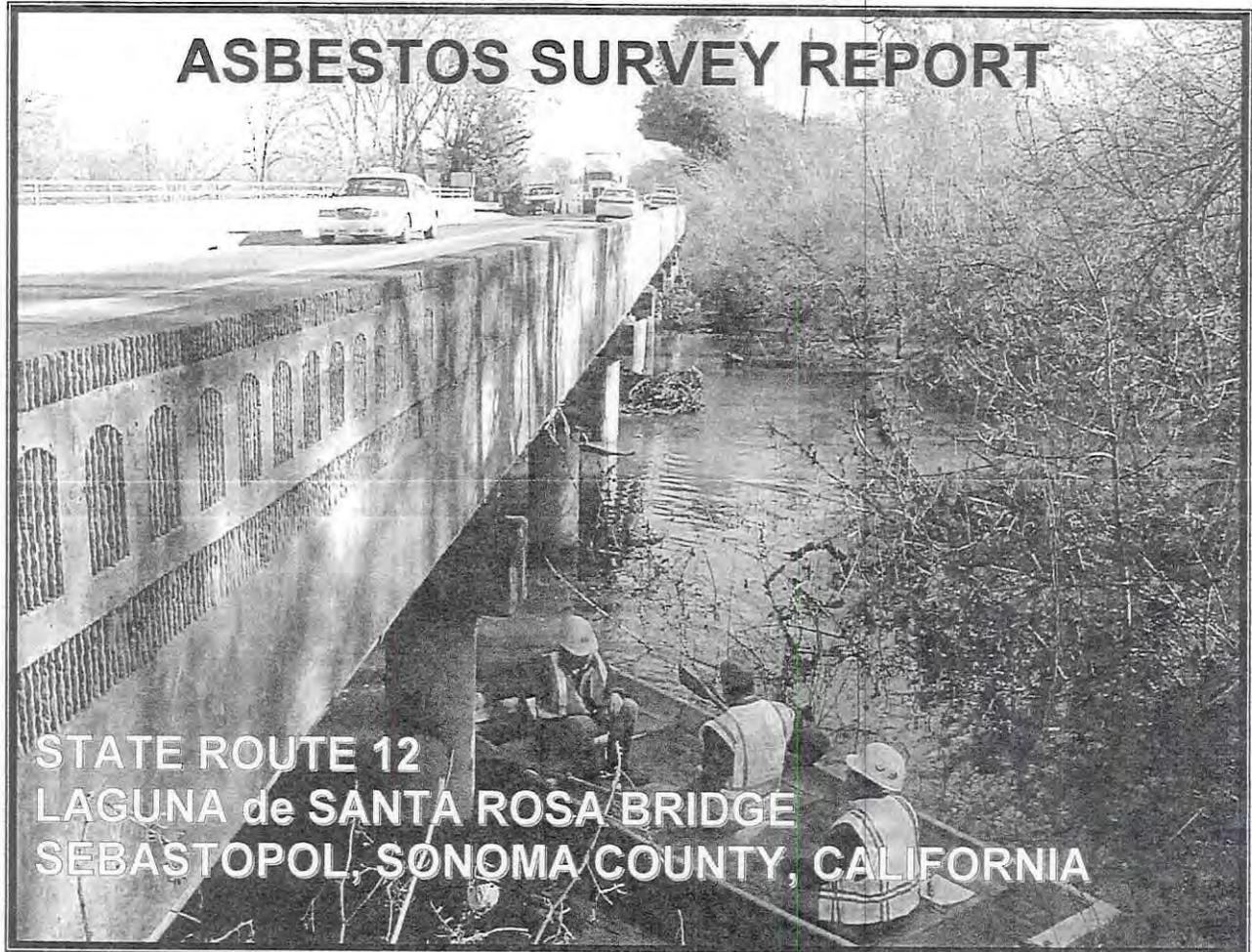
mg/kg = milligrams per kilogram

mg/l = milligrams per liter

* = WET lead concentrations are predicted using slope of regression line,
 where y = predicted WET lead and x = total lead.

Regression Line Slope: $y = 0.0401 x$

ASBESTOS SURVEY REPORT



STATE ROUTE 12
LAGUNA de SANTA ROSA BRIDGE
SEBASTOPOL, SONOMA COUNTY, CALIFORNIA

PREPARED FOR:
CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE
OAKLAND, CALIFORNIA

PREPARED BY:
GEOCON CONSULTANTS, INC.
2356 RESEARCH DRIVE
LIVERMORE, CALIFORNIA

CALTRANS CONTRACT 04A1862
TASK ORDER NO. 50
EA NO. 04-1A2900

GEOCON PROJECT NO. E8220-06-50

MARCH 2006



GEOCON

6.0 CONCLUSIONS

Since no asbestos was detected in samples collected during the survey, the Cal/OSHA asbestos standard does not apply for planned bridge replacement activities at the Site. In addition, demolition debris at the Site would not be considered as a California hazardous waste based on asbestos content.

However, in accordance with Bay Area Air Quality Management District (BAAQMD) Regulation 11, Rule 2, written notification to BAAQMD is required ten working days prior to commencement of *any* demolition activity (whether asbestos is present or not).

TABLE 1
SUMMARY OF ANALYTICAL LABORATORY TEST RESULTS - ASBESTOS
LAGUNA de SANTA ROSA BRIDGE IN SEBASTOPOL, SONOMA COUNTY, CALIFORNIA

Polarized Light Microscopy (PLM) - EPA Test Method 600/R-93/116

Sample No.	Description of Material	Approximate Quantity	Friable	Condition	Site Photo	Maximum Asbestos Content
0035-1A 0035-1B	Expansion joint material (span)	NA	NA	NA	3	ND ND

Notes:

NA = Not applicable (no asbestos detected)

ND = No asbestos fibers detected



Laguna
de Santa Rosa

● 1B

● 1A

SR 12 EAST

SR 12 WEST

FLOW

BRIDGE 20-0035

NOT TO SCALE

LEGEND:

- Approximate Asbestos Sample Location

GEOCON

CONSULTANTS, INC.

2356 RESEARCH DRIVE - LIVERMORE, CA. 94550
PHONE 925 371-5900 - FAX 925 371-5915



Laguna de Santa Rosa Bridge on State Route 12

Sebastopol,
California

SITE PLAN

GEOCON Proj. No. E8220-06-50

Task Order No. 50, EA 04-1A2900

March 2006

Figure 2



Photo 1 – Laguna de Santa Rosa Bridge (Bridge 20-0035)

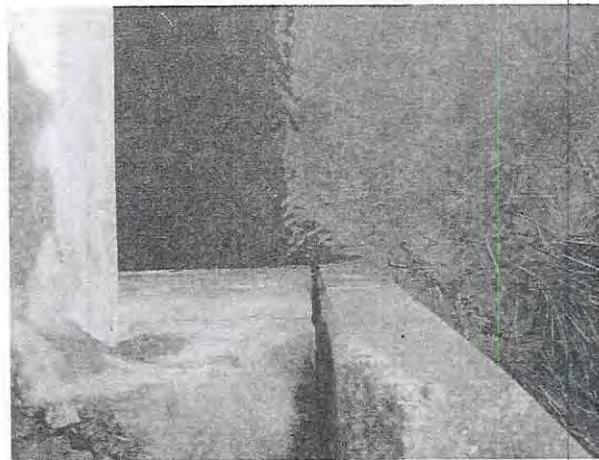


Photo 2 – Abutment expansion joint (non-suspect)

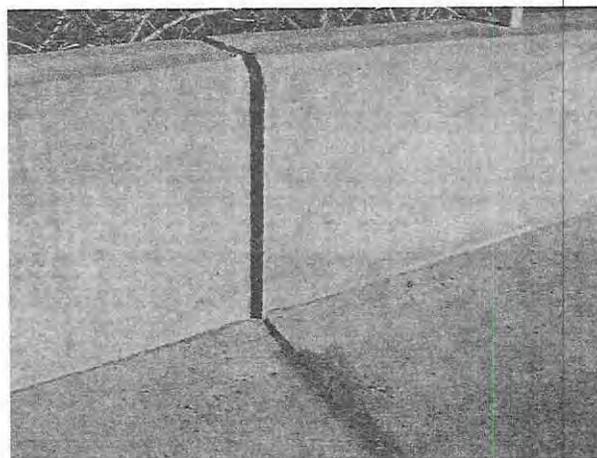


Photo 3 – Span expansion joint

GEOCON

CONSULTANTS, INC.
2356 Research Drive, Livermore, California 94550
PHONE (925) 371-5900 – FAX (925) 371-5915



PHOTOGRAPHS 1, 2, & 3

Laguna de Santa Rosa Bridge on State Route 12
Sebastopol, Sonoma County, California

E8220-06-50

Task Order 50

March 2006

Water Quality Information Handout

Laguna de Santa Rosa Bridge

Contract No. 04-1A2901

04-SON-12-PM 9.6

California Department of Transportation
District 04
Office of Water Quality
111 Grand Avenue, Oakland, CA 94612

February 27, 2013

TABLE OF CONTENTS

1. Project Information
 - 1A. Project Description
 - 1B. Receiving Water Bodies
 - 1C. Climate and Rainfall Data
2. Construction General Permit
 - 2A. Risk Level
3. Temporary Construction Site BMPs
 - 3A. Water Quality Monitoring
 - 3B. Run-on Discharges
 - 3C. Temporary Creek Diversion System
 - 3D. Temporary Access Pad
 - 3E. Dewatering
 - 3F. Temporary ESA Fencing
 - 3G. Temporary Ground Protection Mat
4. Permits

Attachments

1. Vicinity Map
2. Rainfall Data
3. Risk Level Documentation
4. Minimum Recommended Sampling Locations
5. USACE and CDFG impact maps
6. Seepage (Flow) Rate memo
7. Notice of Intent

Disclaimer:

The non-storm water information handout is a guideline and is to be used for informational purposes only. It is not a waiver of the provisions in the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP), Number CAS 000002, adopted on September 2, 2009. Bidders and Contractors are to make all necessary investigations and examinations to satisfy conditions encountered to perform work and to conform to the requirements of the contract documents and the CGP.

1. Project Information

1A. Project Description

This project will replace the Laguna de Santa Rosa Bridge (Br. No. 20-0035) on State Route 12 in Sonoma at post mile 9.6. Retaining walls and roadway improvements are also proposed. Construction is anticipated to span two years and will include a plant establishment period of one year. In-water work must occur between June 15 October 15.

Latitude and Longitude:	<u>38.4034, -122.8165</u>
Construction Start Date	<u>06/01/2014</u>
Construction End Date	<u>12/01/2015</u>
Project Area	<u>5.7 ac</u>
Disturbed Soil Area	<u>3.15 ac</u>

1B. Receiving Water Bodies

Laguna de Santa Rosa, the receiving water body, is on the Clean Water Act 2006 303(d) List of Water Quality Limited Segments for Sedimentation/Siltation, Dissolved Oxygen, Mercury, Nitrogen, Phosphorus, and Temperature. On the 2010 303(d) list, Indicator Bacteria is also a pollutant.

1C. Climate and Rainfall Data

A National Oceanic and Atmospheric Administration (NOAA) weather station located in Graton, CA was used to obtain an estimated number of rainy days per year and qualifying rain events. The Compliance Storm Event was also downloaded from the NOAA website.

Rainy days per year (precipitation 0.10 inches or greater)	<u>52.6</u> days
Qualifying rain events per year	<u>26.8</u> days
Compliance Storm Event (rainfall total for the 5 year, 24 hr storm)	<u>4.77</u> inches

2. Construction General Permit

A Storm Water Pollution Prevention Plan is required since the disturbed soil area is 3.15 acres.

2A. Risk Level

R factor	<u>105.15</u>
K factor	<u>0.32</u>
LS factor	<u>1.24</u>
Sediment Risk	<u>41.7</u>
<u>Receiving Water Body Risk</u>	<u>Yes/ High</u>
Risk Level	<u>2</u>

3D. Temporary Access Pad

A temporary access pad has been detailed to provide equipment access for bridge construction. Plans and its impacted area and the nssp are in the PSE package. The area of the pad is anticipated to change in position and size during stage 1 and 2.

The temporary access pad consists of gravel, rock, and subgrade enhancement geotextile (SEG). The gravel is specified by the regulatory agencies. It has limited structural capacity. Rock is proposed on top of the gravel and has some structural capacity. Rock is recommended to be 1 ft minimum and may need to be thicker. SEG separates the gravel from the native creek bed and the gravel from rock.

It is anticipated that the pad will be constructed in a dry environment. Any impermeable layer to separate the pad from water should be paid as temporary cover. The Contractor should be aware that water may come in contact with the access pad at the upstream location and the existing pool of water at the downstream location.

A temporary creek crossing/trestle is noted as optional in the temporary access pad nssp. There is no nssp or detail for the crossing. The Contractor should be aware that ramps for the trestle crossing may need to be constructed on top of the access pad.

The temporary creek diversion system and temporary access pad must be within the USACE and CDFG impact maps in the attachments. Adhere to the ESA fencing shown on the layout plans.

3E. Dewatering

Displacement of groundwater is anticipated for bridge work. An Active Treatment System specification is included in the project. A dewatering and discharge work plan is required before dewatering activities.

The specification allows discharging into a POTW system. If groundwater, stormwater, or both are discharged to a POTW, the Contractor needs to obtain a municipal batch discharge permit and is responsible for all costs and requirements related to obtaining the municipal batch discharge permit and discharging the water.

Dewatering must also comply with the provisions of Order No. R1-2009-0045 adopted by North Coast Regional Water Quality Control Board (General NPDES Permit No. CA 0024902 Waste Discharge Requirements for Low Threat Discharges to Surface Waters in the North Coast Region).

A Seepage (Flow) Rate memorandum from Geotech is attached and a Site Investigation Report is included as a separate Information Handout.

3F. Temporary ESA Fencing

Temporary ESA fencing is depicted on the layouts and on the USACE and CDFG impact maps. Adhere to the ESA fencing on the layout plans. The ESA fencing will depict areas where no construction activity can occur, except water quality monitoring and sampling. In many locations where temporary silt fence was also required, ESA fencing may be combined with temporary silt fence as temporary reinforced silt fence type 1. These locations will be depicted on the layout maps.

3G. Temporary Ground Protection Mat

Temporary Ground Protection Mat is depicted on the plans and replaces the temporary construction roadway over the wetlands. It is condition 31 within the 401 certification.

4. Permits

The permits required for the project note conditions that may call for special consideration from the Contractor. Conditions include work windows for in water work and various job site management, including equipment and stockpiles.

For the preparation of the Storm Water Pollution Prevention Plan, the Contractor should refer to conditions 13, 16, and 29 in the 401 Certification.

Condition 13 of the 401 Certification requires a demolition debris containment plan to prevent demolition waste from entering jurisdictional waters. Condition 16 requires a fueling plan if fueling of equipment within jurisdictional waters is needed. Condition 29 requires post storm event reports to be submitted to the Water Board, including photos.

Required permits:

1. 401 Certification from the Regional Water Quality Board
2. 404 Permit from the U.S. Army Corps of Engineers
3. Biological Opinion from the U.S. Fish and Wildlife
4. 1600 Permit from the CA Department of Fish and Game

INDEX OF PLANS

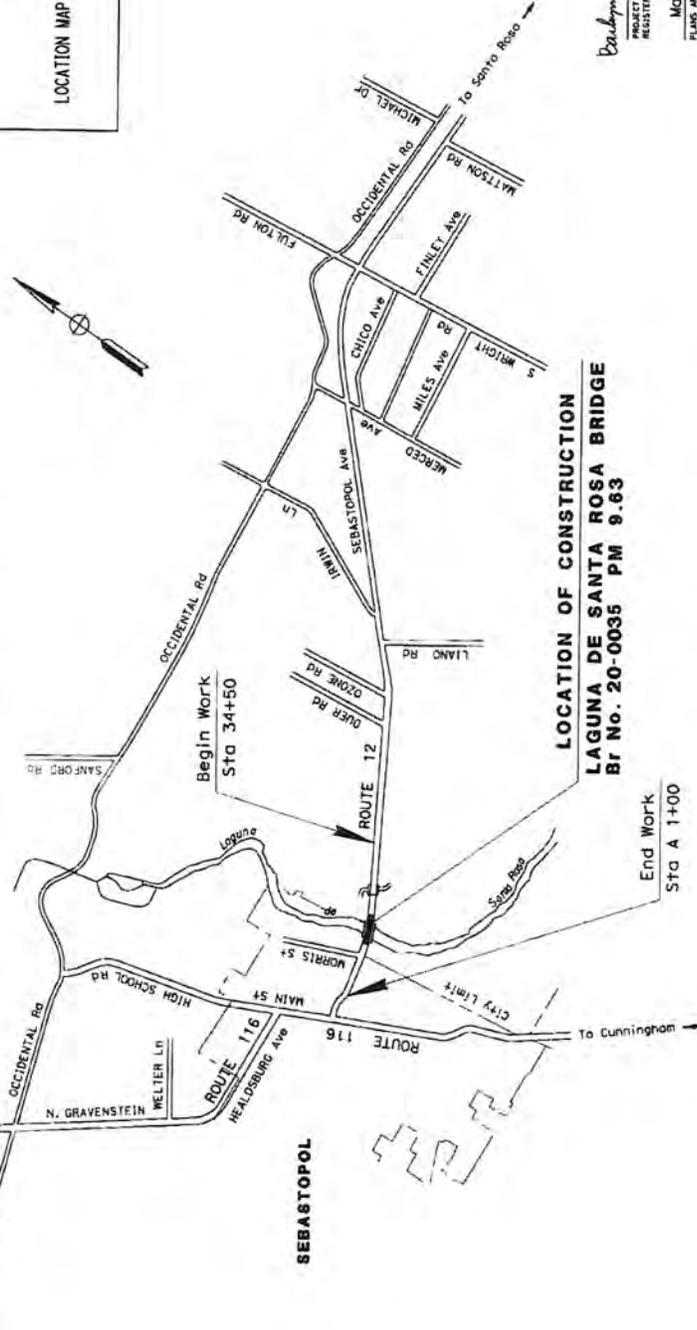
STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
 PROJECT PLANS FOR CONSTRUCTION ON
 STATE HIGHWAY
 IN SONOMA COUNTY
 NEAR CITY OF SEBASTOPOL
 AT LAGUNA DE SANTA ROSA BRIDGE

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

Dist. COUNTY ROUTE TOTAL MILEAGE CONTRACT NO. SHEETS

04 SONO 12 9.63

LOCATION MAP



LOCATION OF CONSTRUCTION
 LAGUNA DE SANTA ROSA BRIDGE
 Br No. 20-0035 PM 9.63

Professional Engineer Seal for **Barbara Nguyen**, License No. 44433, State of California, Civil Engineering, dated 3-30-13.

PROJECT ENGINEER: **Barbara Nguyen** 3-7-12
 DATE: **March 27, 2012**
 REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE: **March 27, 2012**
 BY: **Barbara Nguyen**
 REGISTERED CIVIL ENGINEER

FOR THE STATE OF CALIFORNIA OR ITS
 AGENCIES, THE CONTRACTOR SHALL BE
 RESPONSIBLE FOR THE ACCURACY OF
 ALL DIMENSIONS AND CONDITIONS OF
 THE FIELD.

CONTRACT NO. **04-1A2904**
 PROJECT ID **0400000482**
 UNIT 0736 PROJECT NUMBER & PHASE 0400000482

NO SCALE

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

BORDER EAST REVISED 7/27/2010 CALTRANS WEB SITE IS: [HTTP://WWW.DOT.CA.GOV/](http://www.dot.ca.gov/)

RELATIVE BORDER SCALE 0 1 2 3 4 5 6 7 8 9 10 FEET

DATE PLOTTED 03-27-12

TIME PLOTTED 11:09

PROJECT WORK	STEWART LEE
LILIAN ACORDA	



NOAA Atlas 14, Volume 6, Version 2
Location name: Sebastopol, California,
US*
Coordinates: 38.4034, -122.8165
Elevation: 63ft*
* source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence Interval(years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.199 (0.177-0.226)	0.243 (0.216-0.277)	0.300 (0.266-0.343)	0.346 (0.303-0.399)	0.407 (0.343-0.488)	0.454 (0.373-0.558)	0.501 (0.400-0.633)	0.548 (0.423-0.717)	0.612 (0.450-0.840)	0.660 (0.466-0.944)
10-min	0.285 (0.254-0.324)	0.349 (0.310-0.396)	0.430 (0.381-0.491)	0.496 (0.435-0.571)	0.584 (0.492-0.700)	0.650 (0.535-0.800)	0.717 (0.573-0.908)	0.786 (0.607-1.03)	0.876 (0.645-1.20)	0.946 (0.668-1.35)
15-min	0.345 (0.307-0.392)	0.422 (0.375-0.479)	0.521 (0.461-0.594)	0.600 (0.526-0.691)	0.706 (0.595-0.847)	0.787 (0.646-0.967)	0.868 (0.693-1.10)	0.950 (0.734-1.24)	1.06 (0.780-1.46)	1.14 (0.808-1.64)
30-min	0.461 (0.411-0.524)	0.564 (0.501-0.641)	0.696 (0.617-0.794)	0.803 (0.704-0.924)	0.945 (0.796-1.13)	1.05 (0.865-1.29)	1.16 (0.927-1.47)	1.27 (0.981-1.66)	1.42 (1.04-1.95)	1.53 (1.08-2.19)
60-min	0.608 (0.541-0.690)	0.743 (0.661-0.845)	0.918 (0.813-1.05)	1.06 (0.927-1.22)	1.25 (1.05-1.49)	1.39 (1.14-1.71)	1.53 (1.22-1.94)	1.68 (1.29-2.19)	1.87 (1.37-2.57)	2.02 (1.43-2.88)
2-hr	0.895 (0.797-1.02)	1.09 (0.968-1.24)	1.34 (1.18-1.52)	1.53 (1.34-1.76)	1.78 (1.50-2.14)	1.97 (1.62-2.42)	2.15 (1.72-2.73)	2.34 (1.81-3.06)	2.58 (1.90-3.54)	2.76 (1.95-3.94)
3-hr	1.11 (0.990-1.26)	1.35 (1.20-1.54)	1.65 (1.46-1.89)	1.89 (1.66-2.17)	2.19 (1.85-2.63)	2.41 (1.98-2.97)	2.63 (2.10-3.33)	2.85 (2.20-3.72)	3.12 (2.30-4.29)	3.33 (2.35-4.76)
6-hr	1.64 (1.46-1.87)	2.01 (1.78-2.28)	2.45 (2.17-2.80)	2.79 (2.45-3.22)	3.23 (2.72-3.88)	3.55 (2.92-4.36)	3.86 (3.08-4.88)	4.15 (3.21-5.43)	4.53 (3.33-6.23)	4.81 (3.40-6.88)
12-hr	2.28 (2.03-2.58)	2.84 (2.52-3.22)	3.52 (3.11-4.01)	4.03 (3.54-4.65)	4.69 (3.95-5.62)	5.15 (4.23-6.33)	5.59 (4.47-7.08)	6.02 (4.65-7.88)	6.56 (4.83-9.01)	6.95 (4.91-9.94)
24-hr	2.97 (2.67-3.37)	3.79 (3.40-4.30)	4.77 (4.27-5.43)	5.50 (4.90-6.31)	6.42 (5.55-7.59)	7.07 (5.99-8.52)	7.69 (6.37-9.47)	8.28 (6.69-10.5)	9.02 (7.02-11.8)	9.55 (7.20-12.9)
2-day	4.23 (3.80-4.80)	5.39 (4.84-6.13)	6.78 (6.08-7.72)	7.83 (6.96-8.98)	9.12 (7.87-10.8)	10.0 (8.50-12.1)	10.9 (9.02-13.4)	11.7 (9.46-14.8)	12.7 (9.90-16.7)	13.5 (10.1-18.2)
3-day	4.88 (4.39-5.54)	6.22 (5.58-7.06)	7.81 (7.00-8.90)	9.01 (8.01-10.3)	10.5 (9.05-12.4)	11.5 (9.76-13.9)	12.5 (10.4-15.4)	13.4 (10.8-17.0)	14.6 (11.3-19.1)	15.4 (11.6-20.8)
4-day	5.44 (4.90-6.18)	6.94 (6.23-7.88)	8.71 (7.81-9.92)	10.0 (8.93-11.5)	11.7 (10.1-13.8)	12.8 (10.9-15.5)	13.9 (11.5-17.1)	14.9 (12.1-18.9)	16.2 (12.6-21.3)	17.1 (12.9-23.2)
7-day	6.79 (6.11-7.71)	8.64 (7.76-9.81)	10.8 (9.71-12.3)	12.5 (11.1-14.3)	14.5 (12.5-17.1)	15.9 (13.5-19.2)	17.2 (14.3-21.2)	18.5 (14.9-23.4)	20.1 (15.6-26.3)	21.1 (15.9-28.6)
10-day	7.74 (6.96-8.78)	9.84 (8.84-11.2)	12.3 (11.0-14.0)	14.2 (12.6-16.3)	16.5 (14.2-19.5)	18.1 (15.3-21.8)	19.6 (16.2-24.1)	21.0 (16.9-26.5)	22.7 (17.7-29.8)	24.0 (18.1-32.4)
20-day	10.3 (9.26-11.7)	13.1 (11.8-14.9)	16.4 (14.7-18.7)	18.9 (16.8-21.6)	21.9 (18.9-25.8)	23.9 (20.3-28.8)	25.9 (21.4-31.8)	27.7 (22.3-34.9)	29.9 (23.2-39.2)	31.4 (23.7-42.5)
30-day	12.4 (11.2-14.1)	15.8 (14.2-17.9)	19.7 (17.7-22.5)	22.6 (20.1-26.0)	26.2 (22.6-30.9)	28.6 (24.2-34.4)	30.8 (25.5-38.0)	32.9 (26.6-41.6)	35.5 (27.6-46.6)	37.3 (28.1-50.5)
45-day	15.3 (13.7-17.3)	19.4 (17.4-22.0)	24.1 (21.6-27.5)	27.6 (24.5-31.6)	31.8 (27.4-37.6)	34.7 (29.4-41.8)	37.3 (30.9-45.9)	39.8 (32.1-50.2)	42.7 (33.2-56.0)	44.8 (33.7-60.6)
60-day	18.2 (16.3-20.6)	22.9 (20.6-26.0)	28.4 (25.4-32.3)	32.4 (28.8-37.2)	37.2 (32.1-44.0)	40.5 (34.3-48.8)	43.5 (36.0-53.5)	46.3 (37.4-58.4)	49.6 (38.6-65.1)	51.9 (39.1-70.2)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

8/23/2012

Y:\ENV\Water_Quality\BRANCH_CONSTRUCTION SITE WATER POLLUTION CONTROL
DESIGN\WPC_PROJECT FILES\1A290\Risk level\1A290_RL_r2.xls

Combined Risk Level Matrix

		<u>Sediment Risk</u>		
		Low	Medium	High
<u>Receiving Water</u> Risk	Low	Level 1	Level 2	
	High	Level 2		Level 3

Project Sediment Risk: Medium

Project RW Risk: High

Project Combined Risk: Level 2

	A	B	C
1	Sediment Risk Factor Worksheet		Entry
2	A) R Factor		
3	Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.		
4	http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm		
5	R Factor Value		105.15
6	B) K Factor (weighted average, by area, for all site soils)		
7	The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.		
8	Site-specific K factor guidance		
9	K Factor Value		0.32
10	C) LS Factor (weighted average, by area, for all slopes)		
11	The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.		
12	LS Table		
13	LS Factor Value		1.24
14			
15	Watershed Erosion Estimate (=R_xK_xLS) in tons/acre		41.72352
16	Site Sediment Risk Factor		Medium
17	Low Sediment Risk: < 15 tons/acre		
18	Medium Sediment Risk: >=15 and <75 tons/acre		
19	High Sediment Risk: >= 75 tons/acre		
20			

8/23/2012

8/23/2012
04-1A290

Table 1. Erosivity Index (%EI) Values extracted from USDA Manual 703

All values are at the end of the day listed below - Linear interpolation between dates is acceptable.
EI as a percentage of Average Annual R Value Computed for Geographic Areas Shown in Figure 1

Month	Jan 1	Jan 16	Jan 31	Feb 15	Feb 28	Mar 15	Mar 31	Apr 15	Apr 30	May 15	May 30	Jun 14	Jun 29	Jul 14	Jul 29	Aug 13	Aug 28	Sept 12	Sept 27	Oct 12	Oct 27	Nov 11	Nov 26	Dec 11	Dec 31
1	0	4.3	8.3	12.8	17.3	21.6	25.1	28	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53	56	60.8	66.8	71	75.7	82	89.1	95.2	100
2	0	4.3	8.3	12.8	17.3	21.6	25.1	28	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53	56	60.8	66.8	71	75.7	82	89.1	95.2	100
3	0	7.4	13.8	20.9	26.5	31.8	35.3	38.5	40.2	41.6	42.5	43.6	44.5	45.1	45.7	46.4	47.7	49.4	52.8	57.0	64.5	73.1	83.3	92.3	100
4	0	3.9	7.8	12.5	17.4	21.8	25.2	28.7	31.9	35.1	38.2	40.1	44.9	46.7	48.2	50.1	53.1	56.6	62.2	67.9	75.2	83.5	90.5	96.0	100
5	0	2.3	3.6	4.7	6.0	7.7	10.7	13.9	17.8	21.2	24.5	28.1	31.1	33.1	35.3	38.2	43.2	48.7	57.3	67.8	77.9	86.0	91.3	96.9	100
6	0	0.0	0.0	0.5	2.0	4.1	8.1	12.6	17.6	21.6	25.5	29.6	34.5	40.0	45.7	50.7	55.6	60.2	66.5	75.5	85.6	95.9	99.5	99.9	100
7	0	0.0	0.0	0.0	0.0	1.2	4.9	8.5	13.9	19.0	26.0	35.4	43.9	48.6	53.9	64.5	73.4	77.5	80.4	84.8	89.9	96.6	99.2	99.7	100
8	0	0.0	0.0	0.0	0.0	0.8	3.6	7.8	15.0	20.2	27.4	38.1	49.8	57.9	65.0	75.6	82.7	86.6	89.4	93.4	96.3	99.1	100.0	100.0	100
9	0	0.8	3.1	4.7	7.4	11.7	17.8	22.5	27.0	31.4	36.0	41.6	46.4	50.1	53.4	57.4	61.7	64.9	69.7	79.0	89.5	97.4	100.0	100.0	100
10	0	0.3	0.5	0.9	2.0	4.3	9.2	13.1	18.0	22.7	29.2	39.5	46.3	48.8	51.1	57.2	64.4	67.7	71.1	77.2	85.1	92.5	96.5	99.0	100
11	0	5.4	11.3	18.8	26.3	33.2	37.4	40.7	42.5	44.3	45.4	46.5	47.1	47.4	47.8	48.3	49.4	50.7	53.6	57.5	65.5	76.2	87.4	94.8	100
12	0	3.5	7.8	14.0	21.1	27.4	31.5	35.0	37.3	39.8	41.9	44.3	45.6	46.3	46.8	47.9	50.0	52.9	57.9	62.3	69.3	81.3	91.5	96.7	100
13	0	0.0	0.0	1.8	7.2	11.9	16.7	19.7	24.0	31.2	42.4	55.0	60.0	60.8	61.2	62.8	65.3	67.6	71.8	76.1	83.1	93.3	98.2	99.5	100
14	0	0.7	1.8	3.3	6.9	16.5	26.6	29.9	32.0	35.4	40.2	45.1	51.9	61.1	67.5	70.7	72.8	75.4	78.6	81.9	86.4	93.6	97.7	99.3	100
15	0	0.0	0.0	0.5	2.0	4.4	8.7	12.0	16.6	21.4	29.7	44.5	56.0	60.6	63.9	69.1	74.5	79.1	83.1	87.0	90.9	96.6	99.1	99.8	100
16	0	0.0	0.0	0.5	2.0	5.5	12.3	16.2	20.9	26.4	35.2	48.1	58.1	63.1	66.5	71.9	77.0	81.6	85.1	88.4	91.5	96.3	98.7	99.6	100
17	0	0.0	0.0	0.7	2.8	6.1	10.7	12.9	16.1	21.9	32.8	45.9	55.5	60.3	64.0	71.2	77.2	80.3	83.1	87.7	92.6	97.2	99.1	99.8	100
18	0	0.0	0.0	0.6	2.5	6.2	12.4	16.4	20.2	23.9	29.3	37.7	45.6	49.8	53.3	58.4	64.3	69.0	75.0	86.6	93.9	96.6	98.0	100.0	100
19	0	1.0	2.6	7.4	16.4	23.5	28.0	31.0	33.5	37.0	41.7	48.1	51.1	52.0	52.5	53.6	55.7	57.6	61.1	65.8	74.7	88.0	95.8	98.7	100
20	0	9.8	18.5	25.4	30.2	35.6	38.9	41.5	42.9	44.0	45.2	48.2	50.8	51.7	52.5	54.6	57.4	59.5	60.1	63.2	69.6	76.7	85.4	92.4	100
21	0	7.5	13.6	18.1	21.1	24.4	27.0	29.4	31.7	34.6	37.3	39.6	41.6	43.4	45.4	48.1	51.3	53.3	56.6	62.4	72.4	81.3	88.9	94.7	100
22	0	1.2	1.6	1.6	1.6	1.6	2.2	3.9	4.6	6.4	6.4	14.2	32.8	47.2	58.8	69.1	76.0	82.0	87.1	96.7	99.9	99.9	99.9	100	100
23	0	7.9	15.0	20.8	25.7	31.1	35.7	40.2	43.2	46.2	47.7	48.8	49.4	49.9	50.7	51.6	54.1	57.7	62.8	65.9	70.1	77.3	86.8	93.5	100
24	0	12.2	23.6	33.0	39.7	47.1	51.7	55.9	57.7	58.6	58.9	59.1	59.2	59.2	59.3	59.5	60.0	61.4	63.0	66.5	71.8	81.3	89.6	100	100
25	0	9.8	20.8	30.2	37.5	45.8	50.6	54.4	56.0	56.8	57.1	57.1	57.2	57.6	58.5	59.8	62.2	65.3	67.5	68.2	69.4	74.8	86.6	93.0	100
26	0	2.0	5.4	9.8	15.6	21.5	24.7	26.6	27.4	28.0	28.7	29.8	32.5	36.6	44.9	55.4	65.7	72.6	77.8	84.4	89.5	93.9	96.5	98.4	100
27	0	0.0	0.0	1.0	4.0	5.9	8.0	11.1	13.0	14.0	14.6	15.3	17.0	23.2	38.1	60.0	76.3	86.1	89.7	90.4	90.9	93.1	96.6	99.1	100
28	0	0.0	0.0	0.0	0.2	0.5	1.5	3.3	7.2	11.9	17.7	21.4	27.0	37.1	51.4	62.3	70.6	78.8	84.6	90.3	94.4	97.9	99.3	100.0	100
29	0	0.6	0.7	0.7	1.5	3.9	6.0	10.5	17.9	28.8	36.6	43.8	51.5	59.3	68.0	74.8	80.3	84.3	88.8	92.7	98.0	99.8	99.9	100	100
30	0	0.0	0.0	0.0	0.0	0.2	0.8	2.8	7.9	14.2	24.7	35.5	45.4	52.2	58.7	68.5	77.6	84.5	88.9	93.7	96.2	97.6	96.3	95.6	100
31	0	0.0	0.0	0.0	0.0	0.2	1.0	3.5	9.9	15.7	26.4	47.2	61.4	65.9	69.0	71.2	66.0	91.6	94.8	98.7	100.0	100.0	100.0	100.0	100
32	0	0.1	0.1	0.1	0.1	0.6	2.2	4.3	9.0	14.2	23.3	34.6	46.3	54.2	61.7	72.9	82.5	89.6	93.7	98.2	99.7	99.9	99.9	100	100
33	0	0.0	0.0	0.0	0.0	0.6	2.3	4.2	8.8	16.1	30.0	46.9	57.9	62.8	66.2	72.1	79.1	85.9	91.1	97.0	98.9	98.9	98.9	100	100
34	0	0.0	0.0	0.0	0.0	1.8	7.3	10.7	15.5	22.0	29.9	35.9	42.0	48.5	56.9	67.0	76.9	85.8	91.2	95.7	97.8	99.6	100.0	100.0	100
35	0	0.0	0.0	0.0	0.0	2.5	10.2	15.9	22.2	27.9	34.7	43.9	51.9	56.9	61.3	67.3	73.9	80.1	85.1	88.6	93.2	98.2	99.8	99.8	100

8/11/14 = 12/14 = 34.8
11/15 = 12/14
6/11/2013 = 100 - 45.2 = 54.8
14 = 50 = 0
12/1/2015 = 98
NO 2.75 = 10.15 > R
2.75 = 180.15



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	DESIGN	FUNCTIONAL SUPERVISOR	DESIGNED BY	REVISOR BY	DATE REVISED

CAL. DATE	DESIGNED BY	REVISOR BY	DATE REVISED

UNIT 0738	PROJECT NUMBER & PHASE	04000004821
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DATE PLOTTED	DATE	07-11-12
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DATE	ROUTE	PROJECT NO.	SHEET NO.
04	50n 12	9.63	

REGISTERED CIVIL ENGINEER	DATE

REGISTERED CIVIL ENGINEER	DATE

REGISTERED CIVIL ENGINEER	DATE

REGISTERED CIVIL ENGINEER	DATE

REGISTERED CIVIL ENGINEER	DATE

STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
 REGISTERED CIVIL ENGINEER
 DATE: _____
 PROJECT NO.: 9.63
 SHEET NO.: _____
 SCALE: 1" = 50'
 PROJECT NUMBER & PHASE: 04000004821

NOTE
 1. ACCESS PAD LIMITS MUST BE WITHIN PLAC IMPACT MAPS
 2. CROSS SECTION OF ACCESS PAD MUST ADHERE TO PLAC REQUIREMENTS FOR IN-WATER WORK
 3. IMPERMEABLE PLASTIC SHEETING MUST COVER UPSTREAM FACE OF ACCESS PAD

ABBREVIATIONS:
 OHWM ORDINARY HIGH WATER MARK
 PLAC PERMITS, LICENSE, AGREEMENTS, AND CERTIFICATION
 SEG SUBGRADE ENHANCEMENT GEOTEXTILE

LEGEND
 ACCESS PAD LIMITS
 TRESTLE AND RAMP LIMITS
 CRANE MAT (OPTIONAL)
 AGGREGATE BASE
 MECHANICALLY ROLLED GRAVEL
 TEMPORARY CONSTRUCTION EASEMENT (TCE)
 TEMPORARY FENCE (TYPE ESA)
 TRESA
 ICE
 ROUTE 12
 LAGUNA DE SANTA ROSA
 TRESTLE AND RAMP TO BE CONSTRUCTED BY CONTRACTOR
 ACCESS PAD
 SEE TO SHEETS FOR TEMPORARY CREEK DIVISION
 SECTION A-A
 NO SCALE
 DETAIL A
 NO SCALE

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

ACCESS PAD
 Crane Mat (optional)
 0.5' AB
 3' x 30' Gravel
 SEE SECTION A-A

TRESTLE AND RAMP TO BE CONSTRUCTED BY CONTRACTOR
 ACCESS PAD
 SEE DETAIL "A"

TRESTLE AND RAMP TO BE CONSTRUCTED BY CONTRACTOR
 ACCESS PAD
 SEE TO SHEETS FOR TEMPORARY CREEK DIVISION
 SECTION A-A
 NO SCALE

TRESTLE AND RAMP TO BE CONSTRUCTED BY CONTRACTOR
 ACCESS PAD
 SEE DETAIL "A"

TRESTLE AND RAMP TO BE CONSTRUCTED BY CONTRACTOR
 ACCESS PAD
 SEE TO SHEETS FOR TEMPORARY CREEK DIVISION
 SECTION A-A
 NO SCALE

04-1A250
 Minimum Recommended
 Sampling Locations

BORDER LAST REVISED 7/2/2010
 UTM FRAME 43 METER
 DOW FILE 43 REQUEST

Memorandum

*Flex your power!
Be energy efficient!*

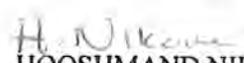
To: MR. HARDEEP TAKHAR
Chief
Office of Water Quality

Date: March 28, 2012

Attention: Kamran Nakhjiri / Trang Hoang

File: 04-SON-12 PM 9.63
04-1A2901; E-FIS 0400000482
Laguna de Santa Rosa
Bridge Replacement

From: 
SUNNY YANG
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services


HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Seepage Rate Estimate

This Memo is prepared in response to your email request dated March 5, 2012 for estimate of seepage rates of foundation soils, for the purposes of dewatering during foundation construction of piles and retaining wall footings. The new Laguna de Santa Rosa Bridge (Bridge No. 20-0296) is located on Route 12, about 6 miles west of the City of Santa Rosa in Sonoma County.

The new Bridge has two abutments and two bents, all founded on 48-inch CISS piles. In addition, there are four retaining walls. Some portions of the walls will be founded on Caltrans standard Class 90 steel pipe piles, and the rest on spread footings. Based on field exploration data, the groundwater table (GWT) is assumed to be at 58 feet elevation. For walls founded directly on spread footings, the bottoms of footings are essentially at or above the GWT elevation so that dewatering may not be needed. For walls founded on piles, the bottoms of footings are mostly below GWT so that dewatering may be needed. In the following, seepage rates are provided for each pile type and for wall footings that are on piles.

For piles, seepage rates were calculated using the theoretical well formula discussed in H.R. Cedergren 1989: Seepage, drainage, and flow nets (Equation 7.1). For spread footings, seepage rates were calculated using the procedure outlined in L.K. Moulton 1980: Highway subdrainage design (Equations 8 and 9). The soils at this site are predominantly silty sand (SM), with interlayers of silt (ML), sandy clay (CL), clayey sand (SC), and poorly-graded sand with silt (SP-SM). For simplicity and to be conservative, permeability of silty sand (SM) was assumed for all soil layers. The range of coefficient of permeability for SM soils was taken to be $0.8 \times 10^{-2} \sim 3.4 \times 10^{-2}$ ft/day (Moulton 1980, Table 3).

MR. HARDEEP TAKHAR

Attn: Kamran Nakhjiri / Trang Hoang

March 28, 2012

Page 2

RESULTS

For CISS piles, the range of seepage rate is 700~3000 gal/day per pile. For Class 90 steel pipe piles, the range of seepage rate is 400~1700 gal/day per pile. The average width of wall footings that are on piles is 14 feet; the bottom of these footings was taken to be 53 feet elevation (i.e., 5 feet below GWT). For these footings, the range of seepage rate is 0.2~0.8 gal/day per linear foot of excavated footing length.

It is noted that the above rates are based on the GWT at 58 feet elevation. If the actual GWT during construction is higher than this elevation, seepage rates can be higher.

If you have any questions, please contact Sunny Yang at (510) 286-4808 or Hooshmand Nikoui, Branch Chief at (510) 286-4811.

c: TPokrywka, HNikoui, Daily File, Route File, J Stayton (DES Office Engineer)

SYang/mm



State Water Resources Control Board
NOTICE OF INTENT
 TO COMPLY WITH THE TERMS OF THE
 GENERAL PERMIT TO DISCHARGE STORM WATER
 ASSOCIATED WITH CONSTRUCTION ACTIVITY (WQ ORDER No. 99-08-DWQ)



I. NOI STATUS (SEE INSTRUCTIONS)

MARK ONLY ONE ITEM	1. <input checked="" type="checkbox"/> New Construction	2. <input type="checkbox"/> Change of Information for WDID#
--------------------	---	---

II. PROPERTY OWNER

Name	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone
Owner Type (check one) 1. <input type="checkbox"/> Private Individual 2. <input type="checkbox"/> Business 3. <input type="checkbox"/> Municipal 4. <input type="checkbox"/> State 5. <input type="checkbox"/> Federal 6. <input type="checkbox"/> Other			

III. DEVELOPER/CONTRACTOR INFORMATION

Developer/Contractor	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone

IV. CONSTRUCTION PROJECT INFORMATION

Site/Project Name		Site Contact Person		
Physical Address/Location		Latitude	Longitude	County
City (or nearest City)		Zip	Site Phone Number	Emergency Phone Number
A. Total size of construction site area: _____ Acres	C. Percent of site imperviousness (including rooftops): Before Construction: _____ % After Construction: _____ %		D. Tract Number(s): _____	
B. Total area to be disturbed: _____ Acres (% of total _____)			E. Mile Post Marker: _____	
F. Is the construction site part of a larger common plan of development or sale? <input type="checkbox"/> YES <input type="checkbox"/> NO		G. Name of plan or development:		
H. Construction commencement date: ____/____/____		J. Projected construction dates: Complete grading: ____/____/____ Complete project: ____/____/____		
I. % of site to be mass graded: _____				
K. Type of Construction (Check all that apply):				
1. <input type="checkbox"/> Residential 2. <input type="checkbox"/> Commercial 3. <input type="checkbox"/> Industrial 4. <input type="checkbox"/> Reconstruction 5. <input type="checkbox"/> Transportation				
6. <input type="checkbox"/> Utility Description: _____ 7. <input type="checkbox"/> Other (Please List): _____				

V. BILLING INFORMATION

SEND BILL TO:	Name	Contact Person
<input type="checkbox"/> OWNER (as in II. above)		
<input type="checkbox"/> DEVELOPER (as in III. above)	Mailing Address	Phone/Fax
<input type="checkbox"/> OTHER (enter information at right)	City	State Zip

VI. REGULATORY STATUS

A. Has a local agency approved a required erosion/sediment control plan?..... YES NO
 Does the erosion/sediment control plan address construction activities such as infrastructure and structures?..... YES NO
 Name of local agency: _____ Phone: _____

B. Is this project or any part thereof, subject to conditions imposed under a CWA Section 404 permit of 401 Water Quality Certification?..... YES No
 If yes, provide details: _____

VII. RECEIVING WATER INFORMATION

A. Does the storm water runoff from the construction site discharge to (Check all that apply):

- Indirectly to waters of the U.S.
- Storm drain system - Enter owner's name: _____
- Directly to waters of U.S. (e.g. , river, lake, creek, stream, bay, ocean, etc.)

B. Name of receiving water: (river, lake, creek, stream, bay, ocean): _____

VIII. IMPLEMENTATION OF NPDES PERMIT REQUIREMENTS

A. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (check one)

A SWPPP has been prepared for this facility and is available for review: Date Prepared: ___/___/___ Date Amended: ___/___/___

A SWPPP will be prepared and ready for review by (enter date): ___/___/___

A tentative schedule has been included in the SWPPP for activities such as grading, street construction, home construction, etc.

B. MONITORING PROGRAM

A monitoring and maintenance schedule has been developed that includes inspection of the construction BMPs before anticipated storm events and after actual storm events and is available for review.

If checked above: A qualified person has been assigned responsibility for pre-storm and post-storm BMP inspections to identify effectiveness and necessary repairs or design changes..... YES NO

Name: _____ Phone: _____

C. PERMIT COMPLIANCE RESPONSIBILITY

A qualified person has been assigned responsibility to ensure full compliance with the Permit, and to implement all elements of the Storm Water Pollution Prevention Plan including:

- Preparing an annual compliance evaluation..... YES NO
 Name: _____ Phone: _____
- Eliminating all unauthorized discharges..... YES NO

IX. VICINITY MAP AND FEE (must show site location in relation to nearest named streets, intersections, etc.)

Have you included a vicinity map with this submittal? YES NO

Have you included payment of the annual fee with this submittal?..... YES NO

X. CERTIFICATIONS

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. In addition, I certify that I have read the entire General Permit, including all attachments, and agree to comply with and be bound by all of the provisions, requirements, and prohibitions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan will be complied with."

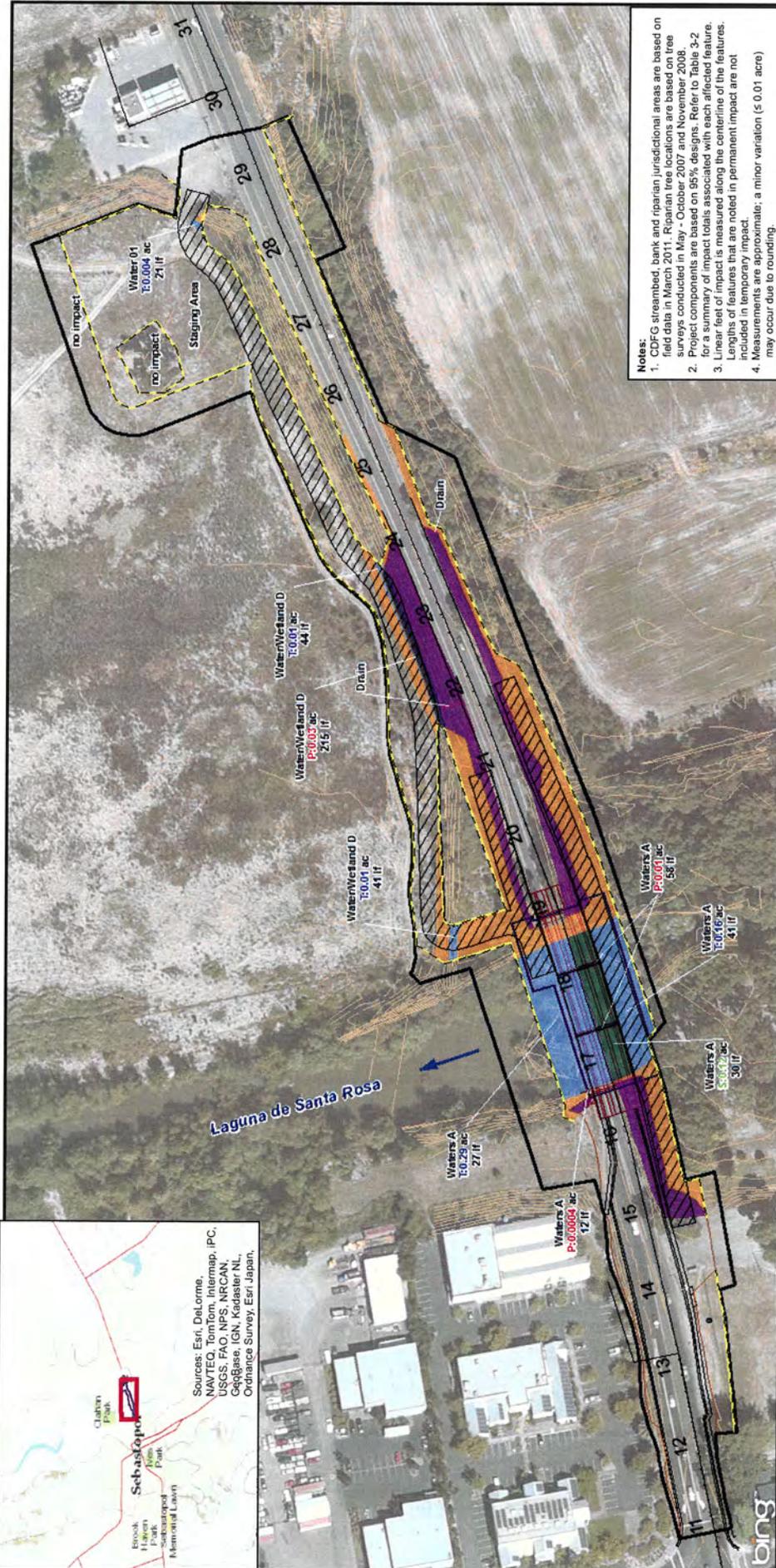
Printed Name: _____

Signature: _____ Date: _____

Title: _____



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, Geoplace, IGN, Kadaster NL, Ordnance Survey, Esri Japan,



Notes:

1. CDFG streambed, bank and riparian jurisdictional areas are based on field data in March 2011. Riparian tree locations are based on tree surveys conducted in May - October 2007 and November 2008.
2. Project components are based on 95% designs. Refer to Table 3-2 for a summary of impact totals associated with each affected feature.
3. Linear feet of impacts is measured along the centerline of the features. Lengths for features that are noted in permanent impact are not included in totals. Measurements are approximate; a minor variation (± 0.01 acre) may occur due to rounding.

FIGURE 5-4
Impacts to Riparian Habitat for Bridge Replacement Based on 95% Design
 Laguna de Santa Rosa Bridge Replacement Project
 State Route 12
 PM 9.63, EA 1A2901
 Sonoma County, CA

Legend

- Project Boundary (8.49 acres)
- ESA Fence Based on 95% Design
- Cut and Fill (10-08-2012)
- Mainline Alignment
- Proposed Pavement Edges
- New Bridge
- Proposed Drain
- Relief Features / Contours
- Temporary Construction Roadway
- Temporary Stream Access Pad Fill Area (0.56 acre, 122 linear feet)
- Stream Impacts**
 - Permanent Impact (0.04 acre, 285 linear feet)
 - Temporary Impact (0.48 acre, 174 linear feet)
 - Shade Impact (0.12 acre, 30 linear feet)
- Riparian Impacts**
 - Riparian - Temporary (T) Impact (0.80 acre, 425 linear feet)
 - Riparian - Permanent (P) Impact (0.57 acre, 317 linear feet)

Memorandum

To: Samad Hamoud
Office of Bridge Design Services
Design Branch 16
Att: Son Ly

Date: June 9, 2011

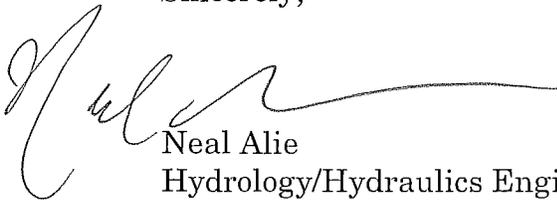
File: 04-Son-12-9.63 (PM)
EA 04-1A2900
Laguna de Santa Rosa Creek
Br. No. 20-0035

From: **Department of Transportation**
Hydraulic Engineering Branch

Subject: Final Hydraulic Report for Laguna De Santa Rosa Creek

Attached for your records is the Hydrography report for the above referenced project. If you have any questions, please contact me at 227-0442.

Sincerely,



Neal Alie
Hydrology/Hydraulics Engineer

cc: Steve Ng

DIVISION OF STRUCTURES Final Hydraulic Report

Laguna De Santa Rosa Creek

Located in Sonoma County in the City of Sebastopol

JOB:

Bridge No. 20-0035

Bridge Replacement

LOCATION:

04-Son-12-9.63 (PM)

DATE:

June 9, 2011

WRITTEN BY:

Neal Alie

REVIEWED BY:

Steve Ng

General

The office of Structure Design is proposing to replace the existing Laguna de Santa Rosa Creek Bridge, Br. No. 20-0035 on State Route 12 in Sonoma County in the city of Sebastopol. The project is part of the HA-21 Bridge Scour Program.

The existing structure was built in 1921, widened in 1949 and retrofitted for earthquake resistance in 1995. The 1995 retrofit included encasing the columns with steel shells. The existing bridge is a continuous RC girder (7) on RC pile (7) bents and RC wing abutment, all founded on RC piles. The structure is 220.0 feet long, 35.0 feet wide, with a structural depth of 3.3 feet.

According to the Bridge Maintenance Records the existing structure has numerous structural deficiencies, the worst of which is scour problems at various locations deeming the bridge scour critical.

The proposed structure is a PC/PS I Girder with three 77.0 ft spans with the abutments and piers supported on 4.0 ft CISS piles. The new bridge will be 231.0 feet long, 58 ft wide with a structural depth of 4.3 ft. The use of PC/PS concrete I-girder will eliminate the need of false work in the stream.

This report makes extensive reference to the (1) Caltrans Bridge Maintenance Reports, (2) General plans and profiles submitted by structures, (3) Caltrans As-Built Plans (4) FEMA Report, June 19, 1997, (5) Previous Hydraulic Studies, July 10, 2008, (6) Draft Hydrologic Assessment by U.S. Army Corps of Engineers, San Francisco District, January 2008.

All elevations indicated in this report are referenced to the General Plans Submitted by Design.

Drainage Basin

The Laguna de Santa Rosa Channel begins southeast of the project site in the city of Cotati at its confluence with Cotati Creek and flows northwest to its confluence with Santa Rosa Creek and Mark West Creek north of Sebastopol, then continues to the Russian River which drains into the Pacific Ocean.

The Laguna watershed covers an area of approximately **78 sqmi** and is the largest tributary to the Russian River. The Mean Annual Precipitation (MAP) in the watershed varies from approximately **29 in** in the lower portion of the watershed to

approximately **45 in** along the ridgeline at the eastern edge of the watershed. 82 percent of the annual rainfall occurs between November and March.

There are 10 different tributaries that drain into the Laguna de Santa Rosa Channel but the major ones are Santa Rosa Creek, Mark West Creek and Windsor Creek. The channel generally flows northwest towards the Russian River, except in times of flood, when the Laguna de Santa Rosa Channel acts like a detention pond from overflow at the Russian River.

Discharge

According to a FEMA Study June 19, 1997 the 50-year discharge for Laguna de Santa Rosa Channel at State Route 12 is approximately **18,000 cfs**, and the 100-year discharge is **20,500 cfs**. According to the Draft Army Corps of Engineer Report, January 2008, the following discharges were calculated for Laguna de Santa Rosa at State Route 12 in Sebastopol:

	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
Discharge	3388 cfs	5930 cfs	8472 cfs	11,239 cfs	13,644 cfs	15,482 cfs

The FEMA discharges were used for this Final Hydraulic Report.

Stage, Velocity and Waterway

According to the Caltrans Maintenance Records the existing bridge does not have adequate waterway for both the 50-year and 100-year storm events. The bridge has overtopped on several occasions and the entire surrounding area transforms into a large flood plain.

Ponding of the lower reaches of Laguna de Santa Rosa due to backwater from the Russian River and Mark West Creek is the principal flooding problem in the City of Sebastopol. Additional flooding problems are caused by inadequate channel capacities during major storm events.

The largest flood of record in the lower reaches of the Russian River occurred in February 1986 with a peak discharge of **102,000 cfs**. After the Warm Springs Dam on Dry Creek, which is a major tributary to the Russian River was constructed in 1983 the 100-year flood stage on Laguna de Santa Rosa was reduced from 76 ft to **75 ft**.

During a 100-year event the Laguna de Santa Rosa Channel will experience a backwater effect of **75.0 ft** due to flooding from the Russian River and **72.5 ft during a 50-year event**. Because the backwater elevation of the Russian River is higher than the base flood elevation of Laguna de Santa Rosa in this area, the Russian river backwater is the controlling flooding source.

The Hydraulic Program (BrEase) was used to perform a one-dimensional hydraulic analysis to calculate a maximum capacity of **10,140 cfs** for the existing structure. This was based on a roughness coefficient of 0.04, a gradient of 0.0008 and a water surface elevation of 65.0 ft. The existing structure was inadequate for both the 50 and 100- year storm events.

The proposed new structure will also be inadequate for the 50 and 100-year storm events. The minimum soffit elevation for the new bridge is approximately 69.3 ft leaving no available freeboard when comparing it to the backwater elevations of 72.5 ft and 75.0 ft. The proposed structure will not meet Caltrans Hydraulic Standards due to various design constraints. Even if the proposed structure were constructed above the 50 and 100-year flood events, the surrounding area would be under water

The Hydraulic Program (BrEase) was used to perform a one-dimensional hydraulic analysis to calculate the maximum capacity for the proposed structure compared to the existing bridge. The results are based on a roughness coefficient of 0.04, a gradient of 0.0008 and a water surface elevation slightly below the soffit elevation. The results are summarized in the table below:

	Max Capacity	Waterway Area
Existing Structure	10,140 cfs	2161 sqft
Proposed Structure	12,750 cfs	3140 sqft

It appears that the proposed structure will improve the existing waterway area by providing 12,750 cfs compared to the existing 10,140 cfs. This translates into approximately a 10-year flood event with a velocity of 6.0 fps.

Streambed and Scour

According to the Caltrans Maintenance Records the existing structure was experiencing degradation, pressure scour and local pier scour. The existing structure was also experiencing a significant amount of debris, and had overtopped on several occasions.

By 2000 the channel bed, on average, had degraded approximately 2.5 feet, the corrugated piles at Bent 2-10 were exposed between 1.5 and 5.0 feet and Abutment 1 was partially undermined.

In March 2000 an evaluation for scour potential was assessed in accordance with FHWA Technical Advisory T5140.23, "Evaluating Scour at Bridges", and within current Caltrans guidelines. The existing bridge was determined to be scour critical. The NBIS Item 113 code was changed to 3, "Bridge Foundations determined to be unstable for calculated scour conditions; scour below spread-footing base or piles.

By 2004, there was a noticeable sag in the bridge rail in spans 1 to 3, and both abutments had been sandbagged to counter the effects of scour.

By 2008 the sack PCC at the upstream end of Abutment 1 was collapsing and the footing of the original bridge was partially undermined over a length of 9.0 feet. Maximum undermining was 6 inches below the bottom of the footing, extending 24 inches underneath the footing, at a point 18.0 feet from the downstream end of the abutment. The piles at Bent 2-10 were exposed between 0.7 and 3.7 feet.

The local pier scour was calculated to be 8.0 feet plus an estimated 3 feet for pressure scour for a total scour of 11 feet. This would potentially expose the Raymond piles of the 1949 widened portion of the bridge to elevation 42.0 feet at the bents. This was estimated to be 3.0 feet below the termination of the longitudinal steel reinforcement in the piles and would create an unstable condition. In addition the pile tip elevations of the original bridge built in 1921 were unknown, so the bearing capacity under potential scour conditions was uncertain.

The Structure Maintenance and Investigation Ratings Branch evaluated the structural stability of the bridge and concurred that the bridge was scour critical.

It was then recommended that the bridge should be replaced for the following reasons:

1. The bridge was scour critical.

2. The age off the bridge and a low sufficiency rating of 31%
3. Lack of information on the original structure, (i.e. pile extensions with unknown foundation).
4. The bridge was experiencing pressure flow exasperating the total scour conditions.

The potential local pier scour for the proposed structure was calculated to be **10.0 ft** for Piers 2 and 3 based on a pier dimension of 4.0 ft. A long-term degradation of **3 ft** was assumed in addition to **5.0 ft** of contraction scour, and **3.0 ft** of pressure scour of for a total scour of **21.0 ft** at elevation **36.0 ft**. Initially Structure Hydraulics recommended placing the top of the footings of the abutments at elevation 49.0 feet to account for contraction and degradation. We understand that there are structural design constraints and Design may proceed with placing the top of the footings at elevation 55.0 feet. Structure Hydraulics recommends that all new foundations to be designed assuming no ground support (lateral or vertical) as a result of soil loss due to possible scour or lateral stream migration.

Bank Protection

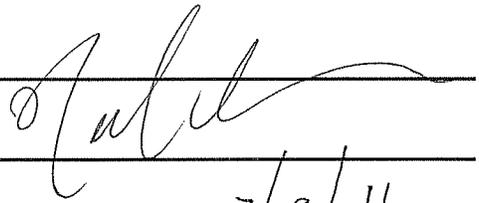
Rock slope protection will be designed by the District to protect the roadway approach fills, if required. The average velocity (See “Stage and Velocity” section above) is provided to assist the District hydraulic engineers in the design of bank protection if necessary.

HYDROLOGIC SUMMARY FOR LAGUNA DE SANTA ROSA CHANNEL Br. No. 29-0035			
Drainage Area: 170 sqmi			
	Design Flood	Base Flood	Overtopping Flood/Flood of Record?
Frequency	50-yr	100-yr	N/A
Discharge	18,000 cfs	20,500 cfs	N/A
Water Surface Elevation at Bridge	72.5 ft	75.0 ft	N/A
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			

Laguna de Santa Rosa Creek
Br. No. 20-0035
04-Son-12-9.63 (PM)
EA 04-1A2900

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the professional Engineers Act of the State of California.

REGISTERED CIVIL ENGINEER (SIGNATURE)



REGISTRATION NUMBER: C056398

DATE: 7/9/11



FOUNDATION REVIEW

DIVISION OF ENGINEERING SERVICES GEOTECHNICAL SERVICES

- To: **Structure Design**
1. Preliminary Report
 2. R.E. Pending File
 3. Specifications & Estimates
 4. File

Date: 8/7/12

Laguna De Santa Rosa Bridge
Structure Name

Geotechnical Services

1. GS (Sacramento)
2. GS

04 SON 12 9.6
District County Route Post Mile

District Project Development District Project Engineer

04-1A2901 20-0296
E.A. Number Structure Number

Foundation Report By: Sunny Yang / H. Nikouli

Dated: 7/6/12, 7/12/12

Reviewed By: _____ (SD)

Meng-hsi Hung / Sunny Yang (GS)

General Plan Dated: 7/13/12

Foundation Plan Dated: 7/13/12

No changes. The following changes are necessary.

FOUNDATION CHECKLIST

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Pile Types and Design Loads <input checked="" type="checkbox"/> Pile Lengths <input checked="" type="checkbox"/> Predrilling <input checked="" type="checkbox"/> Pile Load Test Substitution of H Piles For Concrete Piles <input type="checkbox"/> Yes <input type="checkbox"/> No | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Footing Elevations, Design Loads, and Locations <input checked="" type="checkbox"/> Seismic Data <input checked="" type="checkbox"/> Location of Adjacent Structures and Utilities <input checked="" type="checkbox"/> Stability of Cuts or Fills <input checked="" type="checkbox"/> Fill Time Delay <input checked="" type="checkbox"/> Effect of Fills on Abutments and Bents | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> LOTB's <input checked="" type="checkbox"/> Fill Surcharge <input checked="" type="checkbox"/> Approach Paving Slabs <input checked="" type="checkbox"/> Scour <input checked="" type="checkbox"/> Ground Water <input checked="" type="checkbox"/> Tremie Seals/Type D Excavation |
|---|---|--|

Son Ly 16
Structure Design Branch No.

Rev. 11/04

Sunny Yang
Geotechnical Services

Memorandum

*Flex your power!
Be energy efficient!*

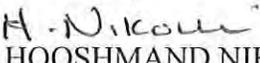
To: MR. SAMAD HAMOUD
Chief, Bridge Design Branch 16
Office of Structure Design-West

Date: July 6, 2012

Attention: Son Ly

File: 04-SON-12 PM 9.63
04-1A2900
Bridge Replacement

From:  S. YANG/M. HUNG/V. KHATA-O-KHOTAN
Transportation Engineers
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

 HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Revised Final Foundation Report

This Revised Final Foundation Report is prepared in response to your request dated September 21, 2009 for the proposed three-span Laguna de Santa Rosa Bridge (Bridge No. 20-0296) replacement project on Route 12, about 6 miles west of the City of Santa Rosa in Sonoma County (Figure 1). This Report supersedes our previous Foundation Report dated June 17, 2010. The revisions are due to modified structure plans, structure loads, and scour data.

1. SCOPE OF WORK

The following tasks were performed for the preparation of this Foundation Report:

- Review of as-built plans of the existing bridge structure.
- Field geotechnical exploration, including drilling nine exploratory borings at the project site, performing Standard Penetration Test (SPT) and Pocket Penetrometer (PP) Test, and collecting soil samples;
- Laboratory testing of selected samples, including particle gradation analysis, unit weight, moisture content, Atterberg Limits, and corrosion tests;
- Foundation design analysis and pile driveability analysis; and
- Preparation of this Foundation Report.

2. PROJECT DESCRIPTION

The existing ten-span, 220 feet long bridge was built in 1921, widened in 1949, and seismically retrofitted in 1994. Due to observed structural deficiencies and low sufficiency rating, Structure Design recommended replacing this structure. The currently proposed replacement bridge is 231 feet long, with two lanes and a shoulder in either direction. The new bridge has two abutments and two bents.

The vertical datum used in this report is NAVD 88. The horizontal datum is NAD 83.

3. EXCEPTION TO POLICY

There is no known exception to Department policy relating to the investigation or design of the proposed bridge foundations.

4. FIELD INVESTIGATION AND TESTING PROGRAM

A total of nine geotechnical exploratory borings were drilled at the project site (Figure 2) to investigate subsurface soil conditions for foundation design of the bridge and three adjacent retaining walls. All were rotary wash borings, using a truck-mounted drill rig with a 3.7-in (O.D.) core barrel. Of the nine borings, four were drilled in 2006 (RC-06-001 through RC-06-004), and five in 2009 (RC-09-001 through RC-09-005). It is worth noting that borings RC-06-002, RC-06-003, and RC-09-005 were drilled through the deck of the existing bridge. Table 1 lists the depths of these borings and the dates they were drilled.

In all borings, Standard Penetration Tests (SPT) were performed at 5-foot interval. Pocket Penetrometer (PP) tests were conducted on soil samples showing apparent cohesion. Soil samples were collected at various depths for laboratory testing (see next Section).

Table 1. Summary of field borings

Boring ID	Total Depth (ft)	Surface Elevation (ft)	Date of completion
RC-06-001	110	70.2	10-12-06
RC-06-002	101.5	58	10-11-06
RC-06-003	103	58	10-18-06
RC-06-004	81.5	70	10-19-06
RC-09-001	51.5	69.8	9-15-09
RC-09-002	41.5	70.2	9-21-09
RC-09-003	51.5	70.3	9-21-09
RC-09-004	41.5	70.2	9-22-09
RC-09-005	105.5	58	9-16-09

5. LABORATORY TESTING PROGRAM

The laboratory testing program included 62 unit weight tests, 108 moisture content tests, 117 gradation (particle distribution) analyses, 53 Atterberg Limits tests, 13 consolidation tests, 11 unconfined compression tests, and 2 corrosion tests.

MR. SAMAD HAMOUD

Attn: Son Ly

July 6, 2012

Page 3

6. SITE GEOLOGY AND SUBSURFACE CONDITIONS

6.1. Topography

The project site is located on the western edge of Santa Rosa Valley. Santa Rosa Valley width ranges from 4 to 7 miles. Although, the Santa Rosa Valley is plain in comparison with the adjoining upland and mountain areas, much of it, is not very level and is marked by several internal topographic features. The Laguna de Santa Rosa is a swampy, intermittent drainage course at the western edge of the Santa Rosa Valley that extends from about 4 miles southwest of Sebastopol to about half a mile east of Trenton. Along this western side area – where the project is located - Laguna de Santa Rosa forms the lowest part of the valley trough (USGS- Water Supply Paper 1427). The project area elevation ranges between approximately 60 to 70 feet in elevation.

6.2. Regional Geology

The project area is entirely covered by latest Holocene flood plain and basin deposits (USGS, OFR 98-460). The Upper Pliocene Merced Formation (the fresh water part) underlies the Holocene deposits. The Merced Formation followed by Petaluma Formation, which in fault contact with the Franciscan-Knoxville Group as a bedrock (USGS- Water Supply Paper 1427).

The Franciscan-Knoxville group forms the basement rock throughout most or all of Sebastopol area. Sandstone and siltstone of the “greywacke suit” is by far the most abundant constituent of the Franciscan-Knoxville rocks.

The Petaluma Formation composed of greenish and buff, well bedded clay and is unconformably overlain by the Merced formation. The fresh-water part of the Merced formation consists chiefly of gravel and medium-grained sandstone intergrading within short distances, but includes a few lenses of sandy clay. The exposed thickness of the Merced formation ranges from a few feet to about 500 feet. The persistent gentle northeast dip indicates that the thickness is greatest near western edge of Santa Rosa Valley (USGS- Water Supply Paper 1427).

The Holocene flood plain and basin deposits is a complex of flood plain, basin, and marsh depositional environments. The basin deposits contain more fine-grained sediments than flood plain and fan sediments. Although, these sediments contain abundant clay, they may also contain layers of sand and silt (USGS, OFR 98-460).

The project area is entirely covered by Blucher fine sandy loam, overwash, 0 to 2 percent slopes. The surface of this soil has an overwash of fine sandy loam. Also, the surface layer of this soil is more stratified with thin layers of loam or light clay loam, and it is gray or brown in color. This

MR. SAMAD HAMOUD

Attn: Son Ly

July 6, 2012

Page 4

soil is on fans at lower elevations, and it is subject to flooding by runoff. This Blucher soil remains wet longer after the rainy season.

The bridge site is located 6.9 miles west of Rodgers Creek Fault. Rodgers Creek Fault is an active, Strike Slip fault with a Maximum Moment Magnitude of 7.1.

6.3. Subsurface Conditions

Based on the boring log of RC-06-001, the subsurface soils near the west abutment (Abutment 1) can be classified as follows (from roadway surface, 70 feet elevation): 14 feet of very loose silty sand is underlain by 6 feet of fat clay, which in turn is underlain by 14 feet of loose to medium dense silty sand. From 34 feet to 89 feet depth is dense to very dense silty sand with significant higher SPT blow counts. From 89 feet to 110 feet depth (bottom of borehole) is very dense sand with silt and gravel.

Based on the boring log of RC-06-002, the subsurface soils near Bent 2 of the proposed bridge can be classified as follows (from ground surface, 58 feet elevation): 17 feet of medium dense clayey sand and medium stiff sandy clay is underlain by 28 feet of loose to medium dense silty sand or sand with silt, with the presence of gravels at 20 to 28 feet, 35 to 37 feet, and 44 to 46 feet intervals. From 45 feet to 80 feet depth is dense to very dense sand with silt or silty sand with significant higher SPT blow counts. From 80 feet to 101.5 feet depth (bottom of borehole) is very dense sand with silt and gravel.

Based on the boring log of RC-06-003, the subsurface soils near Bent 3 of the proposed bridge can be classified as follows (from ground surface, 58 feet elevation): 19 feet of stiff to very stiff sandy clay and medium dense clayey sand is underlain by 8 feet of medium dense silty sand and silt. From 27 feet to 103 feet depth (bottom of borehole) is very dense sand with silt or silty sand with significant higher SPT blow counts.

Based on boring logs of RC-09-003 and RC-06-004, the subsurface soils near east abutment (Abutment 4) can be classified as follows (from roadway surface, 70 feet elevation): 19 feet of interlayered medium dense silty sand and clayey sand is underlain by 4 feet of very soft peat, which in turn is underlain by 42 feet of medium dense to dense silty sand, sand with silt, or silt. From 65 feet to 81.5 feet depth (bottom of borehole RC-06-004) is very dense sand.

6.4. Groundwater

The groundwater level at the bridge site typically fluctuates with the season and correlates with local geology and topography. The water level in the river reflects approximately the groundwater elevation at the abutment and bent locations.

MR. SAMAD HAMOUD

Attn: Son Ly

July 6, 2012

Page 5

A piezometer was installed at borehole RC-06-004 location in October 2006. Groundwater levels were monitored between November 2006 and April 2007. The highest recorded groundwater elevation was approximately 57 feet during this period.

According to the FEMA Flood Insurance Study (June 19, 1997), the Laguna de Santa Rosa Bridge and nearby State Route 12 will be submerged during a 50-year flood (510 m³/s) or 100-year flood (580 m³/s). The bridge has been overtopped on several occasions, including the winter floods in 1955, 1986, and most recently in 2006.

7. SCOUR EVALUATION

According to Structure Design, the long-term scour elevation is at 39 feet elevation at the two abutments, and 36 feet elevation at the two bents.

8. CORROSION EVALUATION

According to current Caltrans Corrosion Guidelines (2003), a soil is considered non-corrosive for structure foundation elements, if the minimum resistivity is greater than 1000 ohm-cm and the pH value is greater than 5.5. Based on our laboratory corrosion test performed on four soil samples (Table 2), the soil at the project site is non-corrosive.

Table 2. Soil Corrosion Test Summary

Location	SIC Number	Sample Depth (ft)	Min. Resistivity (ohm-cm)	pH
RC-06-003	C634104	15	1200	6.57
RC-06-004	C634103	3 – 5	4400	5.84
RC-09-001	C722547	10 – 20	3139	6.58
RC-09-005	C722546	0 – 7	1422	7.34

9. SEISMIC RECOMMENDATIONS

Please refer to the Memo from Hossain Salimi of our office to your Branch, dated December 21, 2009 for the final seismic design recommendations. The following is a brief summary of the proposed seismic design parameters:

Controlling Fault = Rodgers Creek Fault (6.9 miles east of project site)

Maximum Moment Magnitude, Mw = 7.1

Peak Bedrock Acceleration = 0.4 g

Peak Ground Acceleration = 0.47 g

Surface Rupture Potential = Minimum

Liquefaction Potential = Moderate to high

MR. SAMAD HAMOUD

Attn: Son Ly

July 6, 2012

Page 6

For clarification or additional information on seismic design aspects of the project, please consult with Hossain Salimi at (916) 227-7147.

10. AS-BUILT FOUNDATION DATA

The as-built plans show that the original 1921 bridge structure was founded on precast concrete piles. The as-built plans for the 1949 bridge-widening project show that the widened bridge structure was founded on 32-ton Raymond piles and precast concrete piles.

11. FOUNDATION RECOMMENDATIONS

In view of significant structure loading and large scour depth, deep foundation is necessary. Large-diameter (48”) Cast-In-Steel-Shell (CISS) pile was considered most suitable pile type based on their load bearing capacity, site conditions, and hydraulic stability. Cast-In-Drilled-Hole (CIDH) piles are not recommended because of high groundwater level and the granular soils underlying the site (which may cause severe caving during drilling). Full-displacement-type precast concrete driven piles are not recommended either because of the high bearing capacity demand and expected difficult driving conditions in the very dense sand layers present at the site.

According to current Caltrans Bridge Design Specifications, the abutments are designed using the Working Stress Design (WSD) method, and the LRFD design method is used to design the bents. Structure Design has also provided structure loads as shown in Tables 3 through 6 (dated September 21, 2009).

Table 3. Preliminary Foundation Design Data Sheet

Support No.	Foundation Type(s) Considered	Estimate of Maximum Factored Compression Loads (kips)
Abutment 1	48” CISS Pile	1900
Bent 2	48” CISS Pile	3800
Bent 3	48” CISS Pile	3800
Abutment 4	48” CISS Pile	1900

Table 4. Scour Data

Support No.	Long Term (Degradation and Contraction) Scour Elevation (ft)	Short Term (Local) Scour Depth (ft)
Abutment 1	39	10
Bent 2	36	10
Bent 3	36	10
Abutment 4	39	10

MR. SAMAD HAMOUD

Attn: Son Ly

July 6, 2012

Page 7

Table 5. Foundation Design Data Sheet

Support No.	Design Method	Pile Type	Finished Grade Elevation (ft)	Cut-off Elevation (ft)	Pile Cap Size (ft)		Permissible Settlement under Service Load (in)	Number of Piles per Support
					B	L		
Abut 1	WSD	48" CISS	60	53	5	58	1	4
Bent 2	LRFD	48" CISS	57	54	N/A	N/A	1	4
Bent 3	LRFD	48" CISS	57	54	N/A	N/A	1	4
Abut 4	WSD	48" CISS	60	53	5	58	1	4

Table 6. Foundation Design Loads

Support No.	Service Limit State (kips)			Strength Limit State (Controlling Group, kips)				Extreme Event Limit State (Controlling Group, kips)			
	Total Load		Permanent Loads Per Support	Compression		Tension		Compression		Tension	
	Per Support	Max. Per Pile		Per Support	Max. Per Pile	Per Support	Max. Per Pile	Per Support	Max. Per Pile	Per Support	Max. Per Pile
Abut 1	1900	475	1400	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bent 2	2600	650	2000	3800	950	N/A	N/A	1300	1300	-370	-370
Bent 3	2600	650	2000	3800	950	N/A	N/A	1300	1300	-370	-370
Abut 4	1900	475	1400	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

The foundation design analysis was performed in general using the methods outlined in AASHTO LRFD Bridge Design Specifications (2007); however, reduction factors for geotechnical strength parameters were based on Caltrans/DES/Geotechnical Services criteria. Idealized subsurface soil profile and soil engineering parameters at each abutment or bent location were defined based on the boring logs (Section 6.3), laboratory testing results, relevant literature, and engineering judgment.

The computer program APILE PLUS (Version 5.0) was used to calculate nominal vertical bearing capacity. In this program, the API method (1986, 1987, 1994) was selected to calculate soil resistance. Both skin friction and end bearing capacity were considered in pile resistance calculations. Unsuitable penetrated layers, including liquefiable and scourable soils, are excluded from the bearing capacity calculation. Furthermore, skin friction from non-liquefiable layers overlying significant liquefiable layers were considered as downdrag force. Tables 7 and 8 provide a summary of foundation design recommendations for abutments and bents, respectively. Table 9 is the pile data table. The computed settlement is less than one inch in all cases.

A separate pile driveability analysis by the Foundation Testing Branch using the GRLWEAP wave equation program suggested that the steel shell thickness should be one inch or one and half inches. The hammer manufacturers and models studied included APE / D 62-42, Delmag / D 80-23, and Menck / MHU 220.

Table 7. Abutment Foundations Design Recommendations

Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-I Limit State Load per Support (kips)		LRFD Service-I Limit State Total Load per Pile (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 1	48" CISS	53	1900	N/A	475	950	11 (a) 25 (c)	11	1080
Abut 4	48" CISS	53	1900	N/A	475	950	5 (a) 18 (c)	5	1000

- Notes: 1) Design tip elevations are controlled by: (a) Compression (Strength Limit) and (c) Settlement, respectively.
- 2) The specified tip elevation shall not be raised above the design tip elevation for Settlement.
- 3) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.), if any, which do not contribute to the design resistance. Unsuitable soil layers extend to Elevation 37 feet at Abutment 1, and Elevation 39 feet at Abutment 4.

Table 8. Bent Foundations Design Recommendations

Support Location	Pile Type	Cut-off Elevation (ft)	Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (in)	Required Factored Nominal Resistance (kips)				Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
					Strength Limit		Extreme Event				
					Comp. ($\phi=0.7$)	Tension ($\phi=0.7$)	Comp. ($\phi=1$)	Tension ($\phi=1$)			
Bent 2	48" CISS	54	2600	1	950	N/A	1300	-370	-3 (a-I) -7 (a-II) 3 (b-II) 11 (c) -2 (d)	-7	1800
Bent 3	48" CISS	54	2600	1	950	N/A	1300	-370	0 (a-I) 1 (a-II) 12 (b-II) 15 (c) 13 (d)	0	1500

MR. SAMAD HAMOUD

Attn: Son Ly

July 6, 2012

Page 9

- Notes: 1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (b-I) Tension (Strength Limit), (a-II) Compression (Extreme Event), (b-II) Tension (Extreme Event), (c) Settlement, and (d) Lateral Load, respectively.
- 2) The specified tip elevation shall not be raised above the design tip elevation for Lateral Load.
- 3) The design tip elevation for Lateral Load was provided by the SD.
- 4) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.), if any, which do not contribute to the design resistance. Unsuitable soil layers extend to Elevation 13 feet at Bent 2, and Elevation 36 feet at Bent 3.

Table 9. Pile Data Table

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	48" CISS	950	N/A	11 (a) 25 (c)	11	1080
Bent 2	48" CISS	1300	N/A	-7 (a) 3 (b) 11 (c) -2 (d)	-7	1800
Bent 3	48" CISS	1300	N/A	0 (a) 12 (b) 15 (c) 13 (d)	0	1500
Abut 4	48" CISS	950	N/A	5 (a) 18 (c)	5	1000

- Notes: 1) Design tip elevations for Abutments are controlled by: (a) Compression (Strength Limit) and (c) Settlement, respectively.
- 2) Design tip elevations for Bents are controlled by: (a) Compression (Strength Limit), (c) Settlement, and (d) Lateral Load, respectively.
- 3) The specified tip elevation shall not be raised above the design tip elevation for Settlement or Lateral Load.
- 4) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.), if any, which do not contribute to the design resistance. Unsuitable soil layers extend to Elevation 37 feet at Abutment 1, Elevation 13 feet at Bent 2, Elevation 36 feet at Bent 3, and Elevation 39 feet at Abutment 4.

MR. SAMAD HAMOUD

Attn: Son Ly

July 6, 2012

Page 10

12. CONSTRUCTION CONSIDERATIONS

- Groundwater levels at the abutments will exceed bottom of footing elevations and flooding of the proposed excavations is expected. Shoring, dewatering and possibly a concrete seal course placement will be necessary to facilitate safe construction. Structure Excavation Plan (Type 'A') will apply. Further, Type 'D' excavation is recommended at the bents.
- For CISS piles, the contractor shall provide a driving system submittal including drivability analysis for approval prior to installing the piles.
- Piles should be made using ASTM A 252 Grade 3 steel per section 49-5.01 of Caltrans Standard Specifications.
- Maintaining proper pile and hammer alignment is essential during pile driving to prevent non-uniform or eccentric pile stresses that may locally exceed the pile yield stress.
- Hard driving is anticipated, due to the presence of dense to very dense sand layers and gravels. Reinforcing the pile tips (using driving shoes) is recommended.
- If hard driving conditions are encountered, center relief drilling may be used. However, center relief drilling shall not extend within 3 pile diameters of the specified pile tip elevation.
- A soil plug of at least 3 pile diameters is required at the bottom of the shell. If the soil plug cannot be maintained (soil boil condition), then a seal course of at least one pile diameter thickness shall be placed. The drilling of the soil inside steel shells, the placement of the seal course if needed, the placement of rebar cage, and concrete pour should be completed in a continuous operation.
- At the option of the Contractor, a vibratory hammer may be used to advance the piles to the depth of maximum scour (Elevation 39 ft). Below the scour elevation, an impact hammer must be used.
- Dynamic monitoring in selected indicator piles throughout the final 25 feet of pile installation is highly recommended to ensure that the impact stress are not excessive.
- Prior to placing concrete, the interior surfaces of the steel shell shall be cleaned of all foreign material, including residue from the drilling operation. Brushing, pressure jetting or equivalent methods shall be used.

MR. SAMAD HAMOUD

Attn: Son Ly

July 6, 2012

Page 11

- Our office should be notified in case pile driving encounters refusal before reaching the specified tip elevation.

13. DISCLAIMER AND CONTACT INFORMATION

The recommendations contained in this report are based on specific project information regarding structure type, location, and design loads that have been provided by the Office of Structure Design West. If any conceptual changes are made during final project design, the Office of Geotechnical Design West, Design Branch A should review those changes to determine if these foundation recommendations are still applicable. Any questions regarding the above recommendations should be directed to the attention of Hooshmand Nikoui at (510) 286-4811.

c: TPokrywka, HNikoui, Daily File, Route File, Translab File

SYang/mm



MR. SAMAD HAMOUD
Attn: Son Ly
July 6, 2012
Page 12

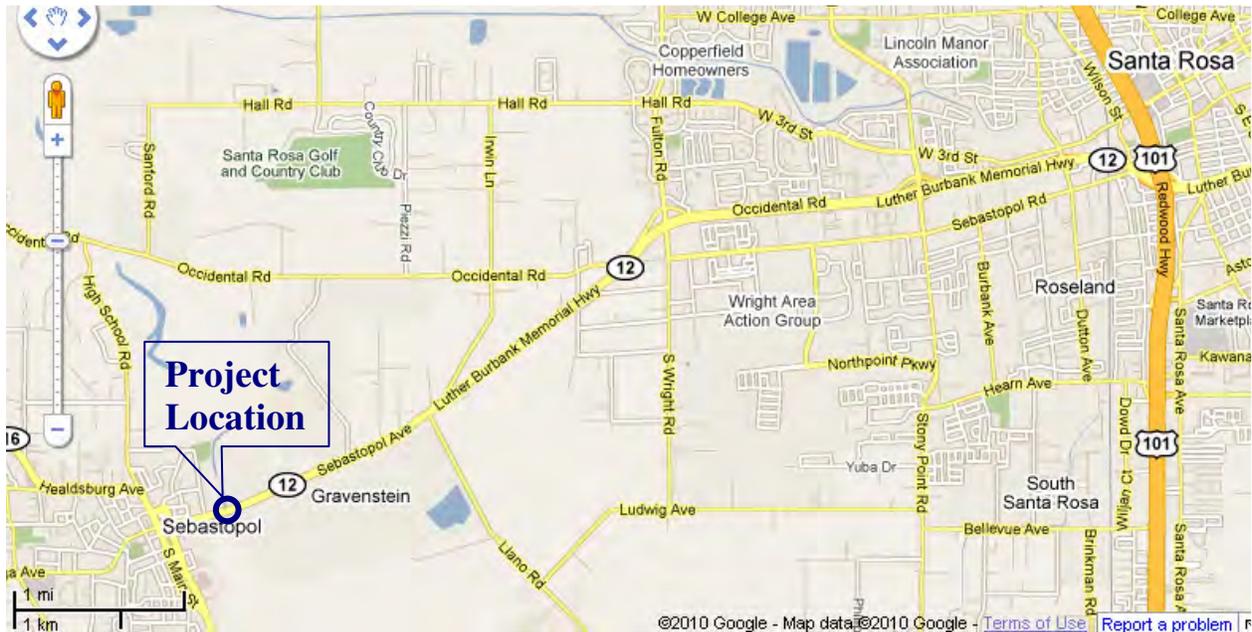


Figure 1. Project location.

MR. SAMAD HAMOUD
Attn: Son Ly
July 6, 2012
Page 13



Figure 2. Boring locations.

Memorandum

*Flex your power!
Be energy efficient!*

To: MR. SAMAD HAMOUD
Chief, Bridge Design Branch 16
Office of Structure Design-West

Date: July 12, 2012

Attention: Son Ly / Bach-Yen Nguyen

File: 04-SON-12 PM 9.63
04-1A2901
Laguna de Santa Rosa
Bridge Replacement

From: *Sunny Yang*
S. YANG/M. HUNG/V. KHATA-O-KHOTAN
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

H. Nikou
HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Foundation Report for Retaining Walls

This Foundation Report is prepared in response to your request dated September 21, 2009 for foundation recommendations for retaining walls adjacent to the proposed new Laguna de Santa Rosa Bridge (Bridge No. 20-0296) on Route 12, about 6 miles west of the City of Santa Rosa in Sonoma County (Figure 1). According to the latest Structure Plans, there are four retaining walls in this project. This Report supersedes the Report dated January 31, 2012, due to changes in retaining wall elevations.

1. SCOPE OF WORK

The following tasks were performed for the preparation of this Foundation Report:

1. Review of as-built plans of the existing bridge structure (Bridge No. 20-0035).
2. Field geotechnical exploration, including drilling nine exploratory borings at the project site, performing Standard Penetration Test (SPT) and Pocket Penetrometer (PP) Test, and collecting soil samples;
3. Laboratory testing of selected samples, including particle gradation analysis, unit weight, moisture content, Atterberg Limits, and corrosion tests;
4. Foundation design analysis; and
5. Preparation of this Foundation Report.

2. PROJECT DESCRIPTION

Retaining Wall 1L, located on the northeast side of the bridge, is 16 feet long with a maximum height of 18 feet. Retaining Wall 1, located on the southeast side of the bridge, is 163.61 feet long with a maximum height of 20 feet. Retaining Wall 2, located on the northwest side of the

bridge, is 193.4 feet long with a maximum height of 18 feet. Retaining Wall 3, located on the southwest side of the bridge, is 297.73 feet long with a maximum height of 20 feet.

The vertical datum used in this report is NAVD 88. The horizontal datum is NAD 83.

3. EXCEPTION TO POLICY

There is no known exception to Department policy relating to the investigation or design of the proposed wall foundations.

4. FIELD INVESTIGATION AND TESTING PROGRAM

A total of nine geotechnical exploratory borings were drilled at the project site (Figure 2) to investigate subsurface soil conditions for foundation design of the bridge and four adjacent retaining walls. All were rotary wash borings, using a truck-mounted drill rig with a 3.7-in (O.D.) core barrel. Of the nine borings, four were drilled in 2006 (RC-06-001 through RC-06-004), and five in 2009 (RC-09-001 through RC-09-005). It is worth noting that borings RC-06-002, RC-06-003, and RC-09-005 were drilled through the deck of the existing bridge. Table 1 lists the depths of these borings and the dates they were drilled.

In all borings, Standard Penetration Tests (SPT) were performed at 5-foot interval. Pocket Penetrometer (PP) tests were conducted on soil samples showing apparent cohesion. Soil samples were collected at various depths for laboratory testing (see next Section).

Table 1. Summary of Field Borings

Boring ID	Total Depth (ft)	Surface Elevation (ft)	Date of completion
RC-06-001	110	70.2	10-12-06
RC-06-002	101.5	58	10-11-06
RC-06-003	103	58	10-18-06
RC-06-004	81.5	70	10-19-06
RC-09-001	51.5	69.8	9-15-09
RC-09-002	41.5	70.2	9-21-09
RC-09-003	51.5	70.3	9-21-09
RC-09-004	41.5	70.2	9-22-09
RC-09-005	105.5	58	9-16-09

5. LABORATORY TESTING PROGRAM

The laboratory testing program included 62 unit weight tests, 108 moisture content tests, 117 gradation (particle distribution) analyses, 53 Atterberg Limits tests, 13 consolidation tests, 11 unconfined compression tests, and 4 corrosion tests.

MR. SAMAD HAMOUD
Attn: Son Ly / Bach-Yen Nguyen
July 12, 2012
Page 3

6. SITE GEOLOGY AND SUBSURFACE CONDITIONS

6.1. Topography

The project site is located on the western edge of Santa Rosa Valley. Santa Rosa Valley width ranges from 4 to 7 miles. Although the Santa Rosa Valley is a plain in comparison with the adjoining upland and mountain areas, much of it is not very level and is marked by several internal topographic features. The Laguna de Santa Rosa is a swampy, intermittent drainage course at the western edge of the Santa Rosa Valley that extends from about 4 miles southwest of Sebastopol to about half a mile east of Trenton. Along this western side area – where the project is located - Laguna de Santa Rosa forms the lowest part of the valley trough (USGS- Water Supply Paper 1427). The project area elevation ranges between approximately 60 to 70 feet in elevation.

6.2. Regional Geology

The project area is entirely covered by latest Holocene flood plain and basin deposits (USGS, OFR 98-460). The Upper Pliocene Merced Formation (the fresh water part) underlies the Holocene deposits. The Merced Formation followed by Petaluma Formation, which in fault contact with the Franciscan-Knoxville Group as a bed rock (USGS- Water Supply Paper 1427).

The Franciscan-Knoxville group forms the basement rock throughout most or all of Sebastopol area. Sandstone and siltstone of the “greywacke suit” is by far the most abundant constituent of the Franciscan-Knoxville rocks.

The Petaluma Formation composed of greenish and buff, well bedded clay and is unconformably overlain by the Merced formation. The fresh-water part of the Merced formation consists chiefly of gravel and medium-grained sandstone intergrading within short distances, but includes a few lenses of sandy clay. The exposed thickness of the Merced formation ranges from a few feet to about 500 feet. The persistent gentle northeast dip indicates that the thickness is greatest near western edge of Santa Rosa Valley (USGS- Water Supply Paper 1427).

The Holocene flood plain and basin deposits is a complex of flood plain, basin, and marsh depositional environments. The basin deposits contain more fine-grained sediments than flood plain and fan sediments. Although, these sediments contain abundant clay, they may also contain layers of sand and silt (USGS, OFR 98-460).

The project area is entirely covered by Blucher fine sandy loam, overwash, 0 to 2 percent slopes. The surface of this soil has an overwash of fine sandy loam. Also, the surface layer of this soil is more stratified with thin layers of loam or light clay loam, and it is gray or brown in color. This

MR. SAMAD HAMOUD
Attn: Son Ly / Bach-Yen Nguyen
July 12, 2012
Page 4

soil is on fans at lower elevations, and it is subject to flooding by runoff. This Blucher soil remains wet longer after the rainy season.

The bridge site is located 6.9 miles west of Rodgers Creek Fault. Rodgers Creek Fault is an active, Strike Slip fault with a Maximum Moment Magnitude of 7.1.

6.3. Subsurface Conditions

There are two borings drilled near the footprint of RW1L and RW1, RC-06-001 and RC-09-002 (Figure 2). Based on the boring log of RC-06-001, the subsurface soils near the eastern end of RW1 and RW1L can be classified as follows (from roadway surface): 14 feet of very loose to loose silty sand (energy-corrected SPT blow count $N_{60} = 3\sim6$) is underlain by 6 feet of fat clay (Pocket Penetrometer value = 1.5~3 tsf), which in turn is underlain by 14 feet of very loose to medium dense silty sand ($N_{60} = 3\sim20$). From 34 feet to 89 feet depth is very dense silty sand ($N_{60} = 50\sim104$). From 89 feet to 110 feet depth (bottom of borehole) is very dense sand with silt and gravel ($N_{60} > 100$).

Based on the boring log of RC-09-002, the subsurface soils below the western portion of RW1 can be classified as follows (from roadway surface): 12 feet of medium dense silty sand ($N_{60} = 15\sim19$) is underlain by 7 feet of medium dense silty sand with gravel ($N_{60} = 27$). From 20 feet to 41.5 feet depth (bottom of borehole) is dense to very dense silty sand or sand with silt ($N_{60} = 39\sim85$).

There are four borings drilled near the footprint of RW2 and RW3, RC-09-003, RC-06-004, RC-09-001, and RC-09-004 (Figure 2). Based on boring logs of RC-09-003 and RC-06-004, the subsurface soils near the western end of RW2 and RW3 can be classified as follows (from roadway surface): 19 feet of interlayered medium dense to dense silty sand and clayey sand ($N_{60} = 16\sim41$) is underlain by 4 to 5 feet of very soft peat or silt ($N_{60} = 3$), which in turn is underlain by 42 feet of medium dense to very dense silty sand, sand with silt, or silt ($N_{60} = 19\sim62$). From 65 feet to 81.5 feet depth (bottom of borehole R-06-004) is very dense sand (intensely weathered sandstone, $N_{60} > 100$).

Based on boring logs of RC-09-001, the subsurface soils near the middle portions of RW2 and RW3 can be classified as follows (from roadway surface, 70 feet elevation): 10 feet of loose silty sand ($N_{60} = 9$) is underlain by 9 feet of medium dense silty sand ($N_{60} = 22$) and 3.5 feet of lean clay (PP = 1.5 tsf), respectively. From 22 to 24 feet depth is soft sandy organic silt, underlain by 2 feet of medium dense sand with silt ($N_{60} = 10$). From 26 to 35 feet depth is stiff sandy lean clay (PP = 1.5 tsf). From 35 feet to 51.5 feet depth (bottom of borehole) is medium dense to very dense sand with silt ($N_{60} = 29\sim57$).

MR. SAMAD HAMOUD
Attn: Son Ly / Bach-Yen Nguyen
July 12, 2012
Page 5

Based on boring logs of RC-09-004, the subsurface soil near the eastern end of RW2 and RW3 can be classified as follows (from roadway surface, 70 feet elevation): 6 feet of loose silty sand with gravel ($N_{60} = 10$) is underlain by 14 feet of medium dense silty sand ($N_{60} = 25\sim 27$). A thin layer of very soft sandy organic silt is present at 20 to 21 feet depth. From 21 feet to 41.5 feet depth (bottom of borehole) is medium dense to very dense silty sand ($N_{60} = 27\sim 65$).

Detailed description of subsurface soil conditions can be found in Log of Test Borings (LOTB's). The LOTB's should be included in the Contract Plans.

6.4. Groundwater

The groundwater level at the bridge site typically fluctuates with the season and correlates with local geology and topography. The water level in the river reflects approximately the groundwater elevation at the abutment and bent locations.

A piezometer was installed at borehole RC-06-004 location in October 2006. Groundwater levels were monitored between November 2006 and April 2007. The highest recorded groundwater elevation was approximately 57 feet during this period.

According to the FEMA Flood Insurance Study (June 19, 1997), the Laguna de Santa Rosa Bridge and nearby State Route 12 will be submerged during a 50-year flood or 100-year flood. The bridge has been overtopped on several occasions, including the winter floods in 1955, 1986, and most recently in 2006.

7. SCOUR EVALUATION

According to Structure Design, the long-term scour elevation is at 45 feet elevation.

8. CORROSION EVALUATION

According to current Caltrans Corrosion Guidelines (2003), a soil is considered non-corrosive for structure foundation elements if the minimum resistivity is greater than 1000 ohm-cm and the pH value is greater than 5.5. Based on our laboratory corrosion test performed on four soil samples (Table 2), the soil at the project site is non-corrosive.

Table 2. Soil Corrosion Test Summary

Location	SIC Number	Sample Depth (ft)	Min. Resistivity (ohm-cm)	pH
RC-06-003	C634104	15	1200	6.57
RC-06-004	C634103	3 – 5	4400	5.84
RC-09-001	C722547	10 – 20	3139	6.58
RC-09-005	C722546	0 – 7	1422	7.34

MR. SAMAD HAMOUD
Attn: Son Ly / Bach-Yen Nguyen
July 12, 2012
Page 6

9. SEISMIC RECOMMENDATIONS

Please refer to the Memo from Hossain Salimi to your Branch, dated December 21, 2009 for the final seismic design recommendations. The following is a brief summary of the proposed seismic design parameters:

Controlling Fault = Rodgers Creek Fault (6.9 miles east of project site)
Maximum Moment Magnitude, $M_w = 7.1$
Peak Bedrock Acceleration = 0.4 g
Peak Ground Acceleration = 0.47 g
Surface Rupture Potential = Minimum
Liquefaction Potential = Moderate to high

For clarification or additional information on seismic design aspects of the project, please consult Hossain Salimi at (916) 227-7147.

10. FOUNDATION RECOMMENDATIONS

According to current Caltrans practice, the retaining wall foundations are designed using the LRFD method. The foundation design analysis was performed in general using the methods outlined in AASHTO LRFD Bridge Design Specifications (2007); however, reduction factors for geotechnical strength parameters were based on Caltrans/DES/Geotechnical Services criteria. Idealized subsurface soil profile and soil engineering parameters along the retaining walls were defined based on the boring logs (Section 6.3), laboratory testing results, relevant literature, and engineering judgment.

Caltrans Standard Type-1 Retaining Wall (2010 LRFD version) is recommended for all the wing walls and retaining walls. The elevation at bottom of footing, height, and length for the walls to be founded on piles (Class 90 Steel Pipe Piles) and the walls to be founded on spread footings are listed in Tables 3 and 4, respectively. In the following, foundation recommendations are discussed for each wall segment listed in Tables 3 and 4.

Table 3. Footing Elevation and Height for Walls on Piles (Class 90 Steel Pipe Piles)

Wall No.	Approx. Station	Elevation at Bottom of Footing (ft)	Max. Height (ft)
Retaining Wall 1L	“RW1L LOL” 1+00 – 1+08	57.0	14
	“RW1L LOL” 1+08 – 1+16	53.0	18
Retaining Wall 1	“RW1 LOL” 10+82.61 – 11+52.61	56.0	16
	“RW1 LOL” 11+52.61 – 11+60.61	53.0	20
Retaining Wall 2	“RW2 LOL” 20+00 – 20+08	53.0	18
	“RW2 LOL” 20+08 – 20+16	57.0	14
	“RW2 LOL” 20+16 – 20+30	61.0	10
Retaining Wall 3	“RW3 LOL” 30+00 – 30+08	53.0	20
	“RW3 LOL” 30+08 – 31+02	56.0	16
	“RW3 LOL” 31+02 – 31+34	59.0	12

Table 4. Footing Elevation and Height for Walls on Spread Footings

Wall No.	Station	Elevation at Bottom of Footing (ft)	Max. Height (ft)
Retaining Wall 1	“RW1 LOL” 9+97 – 10+18.61	60.5	10
	“RW1 LOL” 10+18.61 – 10+50.61	60.33	12
	“RW1 LOL” 10+50.61 – 10+82.61	57.5	14
Retaining Wall 2	“RW2 LOL” 20+30 – 21+93.37	62.5	8
Retaining Wall 3	“RW3 LOL” 31+34 – 32+06	60.5	10
	“RW3 LOL” 32+06 – 32+97.73	62.5	8

10.1. Walls on Piles

Retaining Wall 1L (“RW1L LOL” 1+00 – 1+16)

The alignment of this wall forms an angle with the roadway alignment. This wall is 16 feet long and has two steps. The bottom elevations of footing and maximum wall heights for the two steps are shown in Table 3 above. According to boring log RC-06-001 and based on a liquefaction susceptibility analysis, there are liquefiable sandy layers from 50 to 37 feet elevation. Pile foundation is more suitable for this wall. In particular, Caltrans standard 90 kips steel pipe piles (Alternative V or W) are recommended.

The computer program APILE PLUS (version 5.0) was used to calculate nominal vertical bearing capacity. In this program, the API method (1986, 1987, 1994) was selected to calculate soil resistance. Both skin friction and end bearing capacity were considered in pile resistance calculations. Unsuitable penetrated layers, including liquefiable and scourable soils, are excluded from the bearing capacity calculation. Furthermore, skin friction from non-liquefiable layers overlying significant liquefiable layers were considered as downdrag force. The design pile tip

MR. SAMAD HAMOUD
Attn: Son Ly / Bach-Yen Nguyen
July 12, 2012
Page 8

elevations and nominal driving resistances are summarized in Table 5 below. The computed settlement under compression load (strength limit) is less than one inch in all cases.

Retaining Wall 1 (“RW1 LOL” 10+82.61 – 11+60.61)

This wall is 78 feet long and has two steps. The bottom elevations of footing and maximum wall heights for the two steps are shown in Table 3 above. According to boring log RC-06-001, pile foundation is more suitable for this wall. In particular, Caltrans standard 90 kips steel pipe piles (Alternative V or W) are recommended. The design pile tip elevations and nominal driving resistances are summarized in Table 5 below.

Retaining Wall 2 (“RW2 LOL” 20+00 – 20+30)

This wall is 30 feet long and has three steps. The bottom elevations of footing and maximum wall heights for the three steps are shown in Table 3 above. According to boring log RC-09-003, a layer of very soft peat is present at Elevation 51 to 47 feet. Pile foundation is more suitable for this wall. In particular, Caltrans standard 90 kips steel pipe piles (Alternative V or W) are recommended. The design pile tip elevations and nominal driving resistances are summarized in Table 5 below.

Retaining Wall 3 (“RW3 LOL” 30+00 – 31+34)

This portion of the wall is 134 feet long and has three steps. The bottom elevation of footing and maximum wall height are shown in Table 3. According to boring logs RC-09-003 and RC-06-004, a layer of very soft peat or silt is present at Elevation 51 to 45 feet. Pile foundation is suitable for this wall. In particular, Caltrans standard 90 kips steel pipe piles (Alternative V or W) are recommended. The design pile tip elevations and nominal driving resistances are summarized below.

Table 5. Pile Data Table

Wall No.	Station	Pile Type	Nominal Resistance (kips)		BOF Elev. (ft)	Design Tip Elev. (ft)	Specified Tip Elev. (ft)	Nominal Driving Resistance (kips)		
			Compress.	Tension						
RW1L	"RW1L LOL" 1+00 – 1+08	90 kips Steel Pipe Pile (Alternative V or W)	129	N/A	57.00	18 (a) 26 (c) 20 (d)	18	170		
	"RW1L LOL" 1+08 – 1+16					18 (a) 26 (c) 16 (d)				
RW1	"RW1 LOL" 10+82.61 – 11+52.61				56.00	18 (a) 26 (c) 19 (d)	18	170		
	"RW1 LOL" 11+52.61 – 11+60.61					18 (a) 26 (c) 16 (d)				
RW2	"RW2 LOL" 20+00 – 20+08				53.00	20 (a) 26 (c) 16 (d)	16	150		
	"RW2 LOL" 20+08 – 20+16					20 (a) 26 (c) 20 (d)				
	"RW2 LOL" 20+16 – 20+30					20 (a) 26 (c) 24 (d)				
RW 3	"RW3 LOL" 30+00 – 30+08				53.00	20 (a) 26 (c) 16 (d)	16	150		
	"RW3 LOL" 30+08 – 30+30					20 (a) 26 (c) 19 (d)				
	"RW3 LOL" 30+30 – 31+02					17 (a) 20 (c) 19 (d)			17	130
	"RW3 LOL" 31+02 – 31+34					20 (a) 24 (c) 19 (d)				

- Notes: 1) Design tip elevations are controlled by: (a) Compression, (c) Settlement, and (d) Lateral Load, respectively.
 2) The specified tip elevation shall not be raised above the design tip elevation for Settlement and Lateral Load.
 3) The design tip elevation for Lateral Load was provided by Structure Design.
 4) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.), if any, which do not contribute to the

design resistance. Unsuitable soil layers for RW1L and RW1 extend to Elevation 37 feet. Unsuitable soil layers for RW2 and RW3 extend to Elevation 45 feet.

10.2. Walls on Spread Footings

Retaining Wall No. 1 (“RW1 LOL” 9+97 – 10+82.61)

This wall is 85.61 feet long and has three steps. The bottom elevations of footing and maximum wall heights for the steps are shown in Table 4 above. Based on boring log RC-09-002, the underlying soil has a factored bearing capacity of 9.1 ksf (with resistance factor of 0.55). This is greater than the required gross uniform bearing stress of 3.8 ksf for a 14-foot-high Type-1 retaining wall per Caltrans Revised Standard Plans B3-1A (2012). The computed total (immediate and consolidation) settlement is less than one inch.

Retaining Wall No. 2 (“RW2 LOL” 20+30 – 21+93.37)

This wall is 163.37 feet long. The bottom elevation of footing and maximum wall height are shown in Table 4 above. According to boring logs RC-06-004 and RC-09-001, the underlying soil has a factored bearing capacity of at least 4.4 ksf (with resistance factor of 0.55). This is greater than the required gross uniform bearing stress of 2.3 ksf for an 8-foot-high Type-1 retaining wall per Caltrans Revised Standard Plans B3-1A (2012). The computed total (immediate and consolidation) settlement is less than two inches.

Retaining Wall No. 3 (“RW3 LOL” 31+34 – 32+97.74)

This portion of the wall is 163.74 feet long and has two steps. The bottom elevations of footing and maximum wall heights for the steps are shown in Table 4 above. According to boring logs RC-09-001 and RC-09-004, the underlying soil has a factored bearing capacity of at least 4.8 ksf (with resistance factor of 0.55). This is greater than the required gross uniform bearing stress of 3.3 ksf for a 10-foot-high Type-1 retaining wall per Caltrans Revised Standard Plans B3-1A (2012). The computed total (immediate and consolidation) settlement is less than two inches.

11. CONSTRUCTION CONSIDERATIONS

11.1. Construction Staging and Shoring for Excavation

The currently proposed construction sequence of the bridge has two stages. In the first stage, the eastbound portion of the bridge is constructed and used temporarily for two-way traffic. In the second stage, the existing bridge is demolished and the remaining (west bound) portion of the bridge is constructed. In accordance with this construction sequence, retaining wall 1 and 3 shall be constructed at stage 1; wall 1L and 2 shall be constructed at stage 2. If there is not enough

MR. SAMAD HAMOUD
Attn: Son Ly / Bach-Yen Nguyen
July 12, 2012
Page 11

roadway width to accommodate the excavation, temporary shoring may be required to reduce the extent of excavation. In that case, the location of the temporary shoring should be shown on the Roadway Plans.

Structure backfill at 95% relative compaction (per Caltrans Standard Specifications 19-3.06, 2006) shall be used to backfill the excavated area below (if any) and in front of the walls. For the area behind the walls, the structure backfill must have a sand equivalent value greater than 20.

11.2. Driven piles

1. Pre-drilling oversize holes through embankment fill and/or drilling beyond existing piles (leading row) at the abutments is permitted as per Caltrans Standard Specifications (2006) Section 49-1.06. If the base of fill is below the existing grade or the pre-drilling beyond the existing pile is deeper than anticipated, our office shall be notified so that possible adjustments to the pile tip elevations can be evaluated.
2. Hard driving is expected due to the presence of dense sand and gravels. Reinforcing the pile tips is recommended.
3. Pile acceptance criteria for driven piles shall be based on the Gates formula (per Caltrans Standard Specifications Section 49-1.08).

12. DISCLAIMER AND CONTACT INFORMATION

The recommendations contained in this report are based on specific project information regarding structure type, location, and design loads that have been provided by the Office of Structure Design West. If any conceptual changes are made during final project design, the Office of Geotechnical Design West, Design Branch A should review those changes to determine if these foundation recommendations are still applicable. Any questions regarding the above recommendations should be directed to the attention of Hooshmand Nikoui at (510) 286-4811.

c: TPokrywka, HNikoui, Daily File, Route File, J Stayton (DES Office Engineer)

SYang



MR. SAMAD HAMOUD
Attn: Son Ly / Bach-Yen Nguyen
July 12, 2012
Page 12



Figure 1. Project location.

MR. SAMAD HAMOUD
Attn: Son Ly / Bach-Yen Nguyen
July 12, 2012
Page 13



Figure 2. Boring locations.

Memorandum

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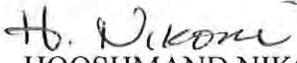
To: MR. MUTHANNA OMRAN
Bridge Design Branch 16
Office of Structure Design-West

Date: January 21, 2013

Attention: Son Ly

File: 04-SON-12 (PM 9.63)
04-1A2901
Gateway Monument Pedestals

From: 
SUNNY YANG
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services


HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Foundation Report for Gateway Monument Pedestals

This Foundation Report is prepared in response to your request dated January 4, 2013 for the proposed two Gateway Monument Pedestals located approximately 190 feet to the east of the new Laguna de Santa Rosa Bridge (Bridge No. 20-0296). The bridge is on Route 12, about 6 miles west of the City of Santa Rosa in Sonoma County.

1. INTRODUCTION

The above mentioned Gateway Monument Pedestals are located at approximate Sta. 20+90.00, 27 feet left and right of the A-line, respectively. The anticipated finished elevation is 65 feet for both pedestals. Each pedestal is limited to a maximum axial load of 1.0 kips, in addition to its own weight.

This Report provides foundation recommendations for the Pedestals. Relevant information regarding site geology and seismology, as well as geotechnical field and laboratory investigations, has been provided in two Foundation Reports previously submitted to your Office:

- S. Yang, M. Hung, V. Khata-O-Khotan, H. Nikoui, July 6, 2012, Revised Final Foundation Report.
- S. Yang, M. Hung, V. Khata-O-Khotan, H. Nikoui, July 12, 2012, Foundation Report for Retaining Walls.

The vertical datum used in this report is NAVD 88. The horizontal datum is NAD 83.

MR. MUTHANNA OMRAN

Attn: Son Ly

January 21, 2013

Page 2

2. SUMMARY OF RELEVANT GEOTECHNICAL INFORMATION

Boring RC-09-001, drilled at Sta. 20+87, 11 feet left of the A-line, was the closest to the proposed pedestal locations. Based on the boring log of RC-09-001, the subsurface soils near the pedestal locations are as follows (from roadway surface, 70 feet elevation): 10 feet of loose silty sand ($N_{60} = 9$) is underlain by 9 feet of medium dense silty sand ($N_{60} = 22$) and 3.5 feet of lean clay ($PP = 1.5$ tsf), respectively. From 22 to 24 feet depth is soft sandy organic silt, underlain by 2 feet of medium dense sand with silt ($N_{60} = 10$). From 26 to 35 feet depth is stiff sandy lean clay ($PP = 1.5$ tsf). From 35 feet to 51.5 feet depth (bottom of borehole) is medium dense to very dense sand with silt ($N_{60} = 29\sim 57$).

Based on our laboratory corrosion test results, the soil at the project site is non-corrosive.

A piezometer was installed at an adjacent borehole (RC-06-004) in October 2006. Groundwater levels were monitored between November 2006 and April 2007. The highest recorded groundwater elevation was approximately 57 feet during this period.

Scour is not an issue at this location.

3. FOUNDATION RECOMMENDATIONS

Cast-In-Steel-Shell (CISS) pile is considered most suitable pile type based on site conditions and hydraulic stability. Cast-In-Drilled-Hole (CIDH) piles are not recommended because of high groundwater level and the granular soils underlying the site (which may cause severe caving during drilling).

The piles are designed using the Working Stress Design (WSD) method. The foundation design analysis was performed in general using the methods outlined in AASHTO LRFD Bridge Design Specifications (2007). Idealized subsurface soil profile and soil engineering parameters were defined based on the boring logs, laboratory testing results, relevant literature, and engineering judgment.

The computer program APILE PLUS (Version 5.0) was used to calculate nominal vertical bearing capacity. In this program, the API method was selected to calculate soil resistance. Both skin friction and end bearing capacity were considered in pile resistance calculations.

Since the vertical loads on the pedestals are very small (one kips), pile length was selected based on similar structures in Caltrans Standard Plans. Excluding the support from loose soil above 60 feet elevation, the pile tip is set at 40 feet elevation. Table 1 provides a summary of foundation design recommendations for the two pedestals. Table 2 is the pile data table. The computed settlement is less than one inch in both cases.

Table 1. Pedestal Foundations Design Recommendations

Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-I Limit State Load per Support (kips)		LRFD Service-I Limit State Total Load per Pile (kips)	Nominal Resistance (kips)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent				
Left Pedestal	48" CISS	65	1	1	1	2	40	150
Right Pedestal	48" CISS	65	1	1	1	2	40	150

- Notes: 1) The specified tip elevation shall not be raised.
 2) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.), if any, which do not contribute to the design resistance.

Table 2. Pile Data Table

Location	Pile Type	Nominal Resistance (kips)		Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension		
Left Pedestal	48" CISS	2	N/A	40	150
Right Pedestal	48" CISS	2	N/A	40	150

- Notes: 1) The specified tip elevation shall not be raised.
 2) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.), if any, which do not contribute to the design resistance.

4. CONSTRUCTION CONSIDERATIONS

- For CISS piles, the contractor shall provide a driving system submittal including drivability analysis for approval prior to installing the piles.
- An impact hammer must be used through the entire pile length.
- Maintaining proper pile and hammer alignment is essential during pile driving to prevent non-uniform or eccentric pile stresses that may locally exceed the pile yield stress.

MR. MUTHANNA OMRAN

Attn: Son Ly

January 21, 2013

Page 4

- If hard driving conditions are encountered, center relief drilling may be used. However, center relief drilling shall not extend within one pile diameter of the specified pile tip elevation.
- A soil plug of one pile diameter is required at the bottom of the shell. If the soil plug cannot be maintained (soil boil condition), then a seal course of at least one pile diameter thickness shall be placed. The drilling of the soil inside steel shells, the placement of the seal course if needed, the placement of rebar cage, and concrete pour should be completed in a continuous operation.
- Prior to placing concrete, the interior surfaces of the steel shell shall be cleaned of all foreign material, including residue from the drilling operation. Brushing, pressure jetting or equivalent methods shall be used.
- Our office should be notified in case pile driving encounters refusal before reaching the specified tip elevation.

5. DISCLAIMER AND CONTACT INFORMATION

The recommendations contained in this report are based on specific project information regarding structure type, location, and design loads that have been provided by the Office of Structure Design West. If any conceptual changes are made during final project design, the Office of Geotechnical Design West, Design Branch A should review those changes to determine if these foundation recommendations are still applicable. Any questions regarding the above recommendations should be directed to the attention of Hooshmand Nikoui at (510) 286-4811.

c: TPokrywka, HNikoui, Daily File, Route File, Translab File

SYang/mm



Memorandum

*Flex your power!
Be energy efficient!*

To: MR. SAMAD HAMOUD
Senior Bridge Engineer
Division of Engineering Services
Office of Bridge Design-West
Bridge Design Branch 16

Date: December 21, 2009

File: 04-SON-12-PM 9.63
04-1A2900
Laguna De Santa Rosa Br.
Bridge No. 20-0296

Attention: Mr. Son Ly

From: HOSSAIN SALIMI
Senior Materials and Research Engineer
Division of Engineering Services
Geotechnical Services – MS-5
Office of Geotechnical Design-West

Subject: Final Seismic Design Recommendations and Soil Springs

This memorandum is in response to your latest request dated September 21, 2009 to provide the Final Seismic Design Recommendations as well as the lateral soil springs (PY curves) for the proposed 3-span Laguna De Santa Rosa Bridge (Bridge No. 20-0296) replacement project on Route 12 about ten kilometers west of the City of Santa Rosa in Sonoma County. The existing 10-span structure was originally constructed in 1921, widened in 1949, and seismically retrofitted in 1994. It should also be noted that the updated Preliminary Seismic Design Recommendations were submitted to your Office in a memorandum dated June 18, 2008.

Geology

The Office of Geotechnical Design-West conducted the field investigation for this site, which included four rotary wash borings (BH-1, BH-2, BH-3, and BH-4) drilled in October 2006 down to a maximum depth of 110 feet, and two rotary wash borings (R-09-003 and R-09-005) drilled in September 2009 down to a maximum depth of about 105 feet. Based on this information, the geology at the site consists of mostly medium dense silty and clayey sand layers, dense to very dense silt and sand layers, as well as layers of loose silty sand in the upper 20 to 30 feet. Occasional layers of sandy lean clay were also

encountered throughout the site. For a more detailed breakdown, please refer to the attached soil profiles.

Ground Water

The water table was measured at boring BH-4 in 2007 at about 18 feet below ground, corresponding to about elevation 52 feet, which is consistent to the creek water elevation. This water table elevation was used for all four support locations.

Seismicity

The controlling fault for the site was previously identified as Rodgers Creek-Healdsburg (RCH, Strike-Slip) with a maximum credible earthquake magnitude, $M_w=7$ located just over 11 kilometers east of the bridge. The Peak Bedrock Acceleration (PBA) at this site. Based on the 1996 California Seismic Hazard Map (CSHM), as well as the Attenuation Relationship Equation by Sadigh, et. Al. 1997, was estimated to be 0.4g. Furthermore, there were no known faults projecting towards or passing directly through the project site, Therefore, the potential for surface rupture at the site due to fault movement was considered minimal.

The 1996 map has since been updated to the 2008 CSHM, which is based on the United States (USGS) and California Geological Survey (CGS) maps. According to the new CSHM map, the Rodgers Creek-Healdsburg fault is now called Rodgers Creek Fault with a Maximum Magnitude $M_{max} = 7.1$. However, this change does not affect the seismicity of the site and the PBA of 0.4g is still valid.

The Acceleration Response Spectrum (ARS) curves based on both the new Deterministic Seismic Hazard Analysis (DSHA) and Probabilistic Seismic Hazard Analysis (PSHA) using a 975-year return period (5% probability of exceedance in 50 years) were generated for the site incorporating the latest Attenuation Relationship models and compared to the original ARS submitted in the 2008 report (Please see attached Figure 1).

The probabilistic spectrum, however, governs, and it considered as the recommended design curve. Furthermore, the ARS curve has been modified to account for the proximity of the site to the fault. The modifications are such that there is no increase in spectral acceleration in periods less than 0.5 seconds and a 20% increase for periods greater than one second. A linear interpolation was used between 0.5 and one second. (Please see attached Figure 2).

Liquefaction Potential

Due to the seismicity of the site, the presence of loose to medium dense granular material(s), and relatively high water table, there is a potential for liquefaction during a seismic event at abutment 1, and bents 2 and 3.

At abutment 1, there is a moderate to high potential from elevation 50 feet to 45 feet. At bent 2, there is a moderate to high potential from elevation 41 feet to 12 feet. At bent 3, there is a moderate to high potential from elevation 50 feet to 37 feet.

Soil Springs, P-Y curves

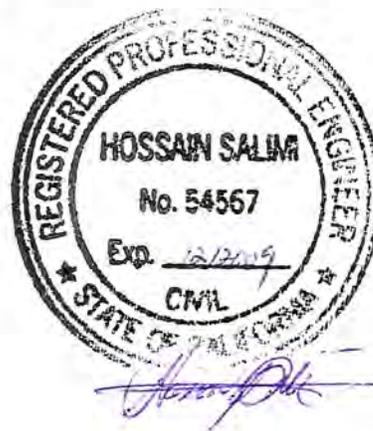
The lateral soil springs (P-Y curves), have been generated for the proposed foundation consisting of 48-inch single Cast-In-Steel-Shell (CISS) piles at all four support locations. The information including the size, support locations, and the cut-off elevations were derived from the latest General Plan dated 11/04/2009 as well as the tables contained in your aforementioned request.

The reduction factors for the PY curves due to the liquefaction potential have been incorporated into the results. However, the Group Reduction Factor (GRF) for the PY curves has not been imposed. A GRF of 0.4 should be applied, where applicable, to pile center-to center spacing of 2D, where D is the pile diameter. A GRF of one should be used for pile spacing of 5D or greater. Use a linear interpolation for pile spacing between 2D and 5D.

If there are any questions, please contact Hossain Salimi at (916) 227-7147.

Attachments

- c: TPokrywka (OGD-W)
- MMacaranes (OGD-W)
- SYang (OGD-W)
- Project file



Acceleration Response Spectra Comparisons for Laguna De Santa Rosa Bridge

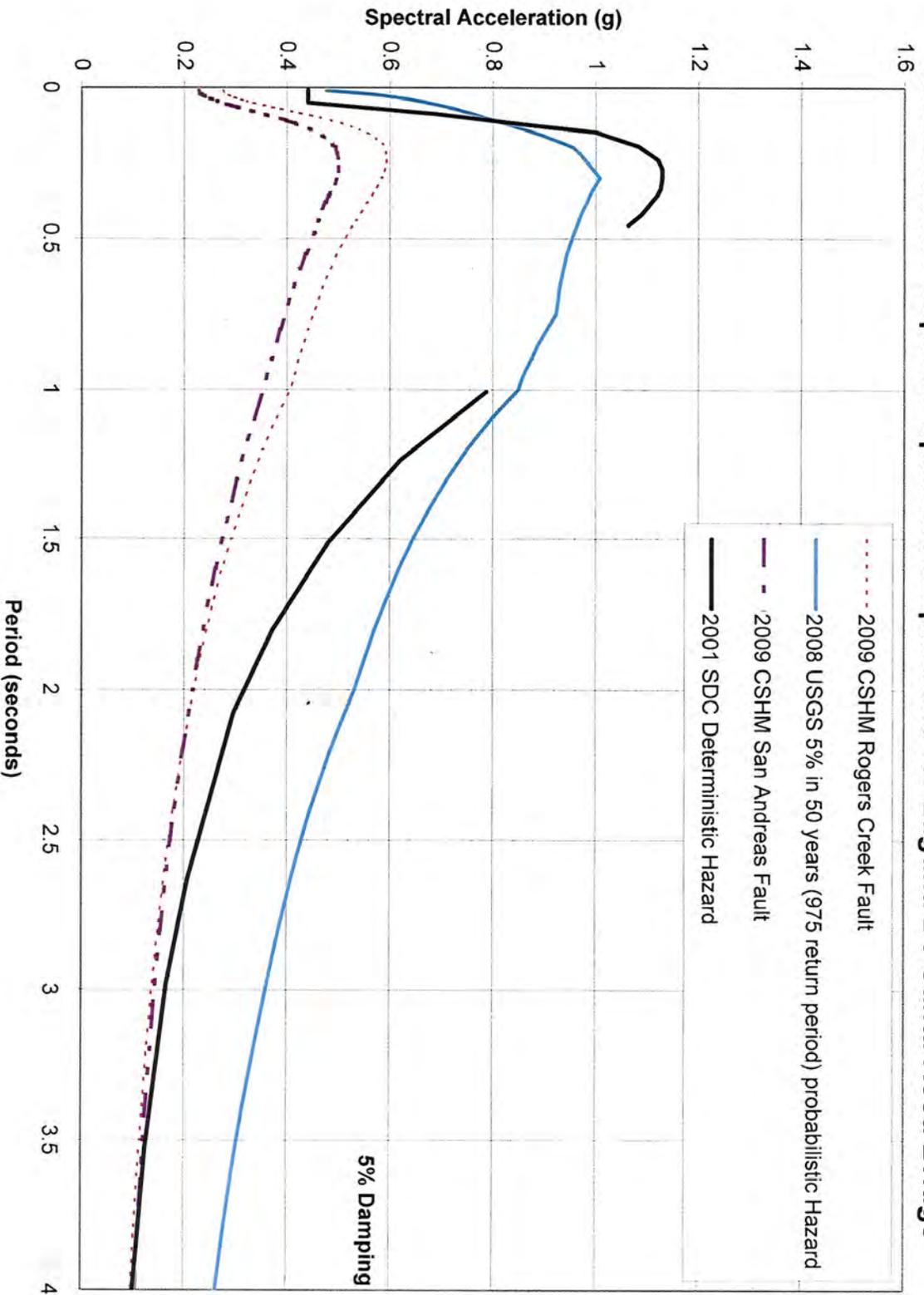


Figure 1

Recommended Acceleration Response Spectrum for Laguna De Santa Rosa Bridge

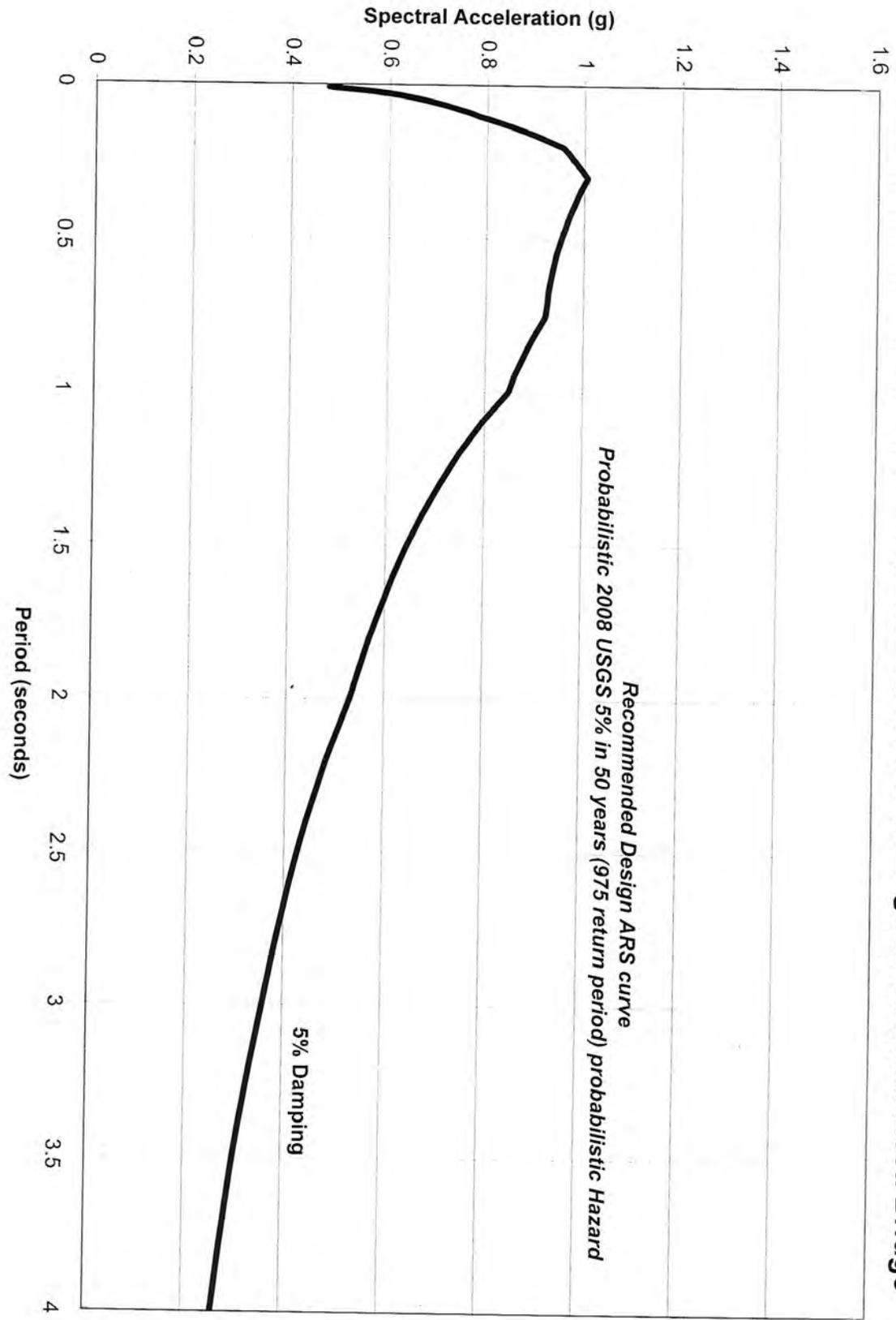


Figure 2

Laguna De Santa Rosa

Abutment 1

GWS 52.0 F.G. 70.0 TOH 21.3 (m)
DATE 12/15/2009 Cut-off 45.0 Cut-off 13.7 (m)

static cyclic Loading
No. of cycles (opt 3 only)
Liquifaction correction

Free Water (clay) static yes/no no

Soil Model C K qu γ'_v γ'_h σ'_v N1(60) Notes 1,2
1 1 100 (ksf) Rock Notes 3,4

HEF 1.4 Dia (in) 48
Ko 0.8

HEF 0.67 δ/ϕ 0.67
Dsp1 = 1, Nonraig = 0.8, C/D-H=0.7
Shear = 0.87, Comp = 0.75

Layer No.	Elevation (ft)	Depth (ft)	Thickness (ft)	SPT (bpf)	RQD %	USCS Soil	Description	p-factor	Pile Dia (in)	Soil Type	γ_m (pcf)	γ'_h (pcf)	σ'_v (psf)	N1(60) (bpf)	Dr %	c (psf)	ϕ (Deg)	E ₅₀	K (pci)	fmax (psf)	GROUP soil Type
1	70.0	14.0	14.0	3		SM	Silty sand		48	S	105	105	735	6	37		28	25	203		4
2	56.0	20.0	6.0	13		CL	Fat clay		48	C	125	125	1,845	19				833	1,159		3
3	50.0	25.0	5.0	2		SM	Silty sand	0.35	48	S	100	38	2,314	3	14		27	20	607		4
4	45.0	27.0	2.0	3		CL	Sandy lean clay		48	S	110	48	2,456	4				53	500		4
5	43.0	31.0	4.0	13		SG	Silty sand with gravel		48	S	125	63	2,628	16	59		32	40	822		4
6	39.0	36.0	5.0	40		SM	Silty sand		48	S	135	73	2,935	46	85		40	125	1,194		4
7	34.0	40.0	4.0	32		SM	Silty sand		48	S	130	68	3,252	35	78		38	97	1,223		4
8	30.0	44.0	4.0	32		SM	Silty sand		48	S	130	68	3,522	34	76		37	97	1,310		4
9	26.0	48.0	4.0	34		SP	PG sand with silt		48	S	130	68	3,793	35	77		37	104	1,419		4
10	22.0	54.0	6.0	45		SP	PG sand with silt		48	S	135	73	4,146	44	82		40	143	1,659		4
11	16.0	60.0	6.0	51		SP	PG sand with silt		48	S	135	73	4,581	47	83		40	150	1,874		4
12	10.0	64.0	4.0	47		SP	PG sand with silt		48	S	135	73	4,944	42	80		39	150	1,953		4
13	6.0	69.0	5.0	48		SP	PG sand with silt		48	S	130	68	5,258	41	79		39	150	2,072		4
14	1.0	74.0	5.0	35		SM	Silty sand		48	S	130	68	5,596	29	70		36	108	2,004		4
15	-4.0	78.0	4.0	67		SM	Silty sand		48	S	135	73	5,911	55	85		42	150	2,522		4

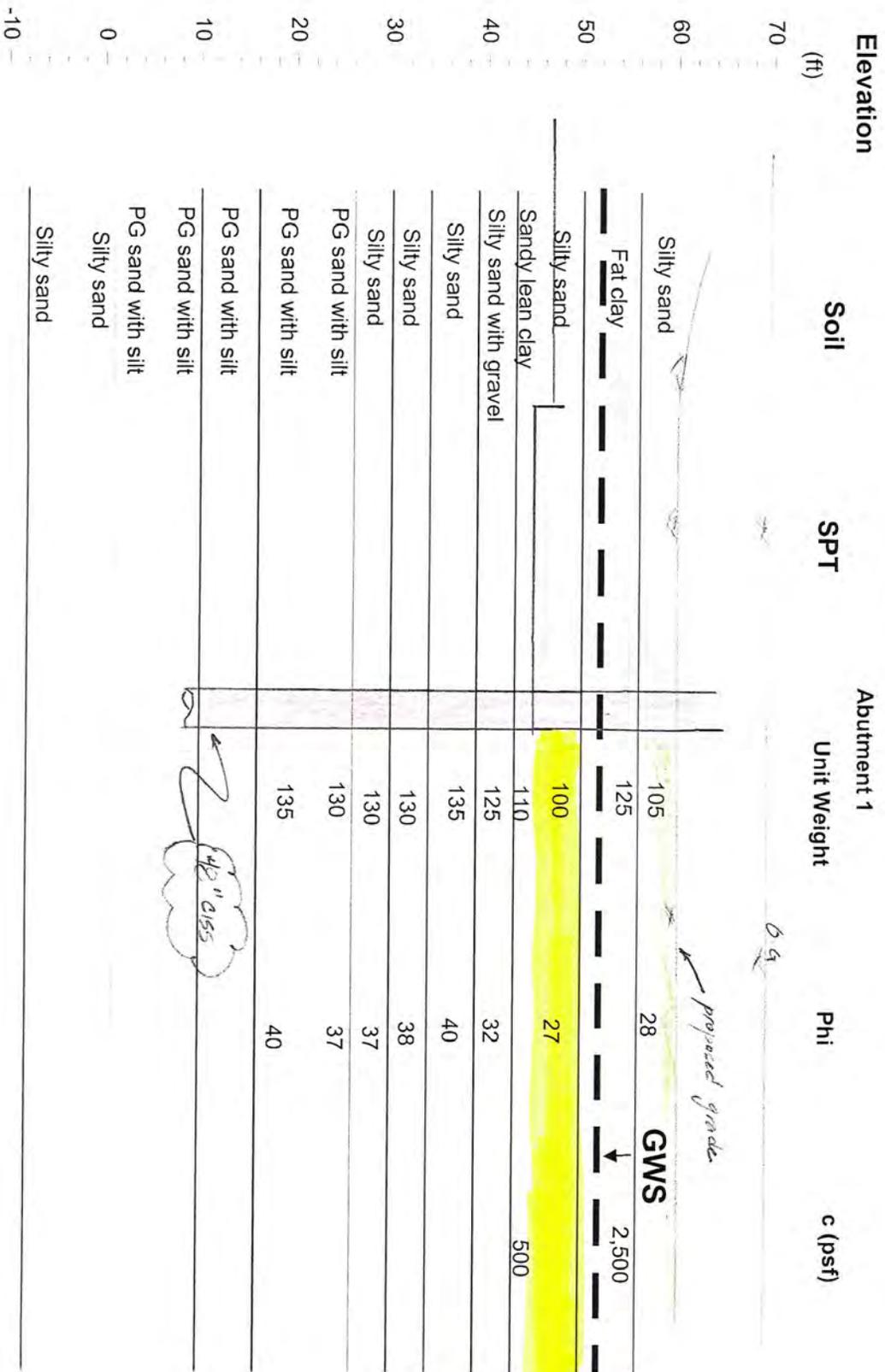
Notes

1. For clay model (1) "c" is correlated with SPT.
2. For clay model (2) "c" is correlated with effective over burden pressure.
3. For soil model (1) k for sand is correlated with SPT.
4. For soil model (2) k for sand is correlated with ϕ .

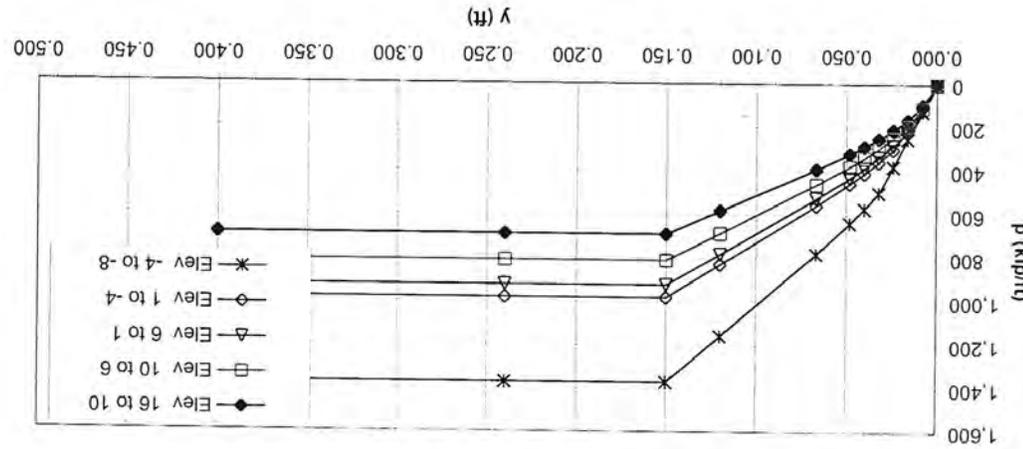
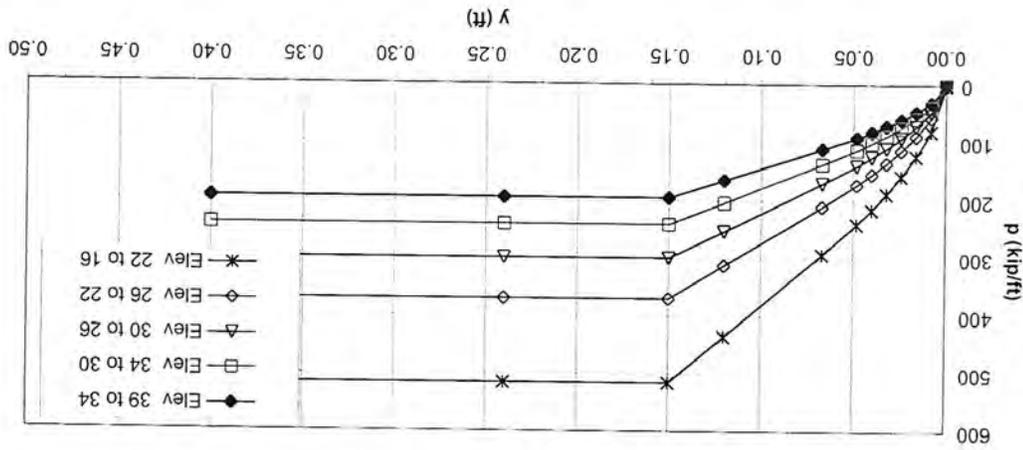
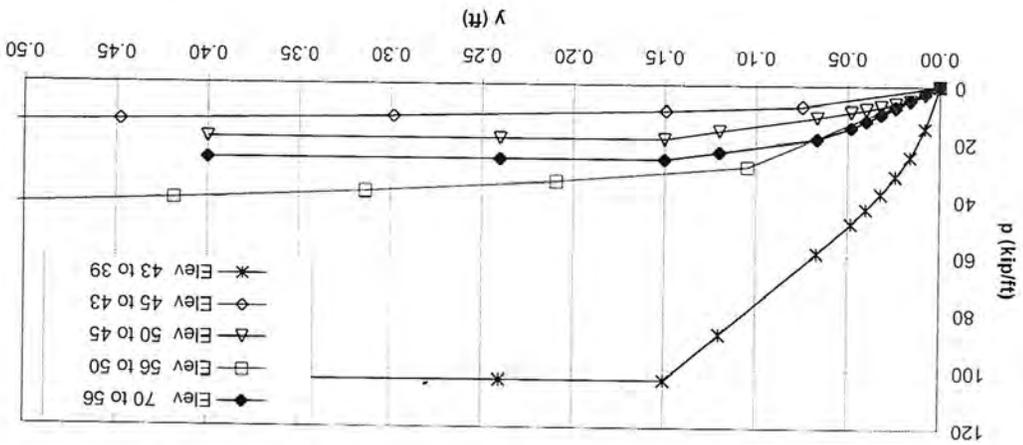
Legend

- USCS : Unified Soil Classification System
- SPT : Standard Penetration Test
- GWS : Ground Water Surface
- K : Soil Modulus Parameter
- HEF : Hammer Efficiency Factor

Laguna De Santa Rosa



Sta. Laguna De Santa Rosa Abutment 1
 O.G. 70.0
 Cut-off 45.0
 Pile 4' CISS
 GWS 52.0



Laguna De Santa Rosa

Abutment 1

y (ft)	Elev	70 to 56	y (ft)	Elev	56 to 50	y (ft)	Elev	50 to 45	y (ft)	Elev	45 to 43	y (ft)	Elev	43 to 39	Pile GWS	4' CISS 52.0	F.G. Cut-off	70 45
0.00	0	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0				
0.01	2	0.10	0.10	28	0.01	3	0.075	7	0.008	15	0.008	15	0.008	15				
0.02	5	0.21	0.21	34	0.02	5	0.149	9	0.016	25	0.016	25	0.016	25				
0.02	7	0.31	0.31	37	0.02	6	0.30	11	0.02	32	0.02	32	0.02	32				
0.03	10	0.42	0.42	40	0.03	7	0.45	13	0.03	38	0.03	38	0.03	38				
0.04	12	0.52	0.52	43	0.04	8	0.60	14	0.04	43	0.04	43	0.04	43				
0.05	15	0.63	0.63	45	0.05	9	0.75	15	0.05	48	0.05	48	0.05	48				
0.07	19	0.84	0.84	48	0.07	11	0.90	16	0.07	59	0.07	59	0.07	59				
0.12	23	1.05	1.05	48	0.12	16	1.04	17	0.12	87	0.12	87	0.12	87				
0.15	26	1.26	1.26	48	0.15	19	1.19	18	0.15	103	0.15	103	0.15	103				
0.24	26	1.46	1.46	48	0.24	19	2.24	18	0.24	103	0.24	103	0.24	103				
0.40	26	1.67	1.67	48	0.40	19	3.73	18	0.40	103	0.40	103	0.40	103				

y (ft)	Elev	39 to 34	y (ft)	Elev	34 to 30	y (ft)	Elev	30 to 26	y (ft)	Elev	26 to 22	y (ft)	Elev	22 to 16
0.00	0	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
0.008	31	0.008	0.008	38	0.008	47	0.008	56	0.008	80	0.008	80	0.008	80
0.016	47	0.016	0.016	58	0.016	72	0.016	88	0.016	123	0.016	123	0.016	123
0.02	60	0.02	0.02	74	0.02	92	0.02	113	0.024	158	0.024	158	0.024	158
0.03	71	0.03	0.03	88	0.03	109	0.03	135	0.032	188	0.032	188	0.032	188
0.04	81	0.04	0.04	101	0.04	125	0.04	154	0.040	215	0.040	215	0.040	215
0.05	91	0.05	0.05	112	0.05	140	0.05	172	0.048	240	0.048	240	0.048	240
0.07	111	0.07	0.07	137	0.07	170	0.07	210	0.067	293	0.067	293	0.067	293
0.12	165	0.12	0.12	204	0.12	253	0.12	313	0.120	436	0.120	436	0.120	436
0.15	196	0.15	0.15	241	0.15	300	0.15	370	0.15	516	0.15	516	0.15	516
0.24	196	0.24	0.24	241	0.24	300	0.24	370	0.24	516	0.24	516	0.24	516
0.40	196	0.40	0.40	241	0.40	300	0.40	370	0.40	516	0.40	516	0.40	516

y (ft)	Elev	16 to 10	y (ft)	Elev	10 to 6	y (ft)	Elev	6 to 1	y (ft)	Elev	1 to -4	y (ft)	Elev	-4 to -8
0.00	0	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
0.008	95	0.008	0.008	109	0.008	121	0.008	103	0.008	126	0.008	126	0.008	126
0.016	165	0.016	0.016	194	0.016	221	0.016	206	0.016	252	0.016	252	0.016	252
0.024	211	0.024	0.024	248	0.024	282	0.024	300	0.024	378	0.024	378	0.024	378
0.032	251	0.032	0.032	295	0.032	357	0.032	357	0.032	498	0.032	498	0.032	498
0.040	287	0.040	0.040	338	0.040	385	0.040	409	0.040	571	0.040	571	0.040	571
0.048	321	0.048	0.048	378	0.048	430	0.048	457	0.048	638	0.048	638	0.048	638
0.067	392	0.067	0.067	461	0.067	525	0.067	558	0.067	779	0.067	779	0.067	779
0.120	583	0.120	0.120	685	0.120	781	0.120	829	0.120	1157	0.120	1157	0.120	1157
0.15	690	0.15	0.15	812	0.15	925	0.15	982	0.15	1370	0.15	1370	0.15	1370
0.24	690	0.24	0.24	812	0.24	925	0.24	982	0.24	1370	0.24	1370	0.24	1370
0.40	690	0.40	0.40	812	0.40	925	0.40	982	0.40	1370	0.40	1370	0.40	1370

Note: p (kip/ft)

Laguna De Santa Rosa
Bent 2

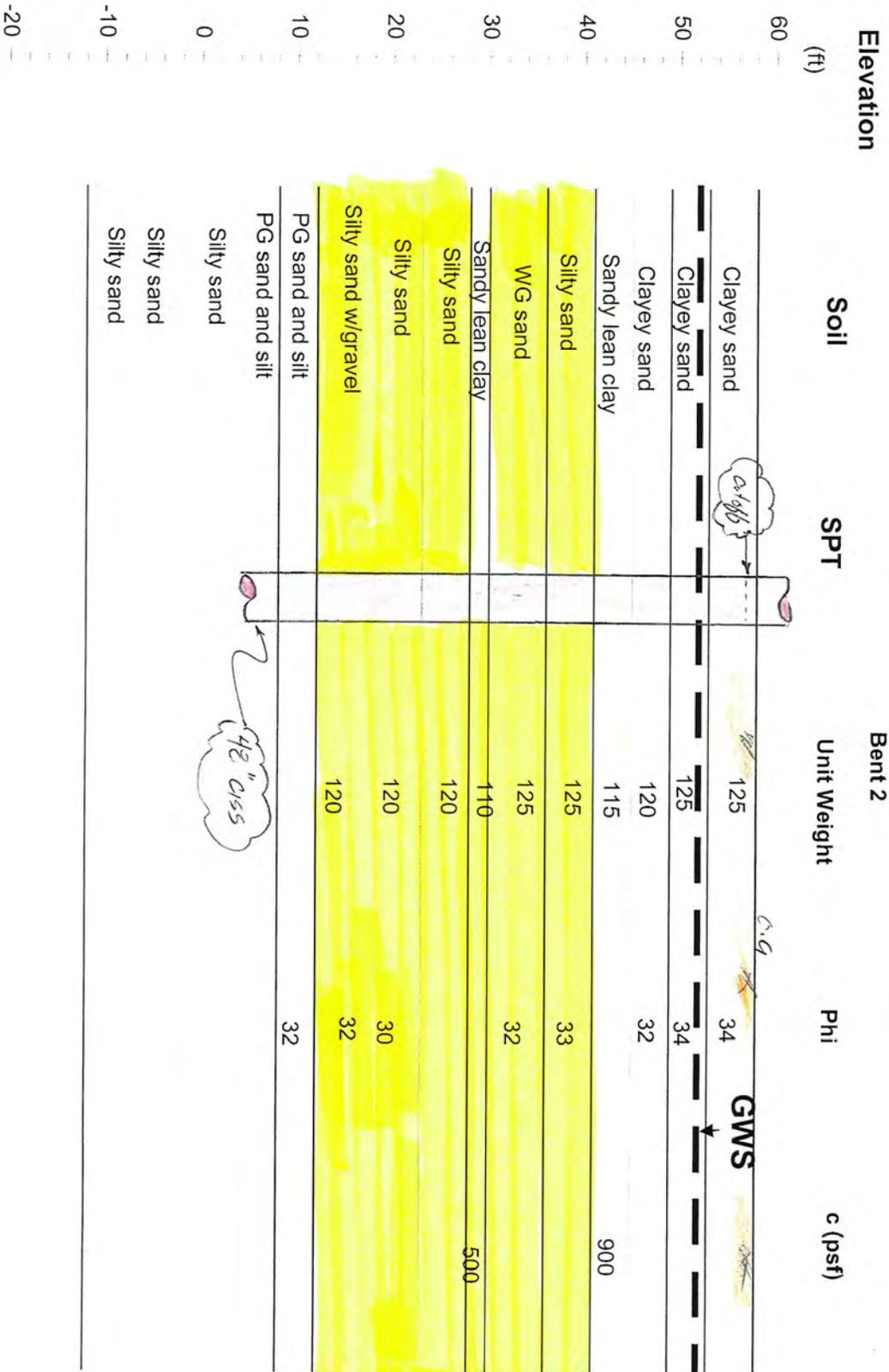
Layer No.	Elevation (ft)	Depth (ft)	Thickness (ft)	SPT (bpf)	RQD (%)	Soil USCS	Soil Description	p-factor	Free Water (clay)		Soil Model			N1(60) (bpf)	Dr (%)	c (psf)	φ (Deg)	c ₅₀	K (pcf)	fmax (psf)	GROUP soil Type
									static	yes/no	C	K	qu								
1	58.0	5.0	5.0	10	17.7	SC	Clayey sand		48	s	125	125	313	21	73		34		43	103	4
2	53.0	9.0	4.0	11	17.7	SC	Clayey sand		48	s	125	63	750	23	70		34		47	253	4
3	49.0	13.0	4.0	8	17.4	SC	Clayey sand		48	s	120	58	991	16	59		32		27	310	4
4	45.0	17.0	4.0	4		CL	Sandy lean clay		48	c	115	52	1,211	7					180	522	1
5	41.0	22.0	5.0	11		SM	Silty sand	0.50	48	s	125	62	1,471	18	63		33		35	471	4
6	36.0	28.0	6.0	11		SW	WG sand	0.50	48	s	125	63	1,815	16	60		32		35	569	4
7	30.0	30.0	2.0	2		CL	Sandy lean clay	0.50	48	c	110	48	2,051	3					53	500	1
8	28.0	35.0	5.0	7		SM	Silty sand	0.50	48	s	120	58	2,242	9	46		30		25	646	4
9	23.0	40.0	5.0	12		SM	Silty sand	0.50	48	s	120	58	2,531	15	57		32		38	782	4
10	18.0	46.0	6.0	13		SG	Silty sand w/gravel	0.50	48	s	120	58	2,847	15	57		32		40	894	4
11	12.0	50.0	4.0	59		SP	Silly sand and silt		48	s	135	73	3,165	66	93		44		150	1,421	4
12	8.0	55.0	5.0	42		SP	PG sand and silt		48	s	130	68	3,480	45	83		40		132	1,400	4
13	3.0	60.0	5.0	46		SM	Silty sand		48	s	130	68	3,818	47	84		40		147	1,556	4
14	-2.0	65.0	5.0	71		SM	Silty sand		48	s	135	73	4,168	69	93		44		150	1,894	4
15	-7.0	70.0	5.0	59		SM	Silty sand		48	s	135	73	4,531	55	87		42		150	1,937	4

- Notes**
- For clay model (1) "c" is correlated with SPT.
 - For clay model (2) "c" is correlated with effective over burden pressure.
 - For soil model (1) K for sand is correlated with SPT.
 - For soil model (2) K for sand is correlated with φ.

- Legend**
- USCS : Unified Soil Classification System
 - SPT : Standard Penetration Test
 - GWS : Ground Water Surface
 - K : Soil Modulus Parameter
 - HEF : Hammer Efficiency Factor

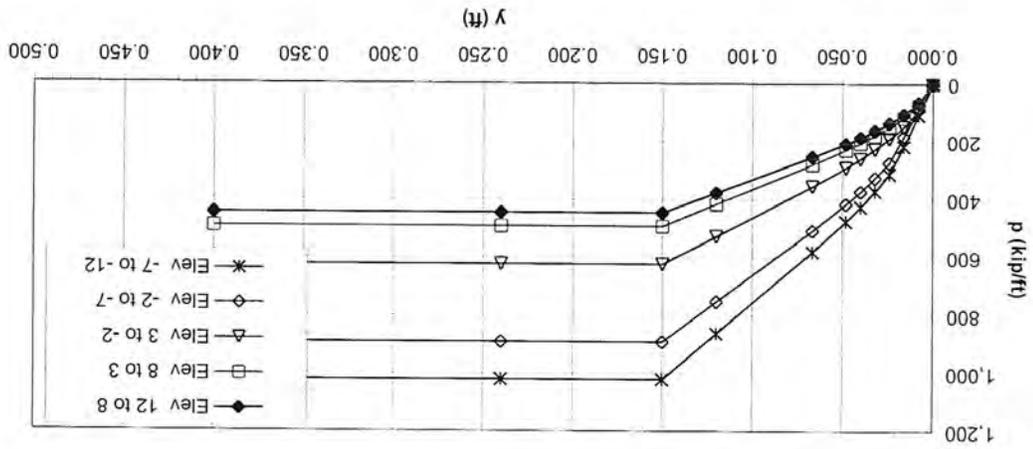
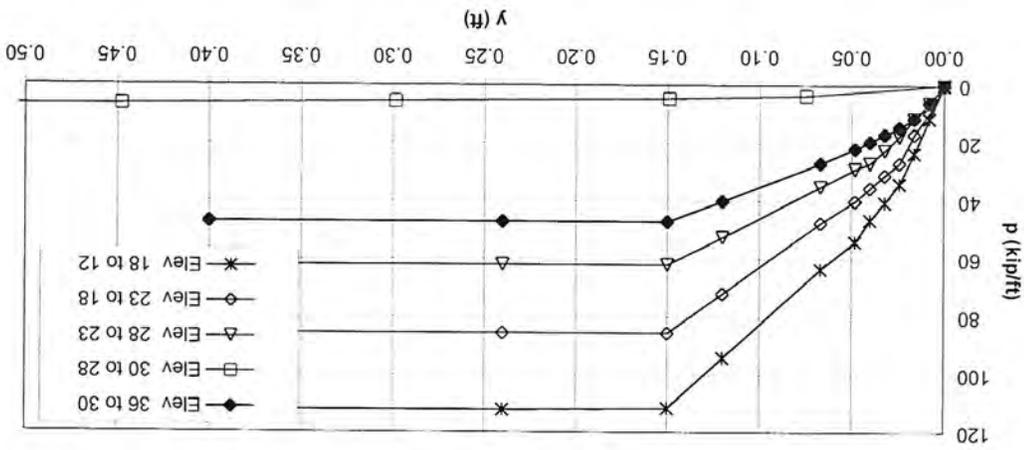
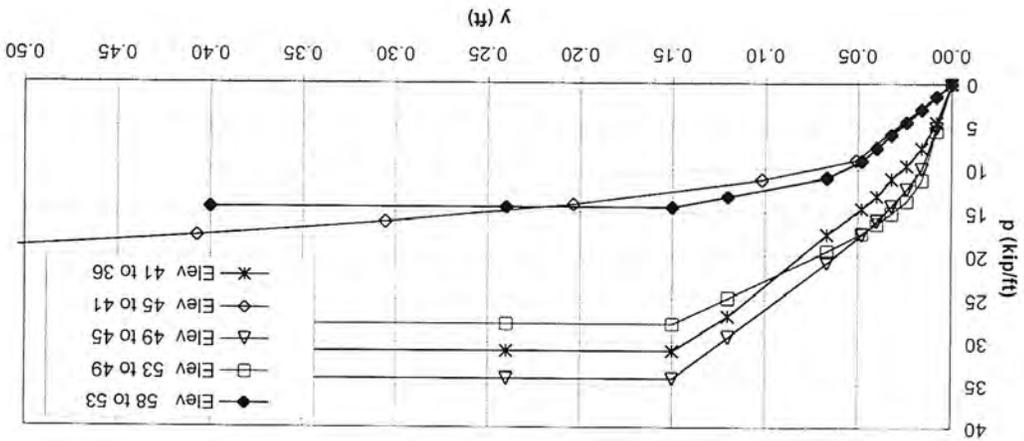
Laguna De Santa Rosa

Bent 2



Soil Profile

Sta. Laguna De Santa Rosa
Bent 2
O.G. 58.0
Cut-off 57.0
Pile 52.0
4' CISS 52.0



Laguna De Santa Rosa

Bent 2

F.G. 58
Cut-off 57
Pile 4' CISS
GWS 52.0

y (ft)	Elev 58 to 53	y (ft)	Elev 53 to 49	y (ft)	Elev 49 to 45	y (ft)	Elev 45 to 41	y (ft)	Elev 41 to 36
0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
0.01	1	0.01	6	0.01	5	0.051	9	0.008	5
0.02	3	0.02	11	0.02	10	0.102	11	0.016	8
0.02	4	0.02	14	0.02	12	0.20	14	0.02	10
0.03	6	0.03	15	0.03	14	0.31	16	0.03	11
0.04	7	0.04	16	0.04	16	0.41	18	0.04	13
0.05	9	0.05	17	0.05	17	0.51	19	0.05	15
0.07	11	0.07	19	0.07	21	0.61	20	0.07	18
0.12	13	0.12	25	0.12	29	0.71	21	0.12	27
0.15	14	0.15	28	0.15	34	0.81	22	0.15	31
0.24	14	0.24	28	0.24	34	1.53	22	0.24	31
0.40	14	0.40	28	0.40	34	2.54	22	0.40	31

y (ft)	Elev 36 to 30	y (ft)	Elev 30 to 28	y (ft)	Elev 28 to 23	y (ft)	Elev 23 to 18	y (ft)	Elev 18 to 12
0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
0.008	6	0.075	4	0.008	6	0.008	10	0.008	12
0.016	12	0.149	5	0.016	12	0.016	17	0.016	24
0.02	15	0.30	6	0.02	18	0.02	27	0.024	34
0.03	17	0.45	7	0.03	23	0.03	31	0.032	41
0.04	20	0.60	7	0.04	27	0.04	36	0.040	47
0.05	22	0.75	8	0.05	29	0.05	40	0.048	54
0.07	27	0.90	8	0.07	35	0.07	48	0.067	64
0.12	40	1.04	9	0.12	53	0.12	72	0.120	94
0.15	47	1.19	9	0.15	62	0.15	86	0.15	112
0.24	47	2.24	9	0.24	62	0.24	86	0.24	112
0.40	47	3.73	9	0.40	62	0.40	86	0.40	112

y (ft)	Elev 12 to 8	y (ft)	Elev 8 to 3	y (ft)	Elev 3 to -2	y (ft)	Elev -2 to -7	y (ft)	Elev -7 to -12
0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
0.008	65	0.008	74	0.008	92	0.008	91	0.008	108
0.016	106	0.016	117	0.016	149	0.016	182	0.016	216
0.024	136	0.024	150	0.024	190	0.024	272	0.024	312
0.032	162	0.032	179	0.032	227	0.032	324	0.032	371
0.040	186	0.040	205	0.040	260	0.040	372	0.040	425
0.048	207	0.048	229	0.048	290	0.048	415	0.048	475
0.067	253	0.067	280	0.067	354	0.067	507	0.067	580
0.120	376	0.120	416	0.120	527	0.120	753	0.120	862
0.15	446	0.15	492	0.15	624	0.15	892	0.15	1,021
0.24	446	0.24	492	0.24	624	0.24	892	0.24	1,021
0.40	446	0.40	492	0.40	624	0.40	892	0.40	1,021

Note: p (kip/ft)

Laguna De Santa Rosa
Bent 3 **58.0** **TOH** **17.7** **(m)**
GWS **52.0** **F.G.** **58.0** **F.G.** **17.7** **(m)**
DATE **12/15/2009** **Cut-off** **57.0** **Cut-off** **17.4** **(m)**

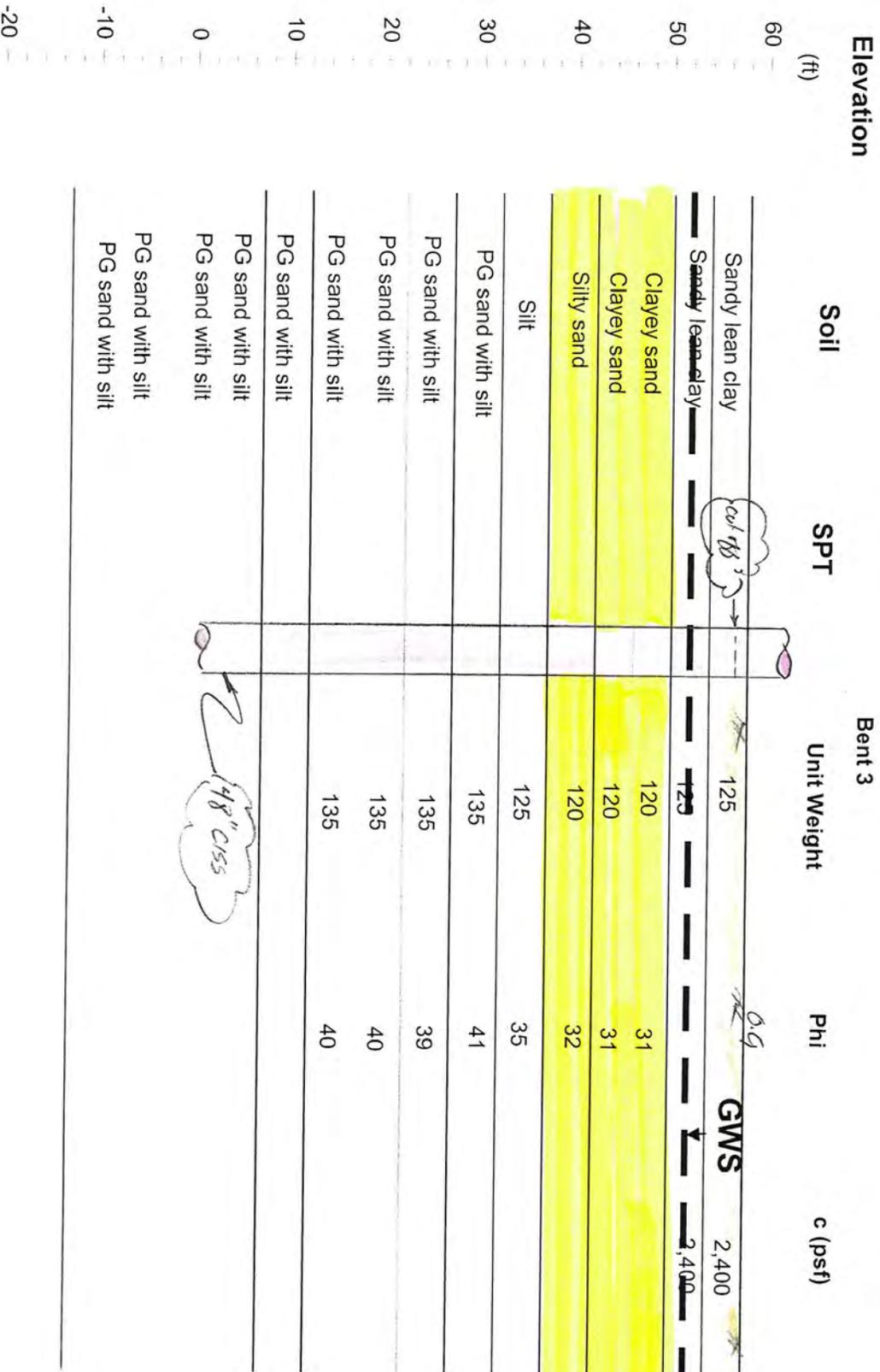
Layer No.	Elevation (ft)	Depth (ft)	Thickness (ft)	SPT (bpf)	ROD %	USCS Soil	Soil Description	p-factor	Free Water (clay)		Soil Model			Notes	DR	c (psf)	φ (Deg)	E ₅₀ (psf)	K (pcf)	fmax (psf)	GROUP soil Type
									static	yes/no	c	K	qu								
1	58.0	4.0	4.0	9	17.7	CL	Sandy lean clay	0.50	48	C	125	125	250	19	19	2,400	31	0.0054	800	682	3
2	54.0	8.0	4.0	9	17.7	CL	Sandy lean clay	0.50	48	C	125	63	625	19	15	2,400	31	0.0054	800	857	3
3	50.0	12.0	4.0	7	17.7	SC	Clayey sand	0.50	48	S	120	58	866	15	57	2,400	31	0.0054	800	267	4
4	46.0	16.0	4.0	7	17.7	SC	Clayey sand	0.50	48	S	120	58	1,096	13	55	2,400	31	0.0054	800	332	4
5	42.0	21.0	5.0	9	17.4	SM	Silty sand	0.50	48	S	120	58	1,355	15	59	2,400	32	0.0054	800	421	4
6	37.0	26.0	5.0	16	17.4	SM	Silt	0.50	48	S	125	63	1,656	25	71	2,400	35	0.0054	800	568	4
7	32.0	31.0	5.0	34	17.4	SP	PG sand with silt	0.50	48	S	135	73	1,994	48	87	2,400	41	0.0054	800	818	4
8	27.0	36.0	5.0	33	17.4	SP	PG sand with silt	0.50	48	S	135	73	2,357	43	84	2,400	39	0.0054	800	936	4
9	22.0	41.0	5.0	37	17.4	SP	PG sand with silt	0.50	48	S	135	73	2,720	44	84	2,400	40	0.0054	800	1,093	4
10	17.0	46.0	5.0	39	17.4	SP	PG sand with silt	0.50	48	S	135	73	3,083	44	84	2,400	40	0.0054	800	1,236	4
11	12.0	51.0	5.0	32	17.4	SP	PG sand with silt	0.50	48	S	135	73	3,446	34	77	2,400	37	0.0054	800	1,285	4
12	7.0	56.0	5.0	42	17.4	SP	PG sand with silt	0.50	48	S	135	73	3,809	43	82	2,400	39	0.0054	800	1,513	4
13	2.0	61.0	5.0	49	17.4	SP	PG sand with silt	0.50	48	S	135	73	4,172	47	84	2,400	40	0.0054	800	1,710	4
14	-3.0	66.0	5.0	55	17.4	SP	PG sand with silt	0.50	48	S	135	73	4,535	51	85	2,400	42	0.0054	800	1,940	4
15	-8.0	71.0	5.0	54	17.4	SP	PG sand with silt	0.50	48	S	135	73	4,898	48	83	2,400	42	0.0054	800	2,096	4
	-13.0																				

- Notes**
- For clay model (1) "c" is correlated with SPT.
 - For clay model (2) "c" is correlated with effective over burden pressure.
 - For soil model (1) K for sand is correlated with SPT
 - For soil model (2) K for sand is correlated with φ.

- Legend**
- USCS : Unified Soil Classification System
 - SPT : Standard Penetration Test
 - GWS : Ground Water Surface
 - K : Soil Modulus Parameter
 - HEF : Hammer Efficiency Factor

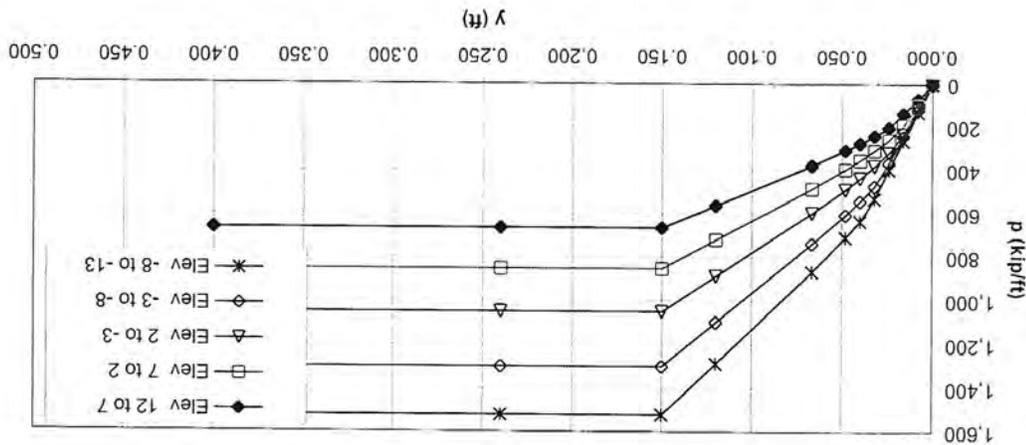
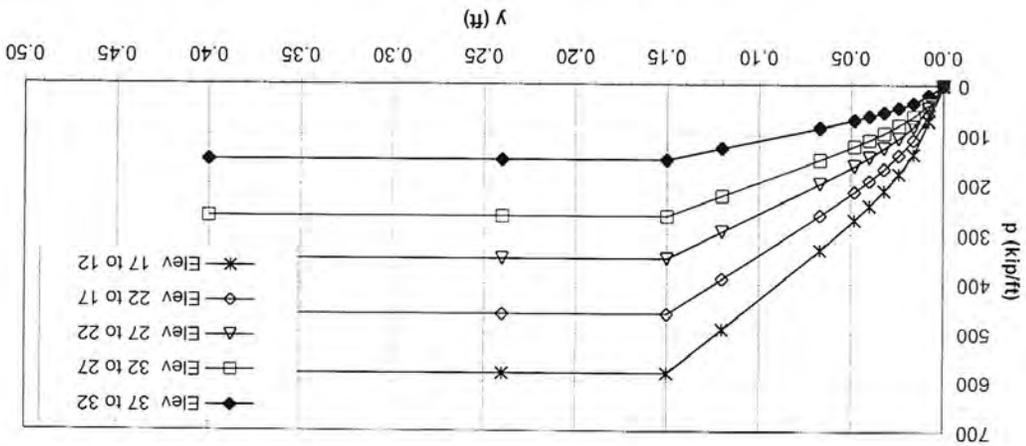
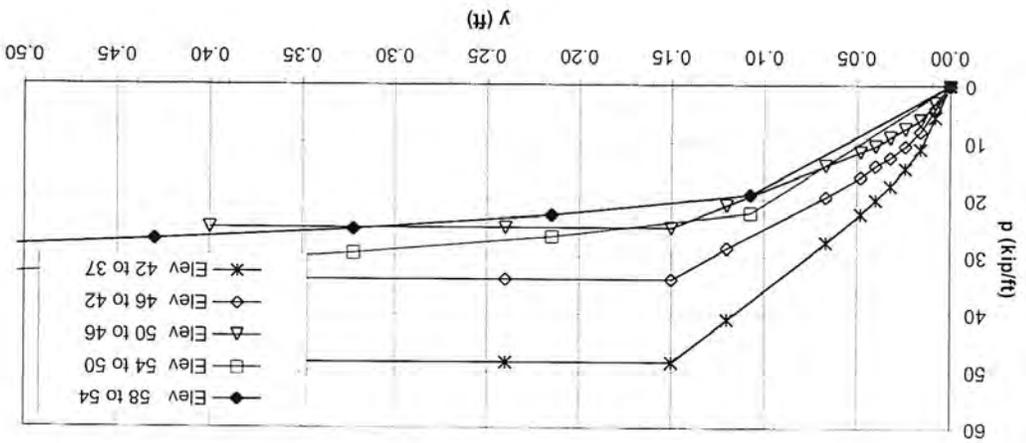
Laguna De Santa Rosa

Bent 3



Soil Profile

Sta. Laguna De Santa Rosa Bent 3
O.G. 58.0
Cut-off 57.0
4' CISS 52.0
Pile GWS 52.0



Laguna De Santa Rosa
Bent 3

y (ft)	Elev	F.G.	Cut-off	58	57	Pile	4' CISS
0.00	58 to 54	0.00	0	50 to 46	0	46 to 42	42 to 37
0.11	19	0.11	22	0.01	3	0.008	0
0.21	23	0.21	27	0.02	6	0.016	4
0.32	25	0.32	29	0.02	8	0.02	6
0.43	27	0.43	32	0.03	9	0.03	8
0.54	29	0.54	33	0.04	11	0.04	11
0.64	30	0.64	35	0.05	12	0.05	13
0.86	32	0.86	38	0.07	14	0.07	14
1.07	32	1.07	38	0.12	21	0.12	16
1.29	32	1.29	38	0.15	25	0.15	20
1.50	32	1.50	38	0.24	25	0.24	23
1.72	32	1.72	38	0.40	25	0.40	28

y (ft)	Elev						
0.00	0	0.00	0	0.00	0	0.00	0
0.008	19	0.008	39	0.008	47	0.008	60
0.016	36	0.016	63	0.016	83	0.016	72
0.02	46	0.02	81	0.02	107	0.024	110
0.03	55	0.03	96	0.03	127	0.032	141
0.04	63	0.04	110	0.04	145	0.040	141
0.05	70	0.05	123	0.05	162	0.048	168
0.07	86	0.07	150	0.07	198	0.067	192
0.12	128	0.12	223	0.12	295	0.120	215
0.15	151	0.15	264	0.15	349	0.15	262
0.24	151	0.24	264	0.24	349	0.24	390
0.40	151	0.40	264	0.40	349	0.40	462

y (ft)	Elev	y (ft)	Elev	y (ft)	Elev	y (ft)	Elev
0.00	0	0.00	0	0.00	0	0.00	0
0.008	69	0.008	97	0.008	117	0.008	122
0.016	139	0.016	195	0.016	234	0.016	244
0.024	203	0.024	260	0.024	320	0.024	366
0.032	242	0.032	310	0.032	382	0.032	472
0.040	277	0.040	355	0.040	437	0.040	541
0.048	310	0.048	396	0.048	488	0.048	605
0.067	378	0.067	484	0.067	596	0.067	738
0.120	562	0.120	719	0.120	886	0.120	1,097
0.15	666	0.15	852	0.15	1,049	0.15	1,299
0.24	666	0.24	852	0.24	1,049	0.24	1,299
0.40	666	0.40	852	0.40	1,049	0.40	1,299

Note: p (kip/ft)

p-y Data

Laguna De Santa Rosa
Abutment 4
70.0 TOH 21.3 (m) Loading static/cyclic No. of cycles (opt 3 only)
52.0 F.G. 70.0 F.G. 21.3 (m) static Free Water (clay) yes/no no
12/15/2009 Cut-off 45.0 Cut-off 13.7 (m) Liquefaction correction
Soil Model c K 1 1 100 qu
Notes 1,2 Notes 3,4
HEF 1.13 Dia (in) 48 4' class
HEF 1.13 Ko 0.8
HEF 1.13 δ/ϕ 0.67
Depth = 1, Modulus = 0.8, CIDH = 7
Steel = 0.87, Conc = 0.75

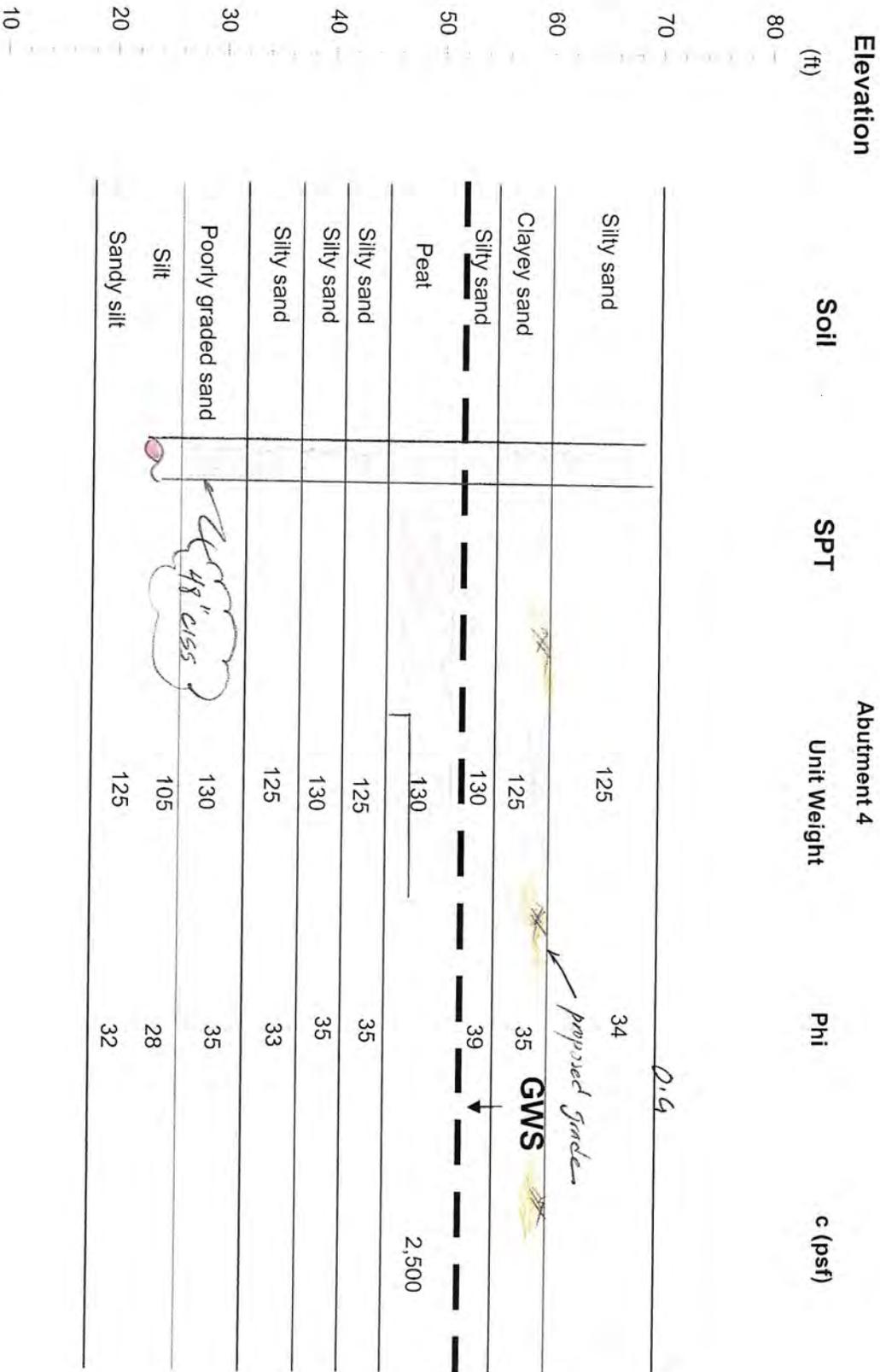
Layer No.	Elevation (ft)	Depth (ft)	Thickness (ft)	SPT (bpf)	ROD %	USCS Soil	Description	p-factor	Pile Dia (in)	Soil Type	γ_m (pcf)	γ_b (pcf)	c_v (psf)	N1(60) (bpf)	Dr %	c (psf)	ϕ (Deg)	E_{50}	K (pci)	tmax (psf)	GROUP soil Type
1	70.0	10.0	10.0	14		SM	Silty sand		48	s	125	125	625	24	77		34		60	212	4
2	60.0	15.0	5.0	20		SC	Clayey sand		48	s	125	125	1,563	26	77		35		90	541	4
3	55.0	19.0	4.0	36		SM	Silty sand		48	s	130	130	2,135	39	87		39		194	829	4
4	51.0	25.0	6.0	30		CL	Peat		48	c	130	68	2,598	30		2,500			833	1,274	3
5	45.0	29.0	4.0	26		SM	Silty sand		48	s	125	63	2,926	24	74		35		78	1,000	4
6	41.0	33.0	4.0	28		SM	Silty sand		48	s	130	68	3,186	25	75		35		84	1,097	4
7	37.0	38.0	5.0	22		SM	Silty sand		48	s	125	63	3,478	19	67		33		66	1,124	4
8	32.0	44.0	6.0	30		SP	Poorly graded sand		48	s	130	68	3,837	24	73		35		91	1,314	4
9	26.0	48.0	4.0	7		SM	Silt		48	s	105	43	4,125	6	35		28		25	1,129	4
10	22.0	52.0	4.0	21		SM	Sandy silt		48	s	125	63	4,336	16	62		32		63	1,359	4

- Notes**
1. For clay model (1) "c" is correlated with SPT.
 2. For clay model (2) "c" is correlated with effective over burden pressure.
 3. For soil model (1) K for sand is correlated with SPT.
 4. For soil model (2) K for sand is correlated with ϕ .

Legend
 USCS : Unified Soil Classification System
 SPT : Standard Penetration Test
 GWS : Ground Water Surface
 K : Soil Modulus Parameter
 HEF : Hammer Efficiency Factor

Laguna De Santa Rosa

Abutment 4

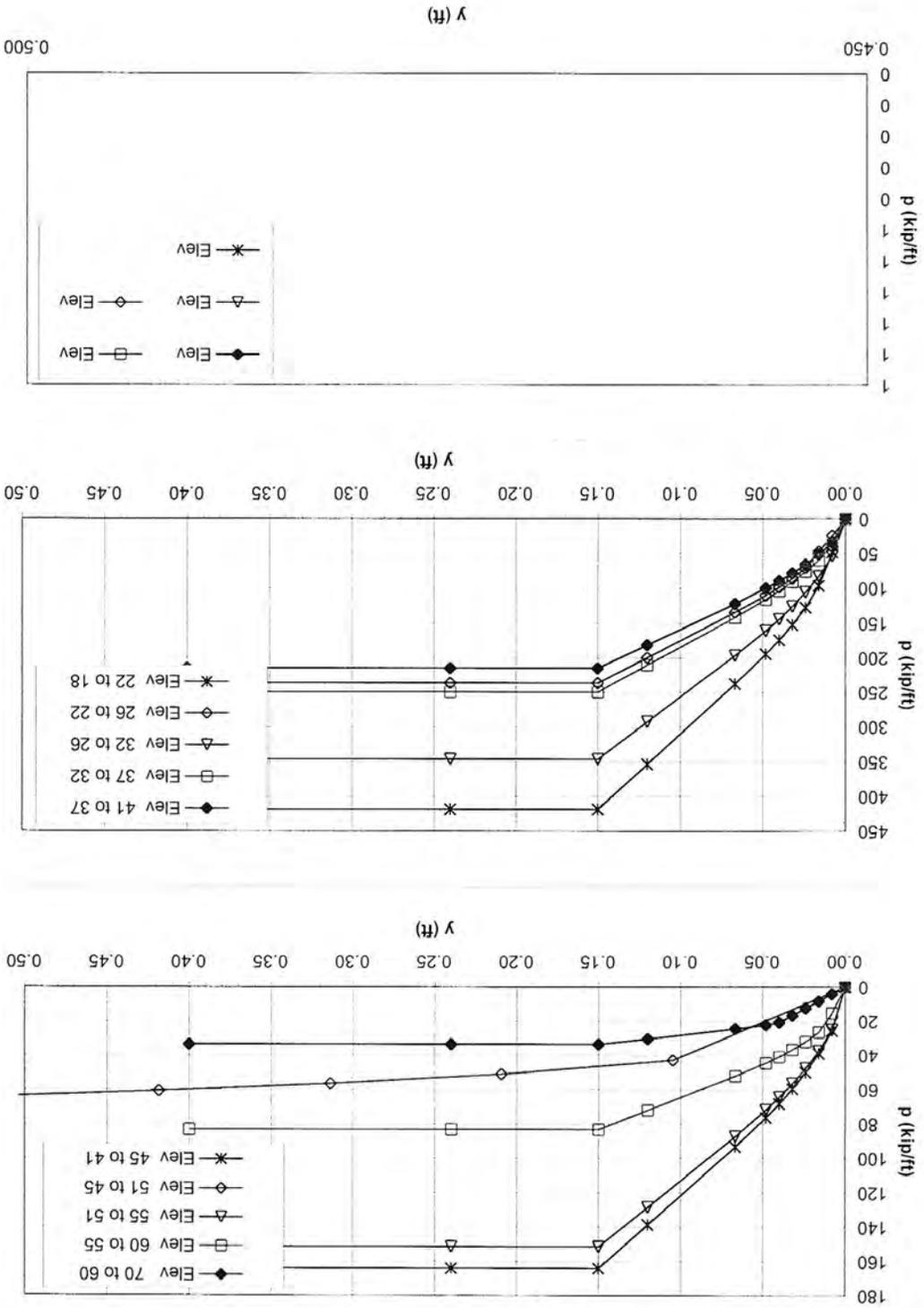


Soil Profile

p-y Curves

Sta. **Laguna De Santa Rosa**
Abutment 4
O.G. 70.0
Cut-off 45.0
Pile 4' CISS
GWS 52.0

Laguna De Santa Rosa
 04-Son-12
 04-1A2900



Memorandum

*Flex your power!
Be energy efficient!*

To: STEWART LEE
District Branch Chief
Office of Design SHOPP

Date: June 15, 2012

Attention: Bach-Yen Nguyen

File: 04-SON-12
PM 9.63
Replace Bridge
04246-1A2900

From: PAULA KINDINGER-WILCOX
Materials Design Engineer
Engineering Services I-Materials B

Concurred by: TINU MISHRA, P.E.
District Materials Engineer
District Branch Chief, Materials A

Subject: Review and Comments on the 65% PS&E

This memo is in response to your request received on June 1, 2012 to review and comment on the 65% PS&E for the above mentioned project. This project proposes to remove and rebuild the existing Laguna De Santa Rosa Bridge on Route 12 in Sonoma County, and widen the approaches at both ends of the bridge to conform to the new structure. The new design raises the profile 2' 6" resulting in the approaches being raised 2' 6". Sidewalks and a bus stop will also be built in this project.

Plans

Typical X-Sections

Sheet X-1-X-4:

1. Cold plane the existing 0.10' OGAC prior to overlay
2. Show the existing structural section under HMA(A) overlay

Construction Details

Sheet C-1

1. The conforms should have a 1:200 ratio. The mainline paving conform for Sta. 24+25 to 24+55 is too short.
2. Under curbs and gutters place 0.5' AB(2)
3. Show structural section for the Temporary Pedestrian Walkway
4. Show the dike detail

Sheet C-10

1. The permeable material shown here may not stay in place, cement treated permeable base material will work better. Even with cement treated permeable base material there is potential for the material below it to washout and the PM Material will become plugged with fines over time. To help slow down the fines entering the PM material, a filter fabric should be placed between the soil and PM Material.

Quantities

1. Include quantities for crack sealing and Replace Asphalt Concrete Surfacing (digouts) which must be done prior to any overlay.
2. Show quantities for the AB which needs to be placed under curbs
3. The bus stop should be listed under minor concrete
4. Add quantities for the LCB for the base of bus stop and dowels for the bus stop
5. Add quantities for the pavement from Sta. 18.94 to 19.70

SSPs:

1. Use attached SSP 15-2.02
2. 39-1.01: Fill in the blank for Para. 1 with the word Standard, cross out Para. 2,3,4&5
3. Delete 39-1.30 Edge Treatment, Hot Mix Asphalt Pavement

BEES:

1. Include quantities for the bus stop which include LCB, minor concrete and dowel bars
2. Include a quantity for crack sealant
3. Include a quantity for Replace Asphalt Concrete Surfacing (digouts)
4. Since this project does not use QCQA Hot Mix Asphalt, delete the incentive item regarding it.

If you have any questions, please call Paula Kindinger-Wilcox at 286-4692.

c: TMishra, PKindinger-Wilcox, Route File, Daily File

Memorandum

*Flex your power!
Be energy efficient!*

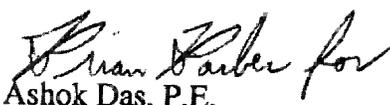
To: STEWART LEE
District Branch Chief
Office of Design SHOPP

Date: March 23, 2011

Attention: Bach-Yen Nguyen

File: 04-SON-12
PM 9.63
Replace Bridge
04246-1A2900

From: 
PAULA KINDINGER-WILCOX
Materials Design Engineer
Engineering Services I - Materials A

Concurred by: 
Ashok Das, P.E.
District Materials Engineer
District Branch Chief, Materials B

Subject: Updated Final Materials Recommendation

This memo is in response to your request dated March 21, 2011, requesting an updated memo for the above captioned project. The updates will change the temporary access road to a temporary construction access road and will include a section for use when the traffic is shifted to the area which had been a sidewalk on the bridge. This project proposes to remove and rebuild the existing Laguna De Santa Rosa Bridge on Route 12 in Sonoma County, and widen the approaches at both ends of the bridge to conform to the new structure. The new design raises the profile 2' 6" resulting in the approaches being raised 2' 6". Sidewalks and a bus stop will also be built in this project.

EXISTING FACILITY

Route 12 at PM 9.63 is a two lane undivided AC paved highway with non-standard shoulders up to 1 meter wide in each direction. According to as-builts, this section of roadway was constructed in 1940 consisting of .25' AC over 1.5' Imported Borrow. In 1987 a slurry seal was placed over the existing roadway under contract 120991 and in 1991 0.08' OGAC was placed over the existing surface under contract 189294.

DESIGN FACTORS

A. Traffic Index

The 20-year design TI for mainline widening, provided by Advanced Planning and Traffic Forecasting, is 10.

B. R-value

Based on test results, provided by personnel from the San Francisco Lab of District 4, the R-values within this project range from 47 to 64. We will use an R-value of 47 for the design of the roadway at grade, for fill or embankment sections, an R-value of 15 will be used.

I. RECOMMENDATIONS

For the approaches which will be raised up to 2.6', we recommend using full-depth Hot Mix Asphalt Type A (HMA-A), building up layer by layer, to reach the desired profile, with a 1:200 conform.

A. Fill Areas

Design Factors: $TI_{20} = 10$, $R_v = 15$, $G.E. = 2.72$

Option 1

<u>Traveled Way & Shoulders</u>	<u>G.E.</u>
0.55' HMA(A)	1.00'
0.85' AB(2)	0.94'
<u>0.95' AS(4)</u>	<u>0.95'</u>
2.35'	2.89'

Option 2

<u>Traveled Way & Shoulders</u>	<u>G.E.</u>
0.55' HMA(A)	1.00'
<u>1.65' AB(2)</u>	<u>1.81'</u>
2.20'	2.81'

B. Areas on Level Ground

Design Factors: $TI_{20} = 10$, $R_v = 47$, $G.E._{req.} = 1.70'$

<u>Traveled Way & Shoulders</u>	<u>G.E.</u>
0.55' HMA(A)	1.00'
<u>0.75' AB(2)</u>	<u>0.83'</u>
1.30'	1.83'

C. Sidewalk: 4" PCC / 6" AB(2)

D. Bus Stop:

1. 0.85' JCPC with dowel bars at transverse joints / 0.50' LCB or HMA(A) See attached directions and Figure 626.4
2. Since this option may be very expensive and time consuming due to the requirements of JCPC, Minor concrete with Dowels may be used over LCB. This section should be 0.85' PCC / 0.50' LCB.

E. Temporary Access Road for Construction Vehicles:

0.65' AB(2)

II. ADDITIONAL DESIGN RECOMMENDATIONS

- We recommend using the same structural section for traveled way and shoulders
- Cold plane any existing OGAC
- Dig out and repair localized distressed areas to a depth of 0.50' and clean and seal all cracks wider than 1/4" before placing the recommended overlays
- Shoulder backing will be necessary where the overlay is less than 0.50'
- Use Standard Plans, page A88A, for curb ramps
- For the sidewalk area on the structure, which will be converted to traveled way to handle traffic during construction, we recommend: Sawcut and remove the PCC from the existing base. Use 0.30' HMA to build up to the existing HMA section on the bridge.

III. CORROSION INVESTIGATIONS

In February 2010, Caltrans San Francisco Materials Laboratory performed a corrosion study analysis in accordance with the requirements of California Test Method 643, and using California culvert criteria and ALTIPIPE. The analysis used test data from samples collected at each existing culvert location and other requested locations to determine alternative pipe culverts allowed, giving a 50 year service life. The pH values and resistivity readings (Ohms-cms) range from 7.4 to 7.8 and 3444 to 3320, respectively. Based on the analysis of the study, the attached table of alternative pipe recommendations should be used.

Specifications:

- Corrugated steel, corrugated aluminum pipe (CAP), or corrugated aluminized steel pipe (CASP) shall conform to Section 66 of the Standard Specifications

STEWART LEE

March 23, 2011

Page 4

- Standard Reinforced Concrete Pipe may be used and shall conform to Section 65 of the Standard Specifications
- For concrete facilities, use Standard Type II concrete Specifications. Cement must conform to Section 90 of the Standard Specifications
- Plastic Pipe may be used for a 50 year service life. It shall be high density polyethylene (HDPE), conforming to Section 64 of the Standard Specifications. Reference should be made regarding durability in Section 854.8 of the Highway Design Manual

If you have any questions, please call Paula Kindinger-Wilcox at 286-4692.

c: ADas, Route File, Daily File

Memorandum

*Flex your power!
Be energy efficient!*

To: STEWART LEE

Date: March 17, 2010

District Branch Chief
Office of Design SHOPP

Attention: Bach-Yen Nguyen

File: 04-SON-12
PM 9.63
Replace Bridge
04246-1A2900



From: PAULA KINDINGER-WILCOX
Materials Design Engineer
Engineering Services I - Materials A

Concurred by: Ashok Das, P.E.
District Materials Engineer
District Branch Chief, Materials B

Subject: Materials Recommendation

This memo is in response to your request dated January 29, 2010, requesting the Materials Recommendation for the above captioned project. This project proposes to remove and rebuild the existing Laguna De Santa Rosa Bridge on Route 12 in Sonoma County, and widen the approaches at both ends of the bridge to conform to the new structure. The new design raises the profile 2' 6" resulting in the approaches being raised 2' 6".

EXISTING FACILITY

Route 12 at PM 9.63 is a two lane undivided AC paved highway with non-standard shoulders up to 1 meter wide in each direction. According to as-builts, this section of roadway was constructed in 1940 consisting of .25' AC over 1.5' Imported Borrow. In 1987 a slurry seal was placed over the existing roadway under contract 120991 and in 1991 0.08' OGAC was placed over the existing surface under contract 189294.

DESIGN FACTORS

A. Traffic Index

The 20-year design TI for mainline widening, provided by Advanced Planning and Traffic Forecasting, is 10.

B. R-value

Based on test results provided by personnel from the San Francisco Lab of District 4, the R-values within this project range from 47 to 64. We will use an R-value of 47 for the design of the roadway in cut and at grade sections. For fill sections, an R-value of 15 will be used.

I. RECOMMENDATIONS

According to the latest plan, sheets L-1 thru L-2, roadway sections approaching the proposed bridge will be built on the existing pavement, with a 1:200 conform, making approximately 500' of existing pavement to be overlaid.

We recommend using full-depth Hot Mix Asphalt Type A (HMA-A) for the first 110' of pavement beginning at the conform building up to 0.55' of HMA-A. From that point on AB(2) may be used as filler directly upon the existing AC pavement with a minimum of 0.55' HMA-A above the AB(2) or full depth HMA-A may be continued to achieve the proposed grade.

A. FILL AREAS

Design Factors: $TI_{20} = 10$, $R_v = 15$, $G.E. = 2.72$

Option 1

Traveled Way & Shoulders G.E.

0.55' HMA(A)	1.00'
0.85' AB(2)	0.94'
<u>0.95' AS(4)</u>	<u>0.95'</u>
2.35'	2.89'

Option 2

Traveled Way & Shoulders G.E.

0.55' HMA(A)	1.00'
<u>1.65' AB(2)</u>	<u>1.81'</u>
2.20'	2.81'

B. AREAS on LEVEL GROUND

Design Factors: $TI_{20} = 10$, $R_v=47$, $G.E._{req.} = 1.70'$

<u>Traveled Way & Shoulders</u>	<u>G.E.</u>
0.55' AC(A)	1.00'
<u>0.75' AB(2)</u>	<u>0.83'</u>
1.30'	1.83'

C. SIDEWALK: 4" PCC / 6" AB(2)

II. ADDITIONAL DESIGN RECOMMENDATIONS

- We recommend using the same structural section for traveled way and shoulders.
- Cold plane any existing OGAC
- Dig out and repair localized distressed areas to a depth of 0.50' and clean and seal all cracks wider than 1/4" before placing the recommended overlays.
- Shoulder backing will be necessary where the overlay is less than 0.50'

III. CORROSION INVESTIGATIONS

In February 2010, Caltrans San Francisco Materials Laboratory performed a corrosion study analysis in accordance with the requirements of California Test Method 643, and using California culvert criteria and ALPIPE. The analysis used test data from samples collected at each existing culvert location and other requested locations to determine alternative pipe culverts allowed, giving a 50 year service life. The pH values and resistivity readings (Ohms-cms) range from 7.4 to 7.8 and 3444 to 3320, respectively. Based on the analysis of the study, the attached table of alternative pipe recommendations should be used.

Specifications:

- Corrugated steel, corrugated aluminum pipe (CAP), or corrugated aluminized steel pipe (CASP) shall conform to Section 66 of the Standard Specifications.
- Standard Reinforced Concrete Pipe may be used and shall conform to Section 65 of the Standard Specifications.

Stewart Lee
March 17, 2010
Page 4

- For concrete facilities, use Standard Type II concrete Specifications. Cement must conform to Section 90 of the Standard Specifications.
- Plastic Pipe may be used for a 50 year service life. It shall be high density polyethylene (HDPE), conforming to Section 64 of the Standard Specifications. Reference should be made regarding durability in Section 854.8 of the Highway Design Manual.

If you have any questions, please call Paula Kindinger-Wilcox at 286-4692.

c: ADas, Route File, Daily File

Memorandum

*Flex your power!
Be energy efficient!*

To: STEWART LEE
District Branch Chief
Office of Design SHOPP

Attention: Bach-Yen Nguyen

Date: August 20, 2008

File: 04-SON-12
PM 9.63
Replace Bridge
04246-1A2900

From: PAULA KINDINGER-WILCOX
Materials Design Engineer
Engineering Services I - Materials A

Concurred by: TINU MISHRA, P.E.
District Materials Engineer
District Branch Chief, Materials A

Subject: Materials Recommendation

This memo is in response to your request to revise our recommendations, given on July 23rd, to give a structural section for the maximum 2' 6" overlay on the existing pavement, building up to the new proposed height of the bridge. This project proposes to remove and rebuild the existing Laguna De Santa Rosa Bridge on Route 12 in Sonoma County, and widen the approaches at both ends of the bridge to conform to the new structure. The new design raises the profile 2' 6" resulting in the approaches being raised 2' 6". We understand that the previously planned temporary access road is no longer planned.

EXISTING FACILITY

Route 12 at PM 9.63 is a two lane undivided AC paved highway with non-standard shoulders up to 1 meter wide in each direction. According to as-builts, this section of roadway was constructed in 1940 consisting of .25' AC over 1.5' Imported Borrow. In 1987 a slurry seal was placed over the existing roadway under contract 120991 and in 1991 0.08' OGAC was placed over the existing surface under contract 189294.

RECOMMENDATIONS

Roadway sections approaching the bridge assuming the proposed approaches will be built on the existing pavement with a 1:200 conform making approximately 500' of pavement overlaid.

Stewart Lee
August 20, 2008
Page 2

We recommend using full depth Hot Mix Asphalt (HMA) for the first 110' of pavement beginning at the conform building up to .55' of HMA. From that point on AB(2) may be used as filler directly upon the existing AC pavement with a minimum of .55' HMA above the AB or full depth HMA may be continued to reach the necessary 3'.

For the widened areas use the following section

Design Factors: $TI_{20} = 10$, $R_v = 15$, $G.E._{req} = 2.72'$

Option 1

Traveled Way & Shoulders G.E.

0.55' AC(A)	1.00'
0.85' AB(3)	0.94'
<u>0.95' PM(3)</u>	<u>0.95'</u>
2.35'	2.89'

Option 2

Traveled Way & Shoulders G.E.

0.55' AC(A)	1.00'
<u>1.65' AB(3)</u>	<u>1.81'</u>
2.20'	2.87'

Shoulder backing will be necessary where the overlay is less than 0.50'. Use attached SSP 19-720.

The above recommendations are only for use in the preparation of the preliminary estimate. Final recommendations will be made when we receive a request for pavement design in the PS&E phase.

If you have any questions, please call Paula Kindinger-Wilcox at 286-4692.

c: ADas, Route File, Daily File, dg

*California Department of Transportation
Division of Maintenance*

Structure Maintenance and Investigations

B_{RIDGE}

I_{NSPECTION}

R_{ECORDS}

I_{NFORMATION}

S_{YSTEM}

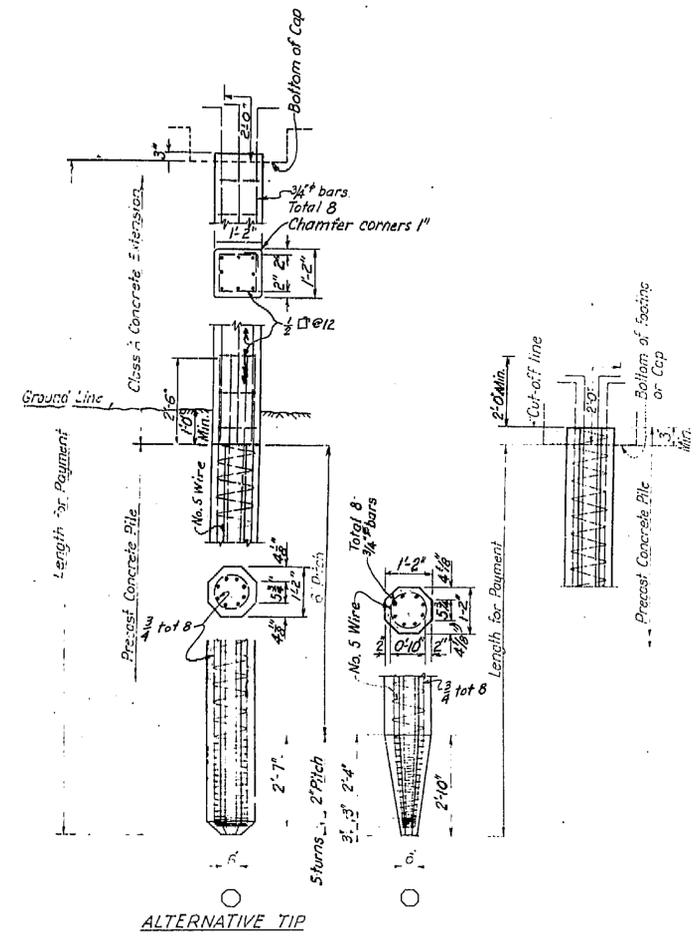
The requested documents have been generated by BIRIS.

These documents are the property of the California Department of Transportation and should be handled in accordance with Deputy Directive 55 and the State Administrative Manual.

Records for “Confidential” bridges may only be released outside the Department of Transportation upon execution of a confidentiality agreement.

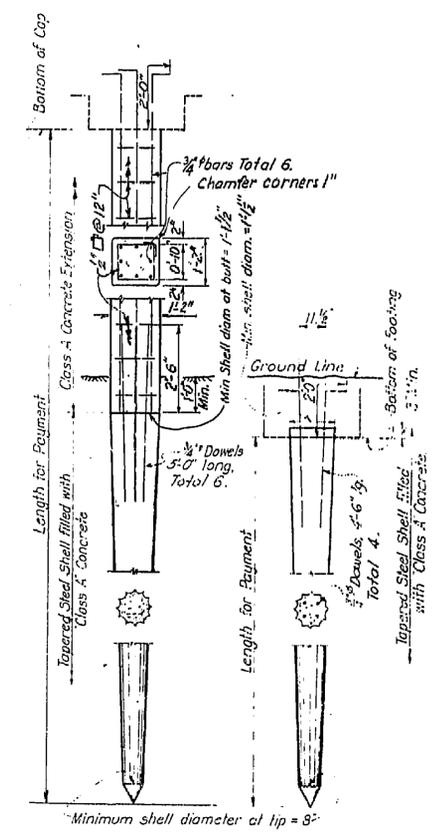
11 Jan 12
 August 10, 1925

BRIDGE DEPARTMENT



**PRECAST CONCRETE PILE
 ALTERNATIVE "A"**

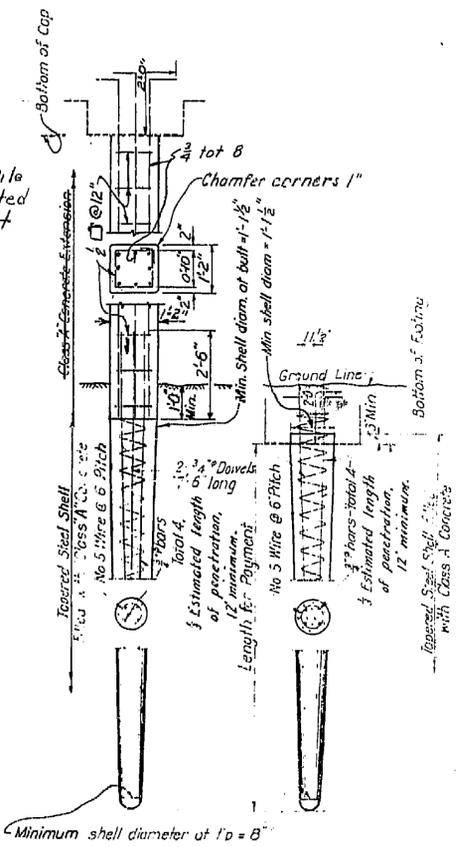
Design Load 27 tons
 Drive to 35 tons bearing value.



**CAST-IN-PLACE CONCRETE PILE
 ALTERNATIVE "B"**

Design Load 27 tons
 Drive to 32 tons bearing value.

Raymond Step Taper Pile
 Extended To Caps & Painted
 with Two Coats of Paint



**CAST-IN-PLACE CONCRETE PILE
 ALTERNATIVE "C"**

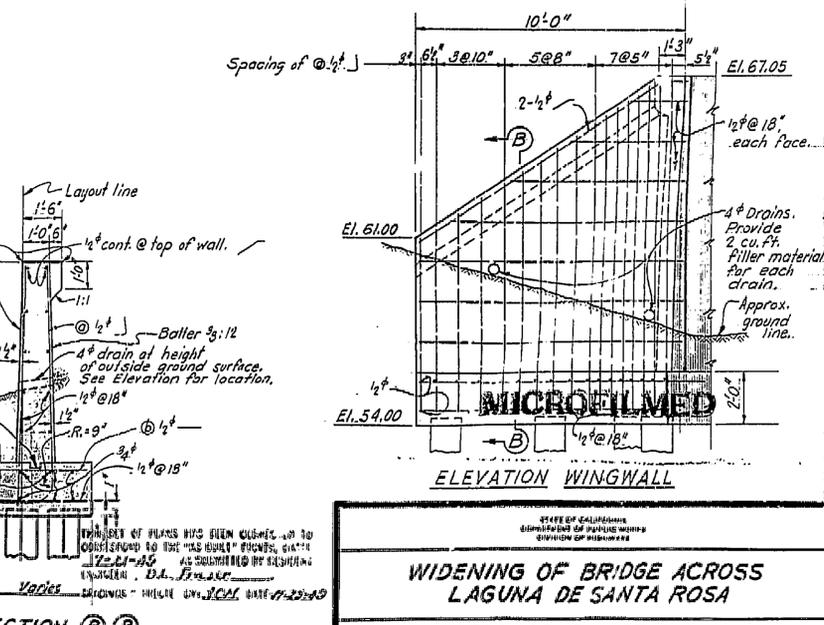
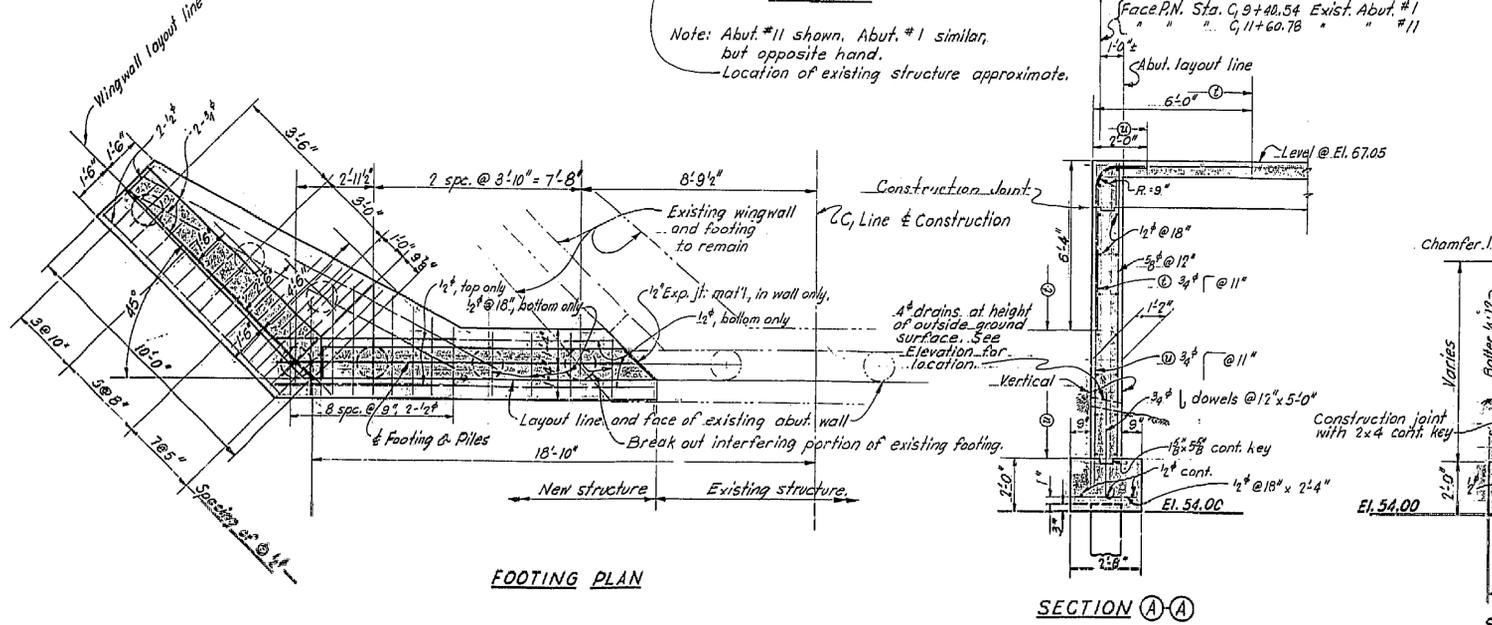
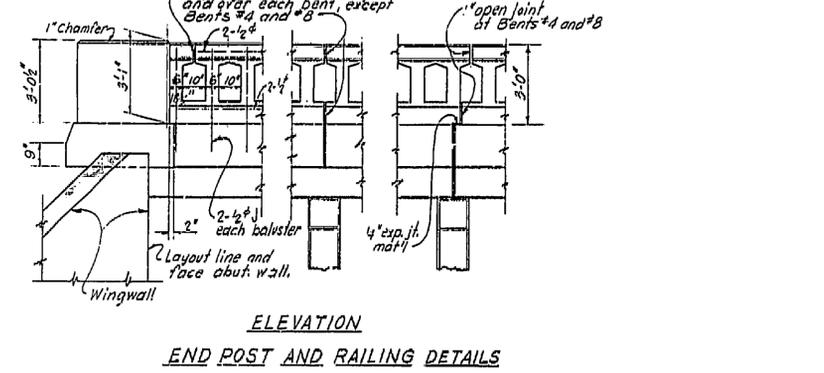
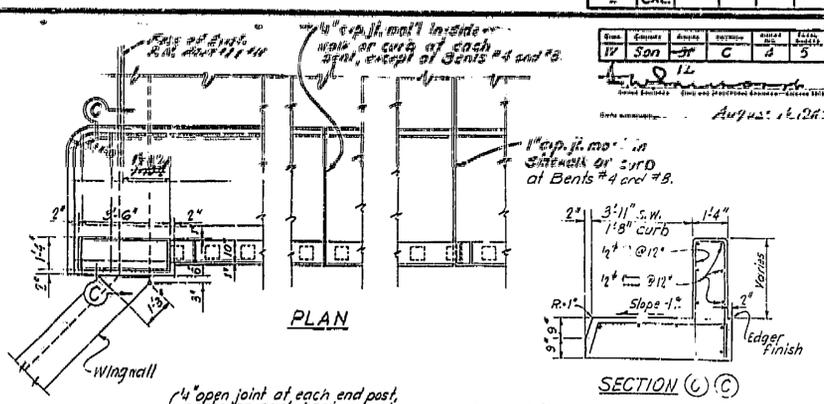
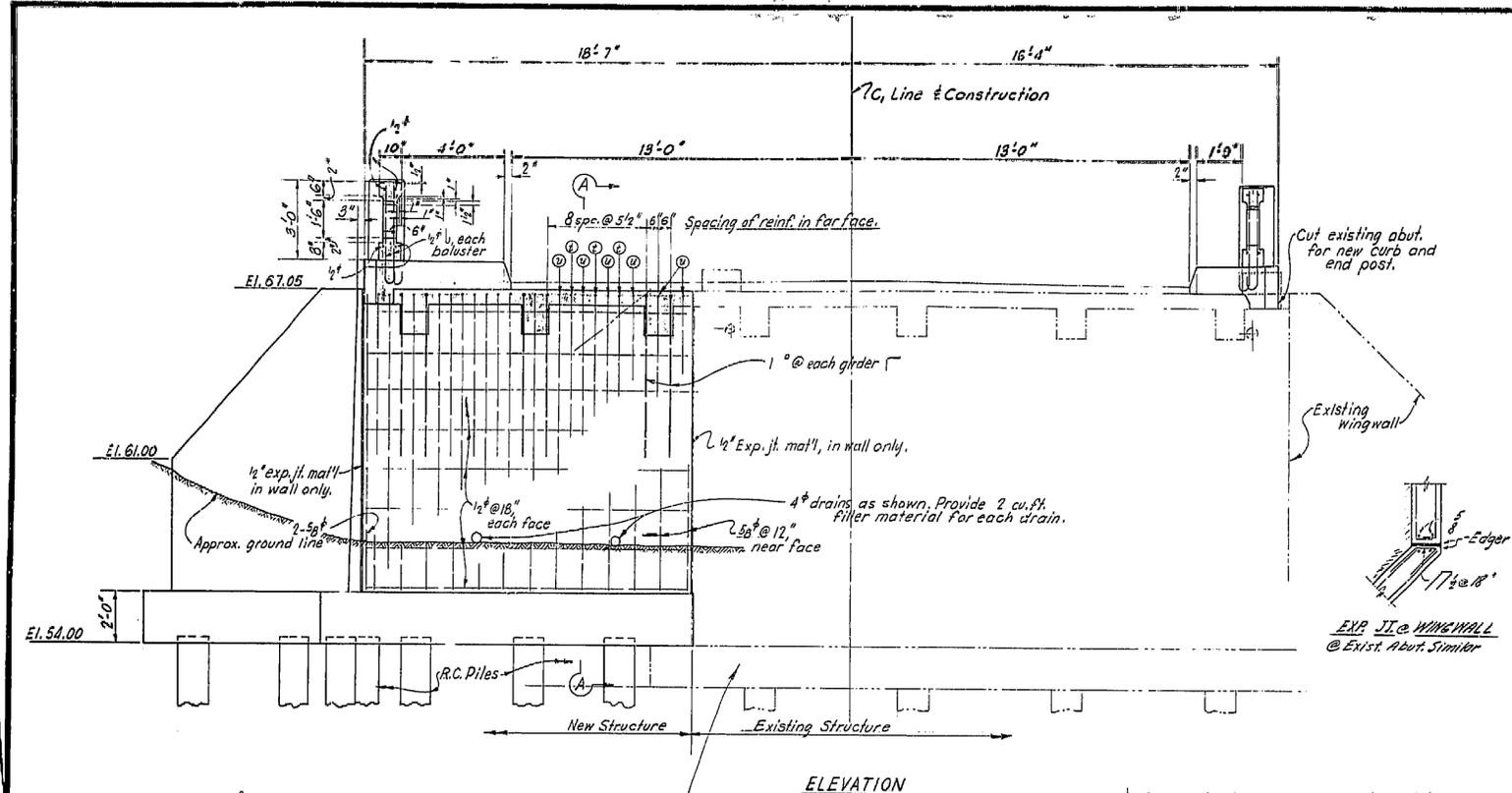
Design Load 27 tons
 Drive to 32 tons bearing value.

AS BUILT PLANS
 Contract No. 47626
 Date Completed _____
 Document No. 40002229

**WIDENING OF BRIDGE ACROSS
 LAGUNA DE SANTA ROSA
 PILE DETAILS**
 Bridge No. 20-35
 DRAWING NO. C-2140-5

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN
 UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO
 AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.
 DATE: April 23, 1971 SIGNATURE: [Signature] TITLE: Highway Administrator

NO.	DATE	BY	REVISION
1			
2			
3			
4			
5			



STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

**WIDENING OF BRIDGE ACROSS
LAGUNA DE SANTA ROSA**

ABUTMENT DETAILS

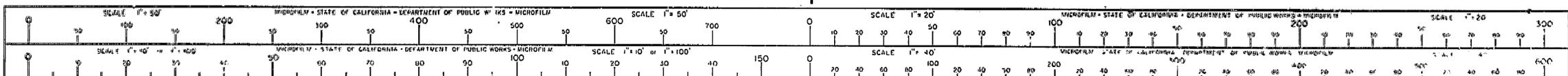
SCALE 1/8" = 1'-0" BRIDGE 20-5 FILE DRAWING C-240-4

AS BUILT PLANS
Contract No. 472-71
Date Completed
Document No. 40002229

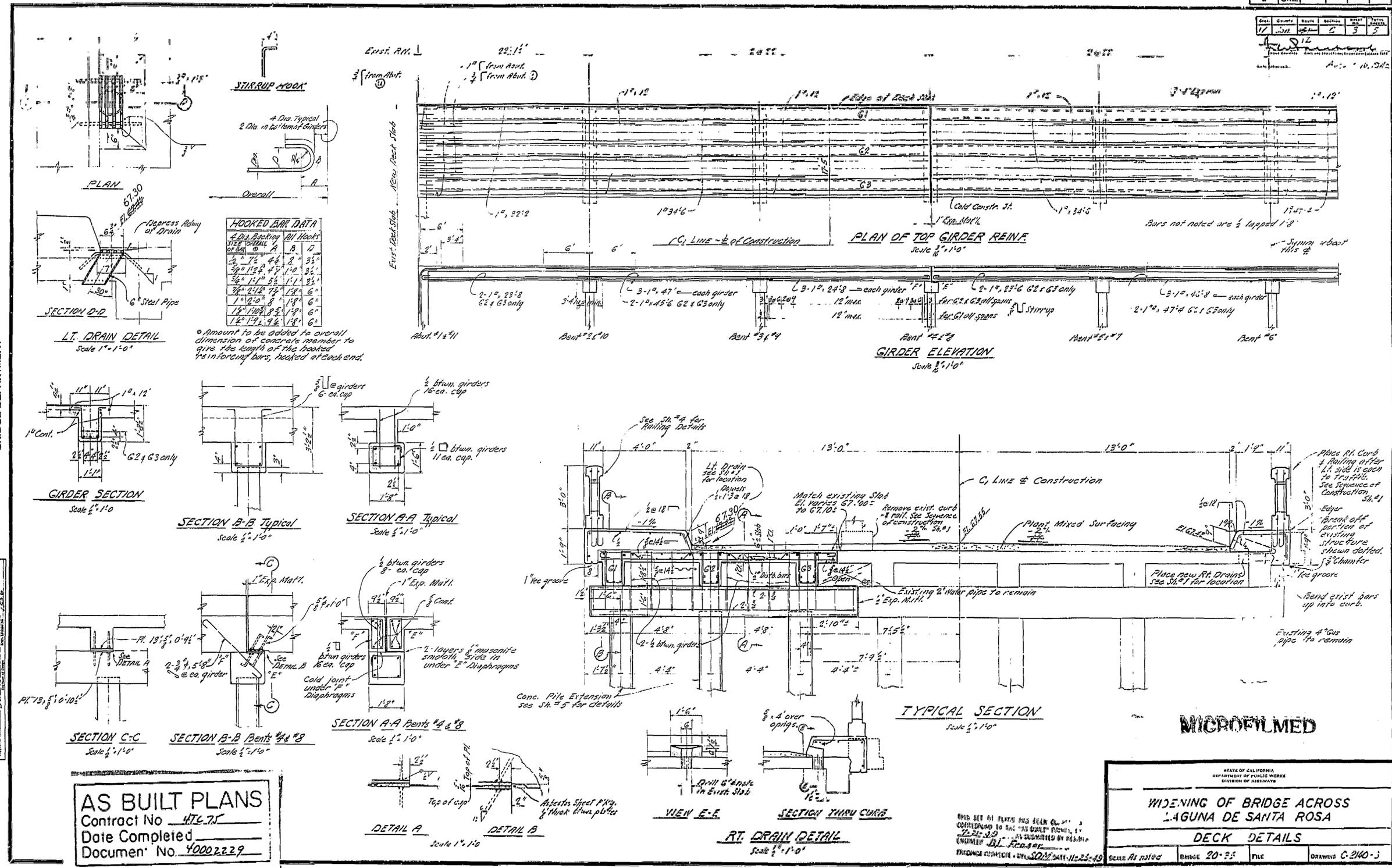
DESIGNED BY	DATE
CHECKED BY	DATE
DRAWN BY	DATE
IN CHARGE	DATE
APPROVED BY	DATE

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT GIVEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN ACCORDANCE WITH THE AUTHORITY AND AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

DATE: 10/22/71



DATE	BY	CHKD.	APP'D.
1/17/59	JL	CS	CS



MICROFILMED

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

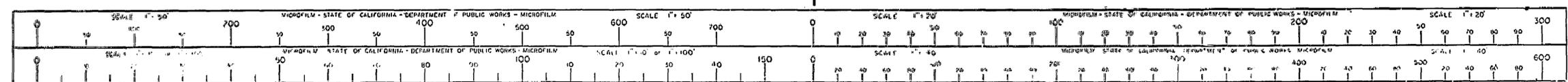
**WIDENING OF BRIDGE ACROSS
LAGUNA DE SANTA ROSA**

DECK DETAILS

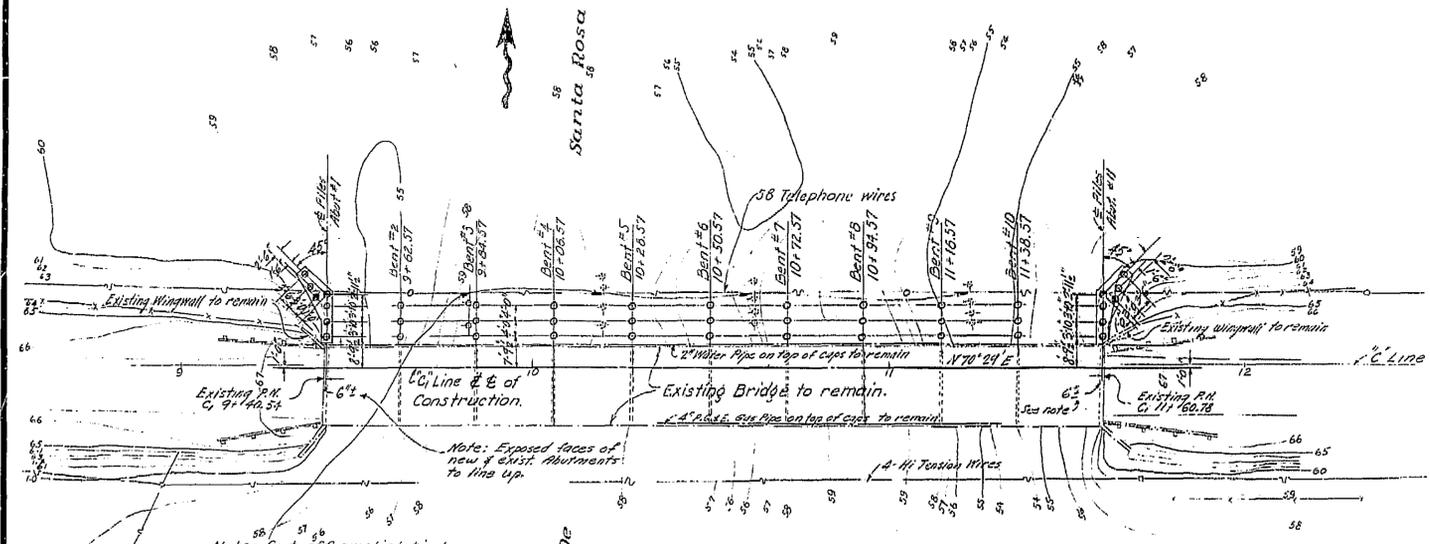
SCALE AS NOTED BRIDGE 20-55 FILE DRAWING C-240-3

I HEREBY CERTIFY THAT THIS IS A TRUE AND CORRECT COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY SUPERVISION AND CONTROL ON THIS DATE IN ALHAMBRA, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

DATE 1/22/59

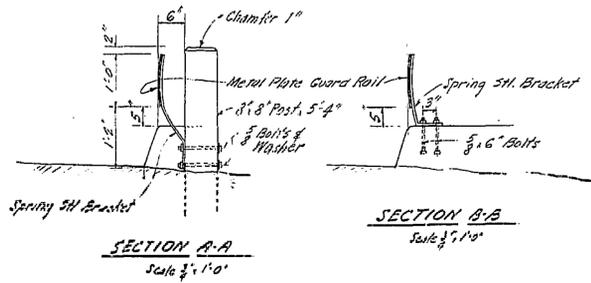


BRIDGE DEPARTMENT



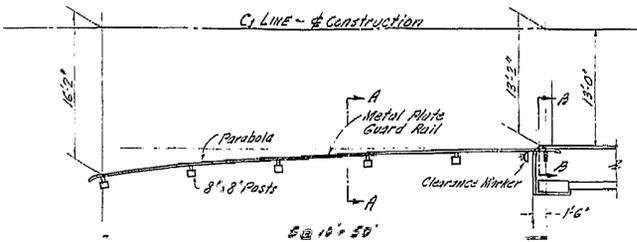
FOUNDATION PLAN
Scale: 1" = 20'

-B.M. Y-204
Std. Brass Disc in Wing Wall
North end Br. No. 20-35
Stamped Y-204 1935
Elev. 67.08

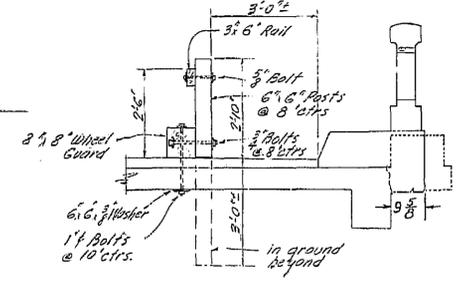


SECTION A-A
Scale 3/4" = 1'-0"

SECTION B-B
Scale 3/4" = 1'-0"



PLAN OF GUARD RAIL
Scale 3/4" = 1'-0"



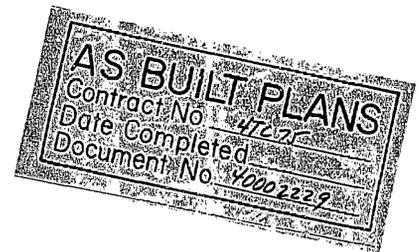
TEMPORARY RAILING
Scale 1/2" = 1'-0"

To be installed with replacing 1st Railing.

THIS SET OF PLANS HAS BEEN CAREFULLY CHECKED TO THE "AS BUILT" POINT. T-21-49 SUBMITTED BY ENGINEER B.L. EBASER. TRACINGS CORRECTED BY S.O.M. DATE 11-25-49

GENERAL NOTES

Specifications:
Design; A.A.S.H.O. dated 1944 with subsequent revisions and Bridge Department Supplement dated 1944.
Construction; State of California, Division of Highways Standard Specifications dated April, 1945 and the Special Provisions accompanying this set of plans.
Live Loading; H20-316-44.
Unit Stresses; f_c -1000 p.s.i., f_s -16000 p.s.i., n -10
Pile Loading; For Conc. Pile Br. #20-35 = 27 Tons
For Timber Piles Br. #20-36 = 24 Tons
Contractor to verify all dependent dimensions in the field.

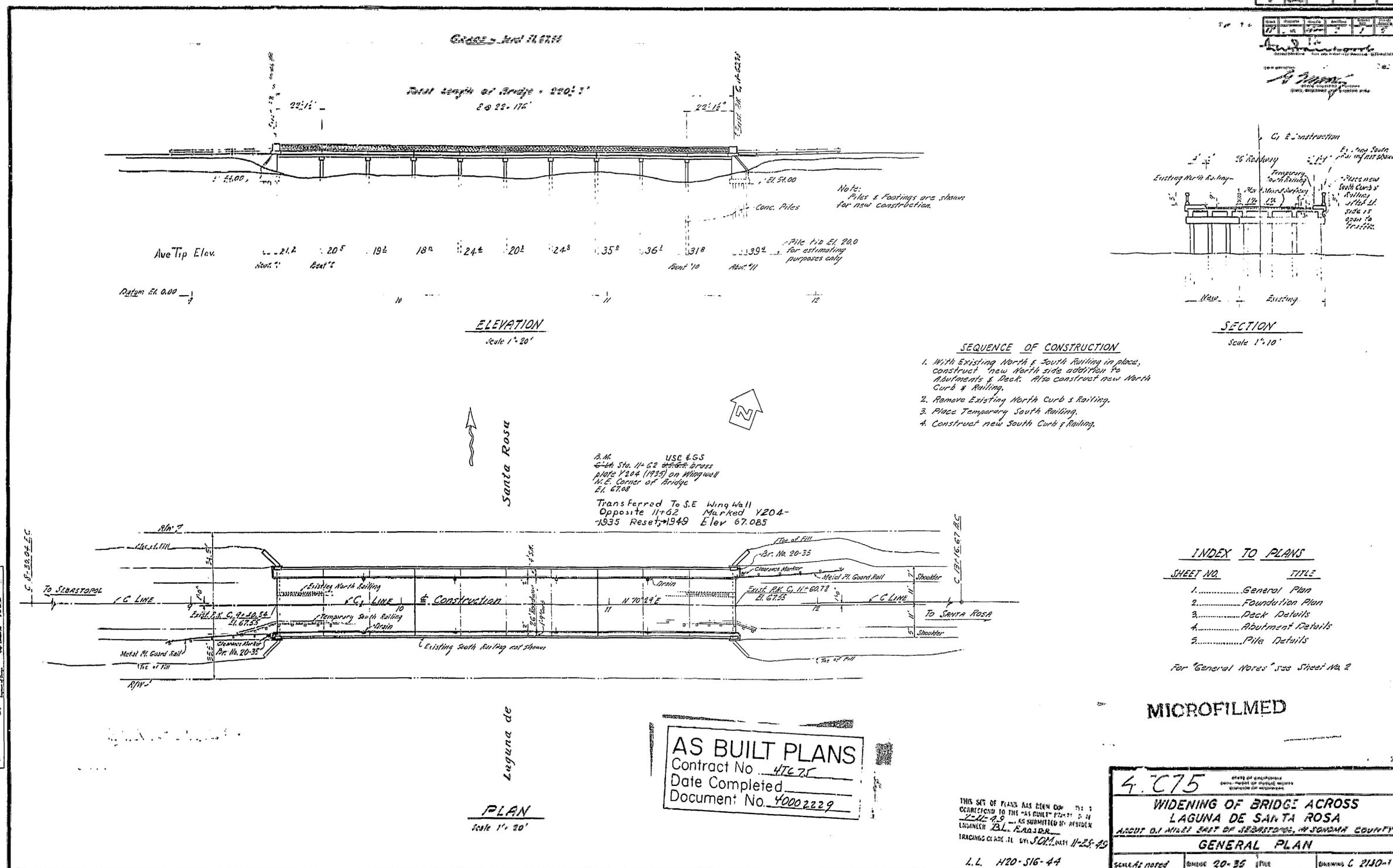


MICROFILMED

STATE OF CALIFORNIA DEPARTMENT OF PUBLIC WORKS DIVISION OF HIGHWAYS			
WIDENING OF BRIDGE ACROSS LAGUNA DE SANTA ROSA			
FOUNDATION PLAN			
SCALE AS NOTED	BRIDGE 20-35	FILE	DRAWING C-240-2

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.
DATE April 24 1971 SIGNATURE [Signature] TITLE Highway Administration Officer

DATE	BY	REVISION	BY
2	CALL		



BRIDGE DEPARTMENT

APPROVED BY	DATE
DESIGNED BY	DATE
CHECKED BY	DATE
QUANTITIES BY	DATE
SPECIFICATIONS BY	DATE
APPROVED BY	DATE

AS BUILT PLANS
 Contract No. 47675
 Date Completed _____
 Document No. 40002229

MICROFILMED

4. C75

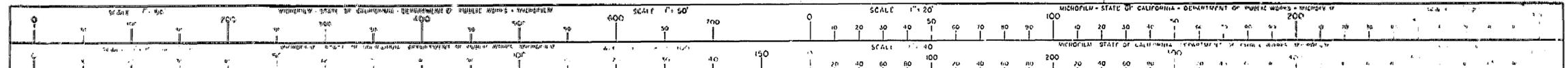
WIDENING OF BRIDGE ACROSS
LAGUNA DE SANTA ROSA
ABOUT 0.1 MILES EAST OF SEBASTOPOLE, IN SONOMA COUNTY

GENERAL PLAN

SCALE: AS NOTED SHEET NO. 20-35 FILE DRAWING C 2110-1

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ORIGINAL PLANS TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN ACCORDANCE WITH THE AUTHORITY OF THE DIRECTOR OF PUBLIC WORKS.

DATE: 11-25-29 SIGNATURE: _____



*California Department of Transportation
Division of Maintenance*

Structure Maintenance and Investigations

B_{RIDGE}

I_{NSPECTION}

R_{ECORDS}

I_{NFORMATION}

S_{YSTEM}

The requested documents have been generated by BIRIS.

These documents are the property of the California Department of Transportation and should be handled in accordance with Deputy Directive 55 and the State Administrative Manual.

Records for “Confidential” bridges may only be released outside the Department of Transportation upon execution of a confidentiality agreement.

QUANTITIES

TEMPORARY RAILING (TYPE K)	720	LF
BRIDGE REMOVAL (PORTION)	LUMP	SUM
TUBULAR HANDRAILING	220	LF
CONCRETE BARRIER (TYPE 26R MODIFIED)	220	LF
CONCRETE BARRIER (TYPE 27R MODIFIED)	220	LF

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Son	12	9.6/11.2	50	52

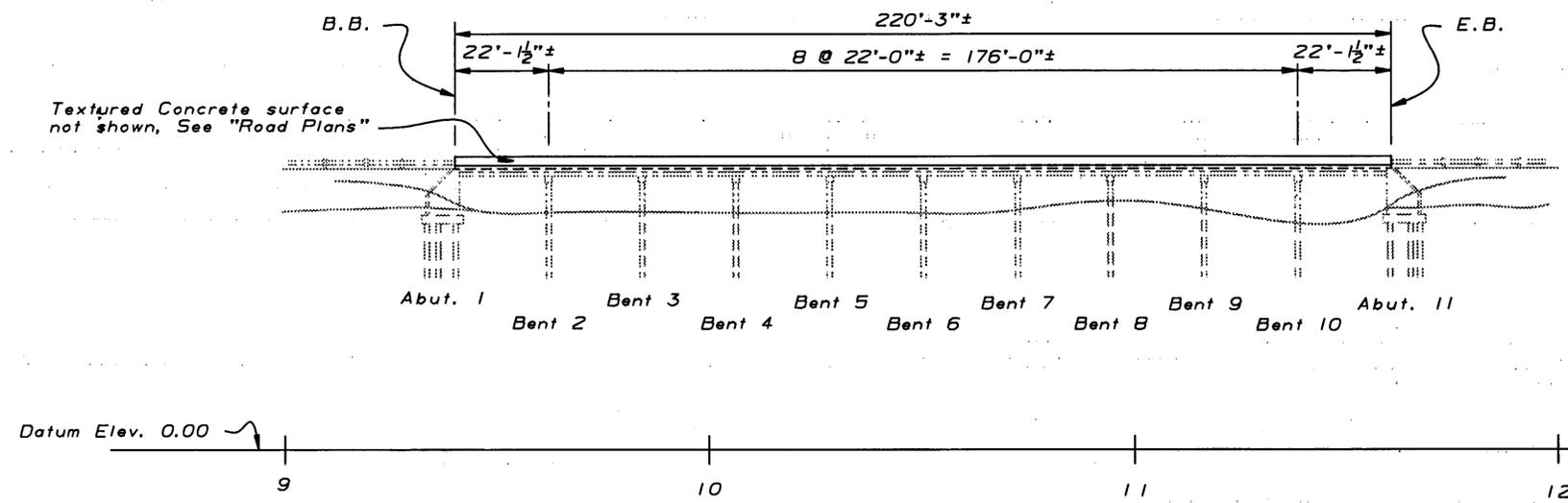
INDEX TO PLANS

SHEET NO.	TITLE
1.	GENERAL PLAN
2.	MISCELLANEOUS DETAILS NO.1
3.	MISCELLANEOUS DETAILS NO.2

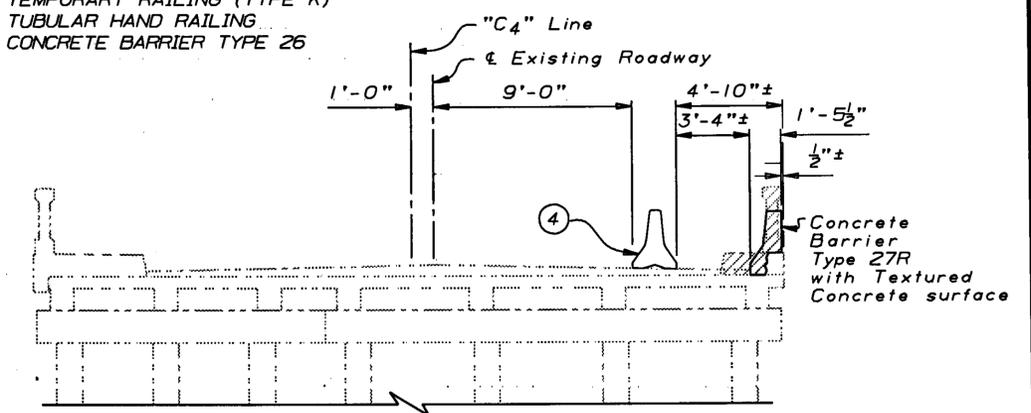
Mark Cuneo
REGISTERED ENGINEER - CIVIL

MARK P. CUNEO
No. 45409
Exp. 9-30-94
CIVIL
STATE OF CALIFORNIA

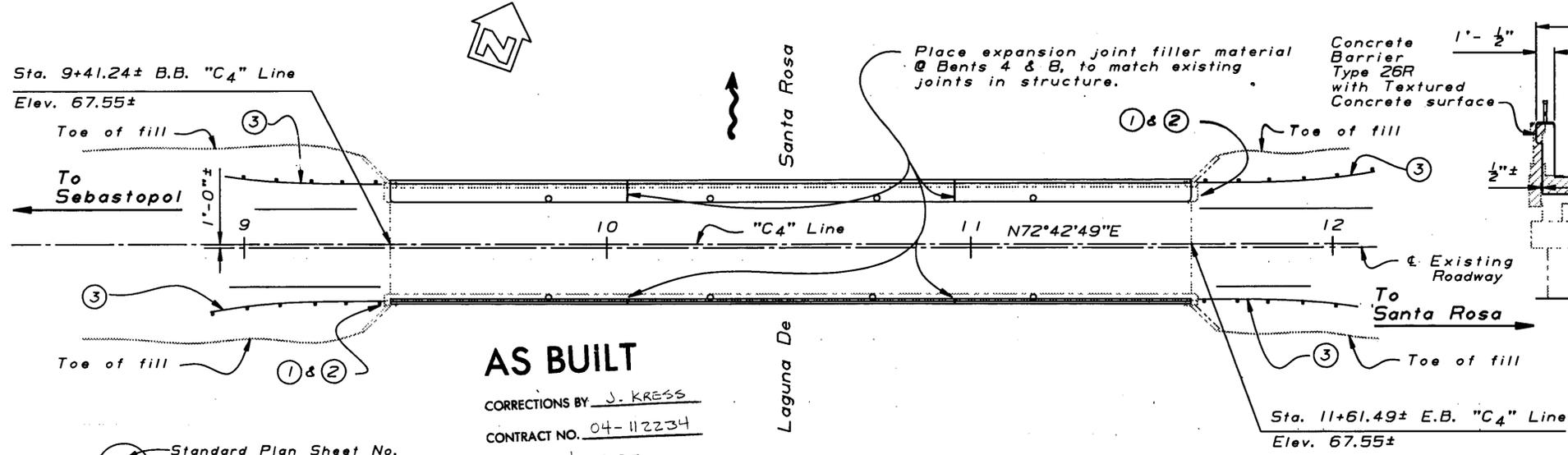
12-5-94
PLANS APPROVAL DATE



ELEVATION
Scale 1"=20'-0"



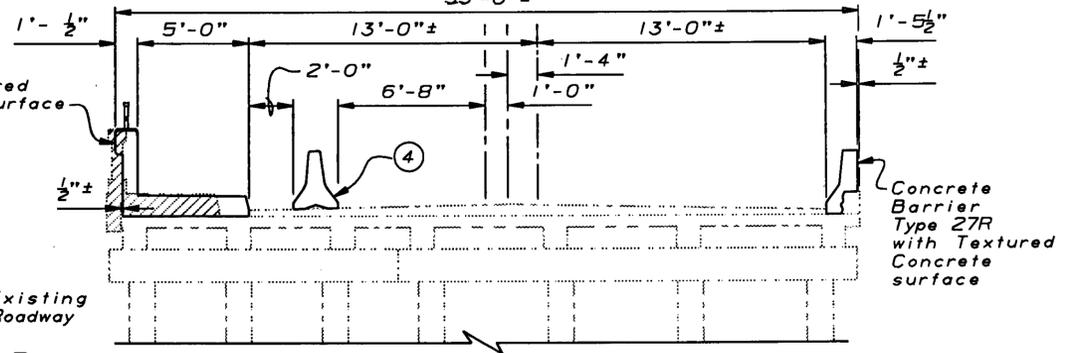
STAGE I
Scale 1/4"=1'-0"



AS BUILT

CORRECTIONS BY J. KRESS
CONTRACT NO. 04-112234
DATE 4-15-97
NO CORRECTIONS THIS SHEET SL

PLAN
Scale 1"=20'-0"



STAGE II
TYPICAL SECTION
Scale 1/4"=1'-0"

Indicates structural concrete to be removed

- Notes:
- ① Paint Bridge No. & Year
 - ② Paint Bridge Name
 - ③ MBGR, See "Road Plans" for details
 - ④ Temporary Railing - Type K, See "Road Plans" for details
 - Indicates existing Deck Drains, see "Miscellaneous Details No.2" sheet.

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

DESIGN ENGINEER <u>M. Hg 5-94</u>	DESIGN	BY Mark P. Cuneo 12-90	CHECKED Nazih Choughari 2-91	LOAD FACTOR	LIVE LOADING: HB20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	BRIDGE NO.	20-35	LAGUNA DE SANTA ROSA (RAIL UPGRADE) GENERAL PLAN	
	DETAILS	BY Stevy Lee 12-90	CHECKED Mark P. Cuneo 2-91	LAYOUT	BY Mark P. Cuneo 2-91		CHECKED Nazih Choughari 2-91	POST MILE		9.7
	QUANTITIES	BY Mark Moreno 2-91	CHECKED Stevy Lee 2-91	SPECIFICATIONS	BY Jill Sewell		PLANS AND SPECS COMPLETED	JILL SEWELL 5/4		

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

CU 04334
EA 112231

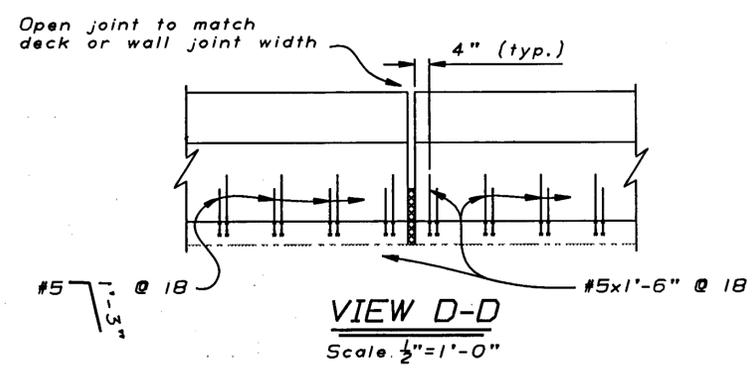
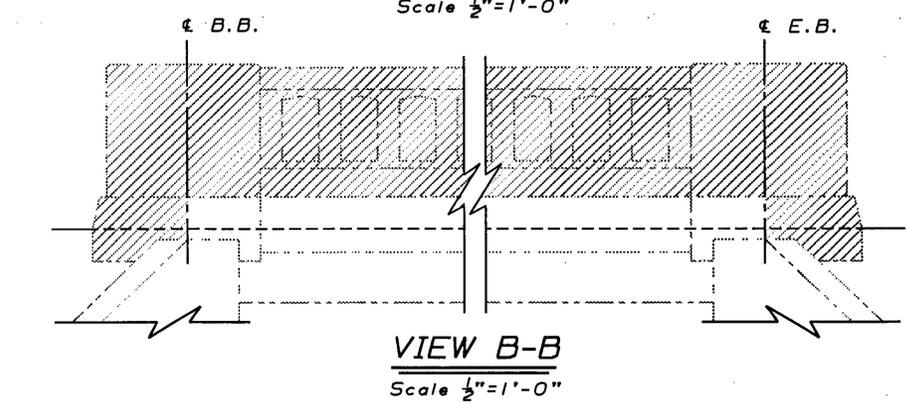
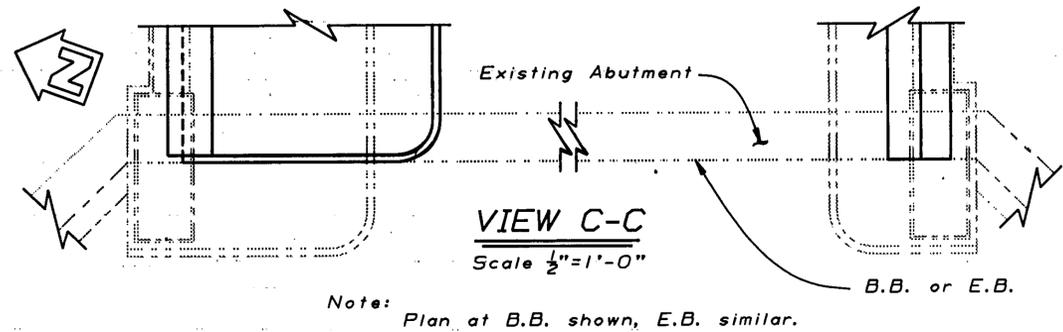
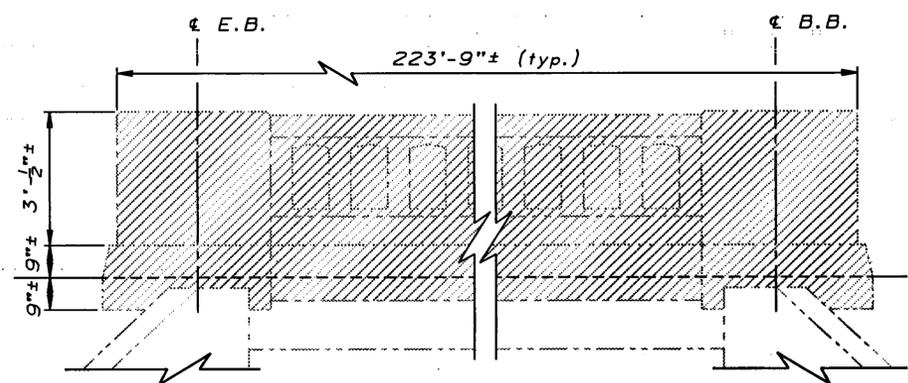
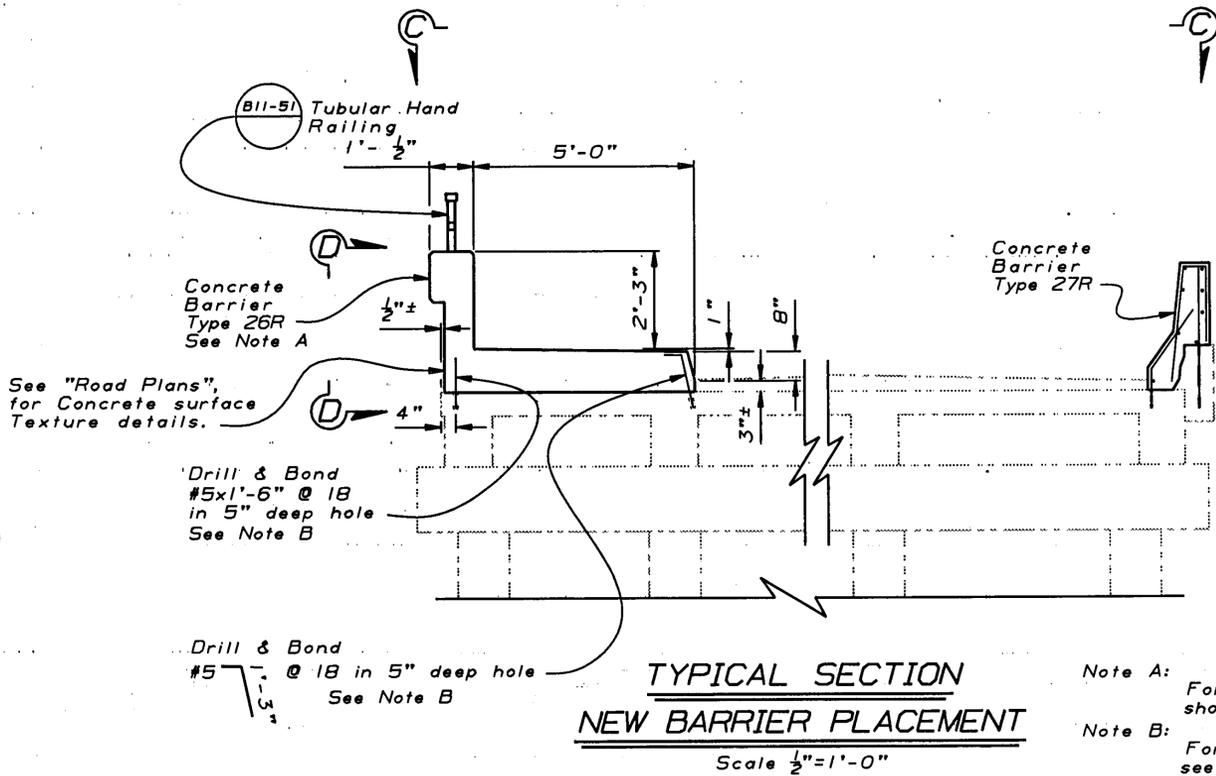
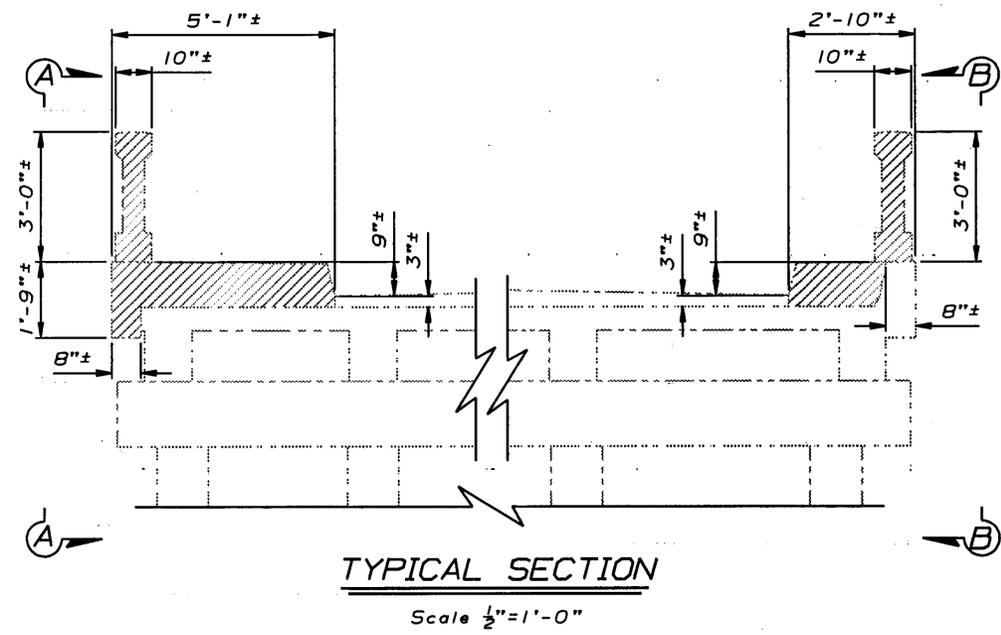
DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)								SHEET	OF
9-18-91	11-8-91	4-15-94	2-28-91	3-1-91	4-8-91	5-12-91	5-24-91	1	3

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Son	12	9.6/11.2	51	52

Mark Cuneo
 REGISTERED ENGINEER - CIVIL
 No. 45409
 Exp. 9-30-94
 CIVIL
 STATE OF CALIFORNIA

12-5-94
 PLANS APPROVAL DATE
 The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.



CONCRETE RAIL REMOVAL LIMITS

Indicates structural concrete to be removed

AS BUILT

CORRECTIONS BY: J. KREGUS

CONTRACT NO. 04-112234

DATE 4-15-97

NO CORRECTIONS THIS SHEET

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

DS OSD 2139 (CADD 4/89) ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3	DESIGN	BY Mark P. Cuneo 2-91	CHECKED Nazih Choughari 2-91	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION CU 04334 EA 112231	BRIDGE NO.	20-35	LAGUNA DE SANTA ROSA (RAIL UPGRADE) MISCELLANEOUS DETAILS NO.1	REVISION DATES (PRELIMINARY STAGE ONLY) 2-97 3-97 4-97 5-97 6-97 7-97 8-97 9-97 11-8-91	SHEET 2 OF 3	
	DETAILS	BY Stevy Lee 2-91	CHECKED Mark P. Cuneo 2-91		DIVISION OF STRUCTURES	POST MILE				9.7
	QUANTITIES	BY Mark Moreno 2-91	CHECKED Stevy Lee 2-91		STRUCTURE DESIGN 4	DISREGARD PRINTS BEARING EARLIER REVISION DATES				

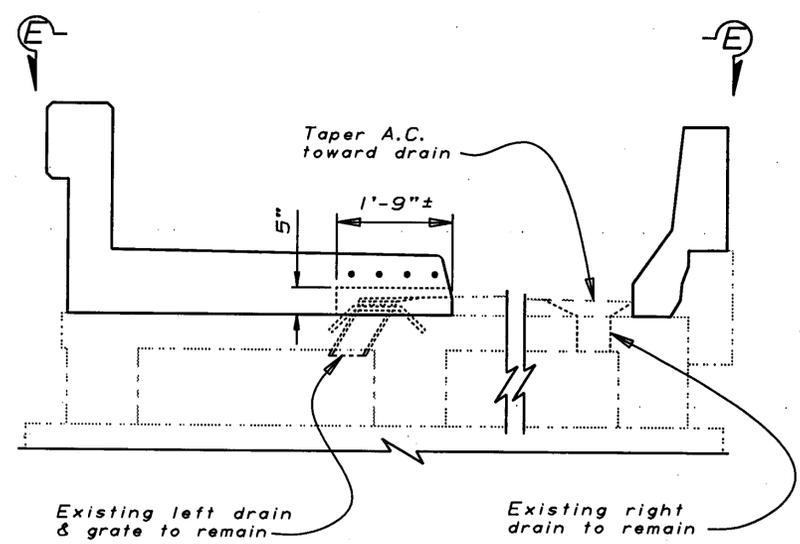
DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Son	12	9.6/11.2	52	52

Mark P. Cuneo
REGISTERED ENGINEER - CIVIL

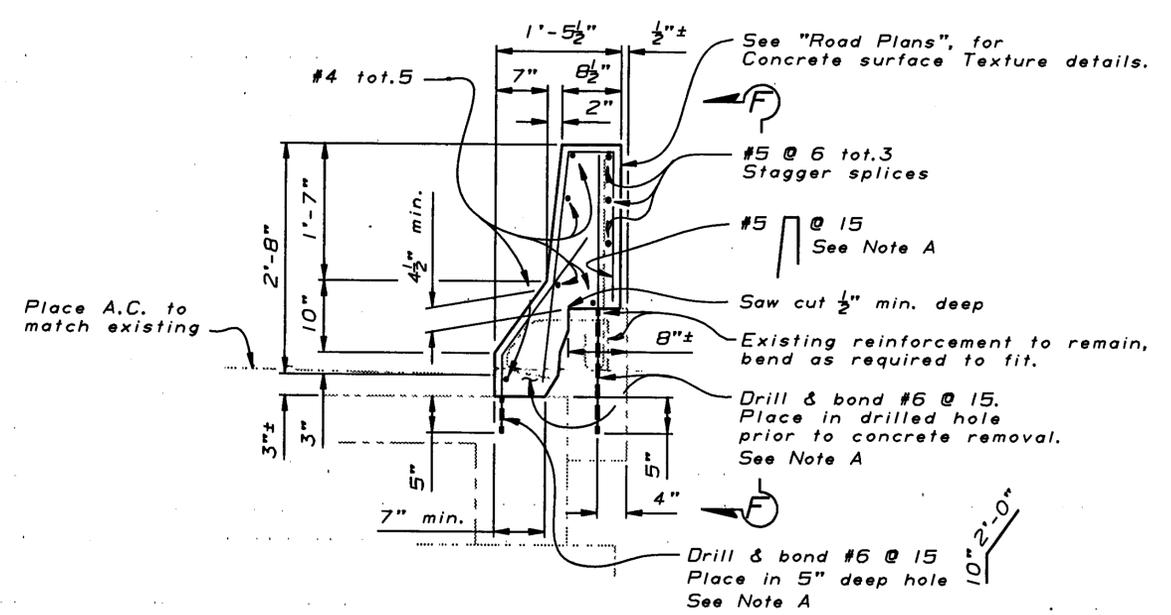
MARK P. CUNEO
No. 45409
Exp. 9-30-94
CIVIL
STATE OF CALIFORNIA

12-5-94
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.



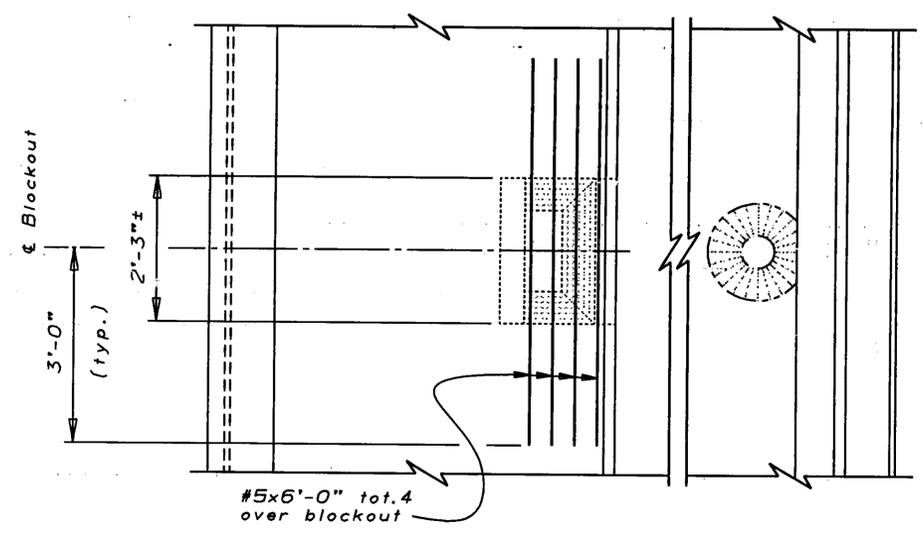
DECK DRAIN DETAIL
Scale 3/4"=1'-0"



CONCRETE BARRIER TYPE 27R
Scale 1"=1'-0"

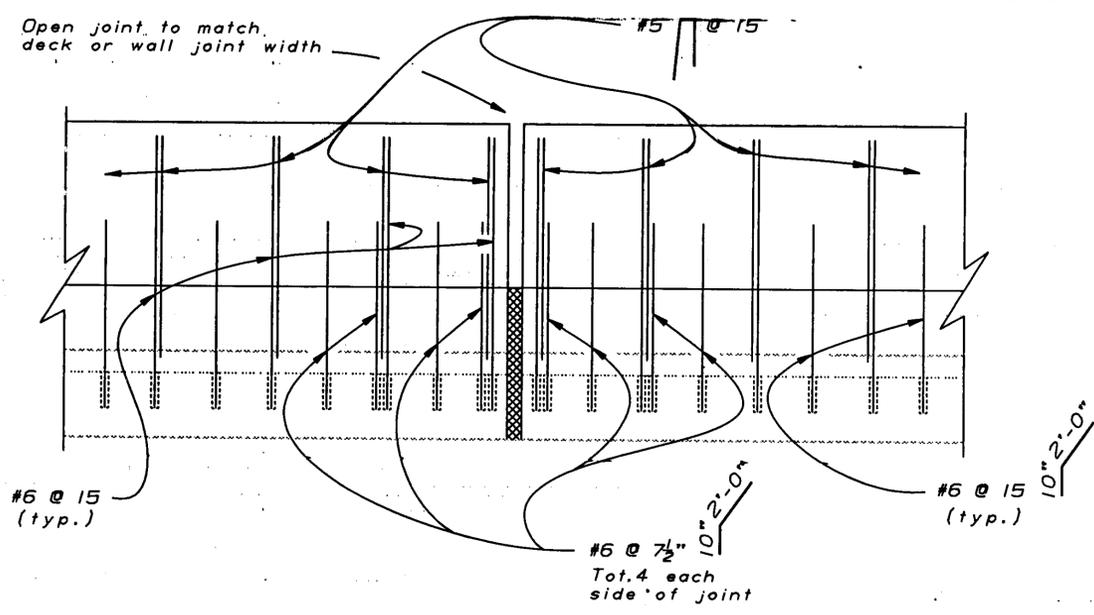
Note A: For reinforcement spacing at deck joints, see "View F-F".

Note: Clearance to reinforcing steel in barrier to be 1", except as noted. Longitudinal reinforcement to stop at all expansion joints.



VIEW E-E
Scale 3/4"=1'-0"

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



VIEW F-F
Scale 1"=1'-0"

AS BUILT

CORRECTIONS BY J. KRESS
CONTRACT NO. 04-112234
DATE 4-15-97
NO CORRECTIONS THIS DATE

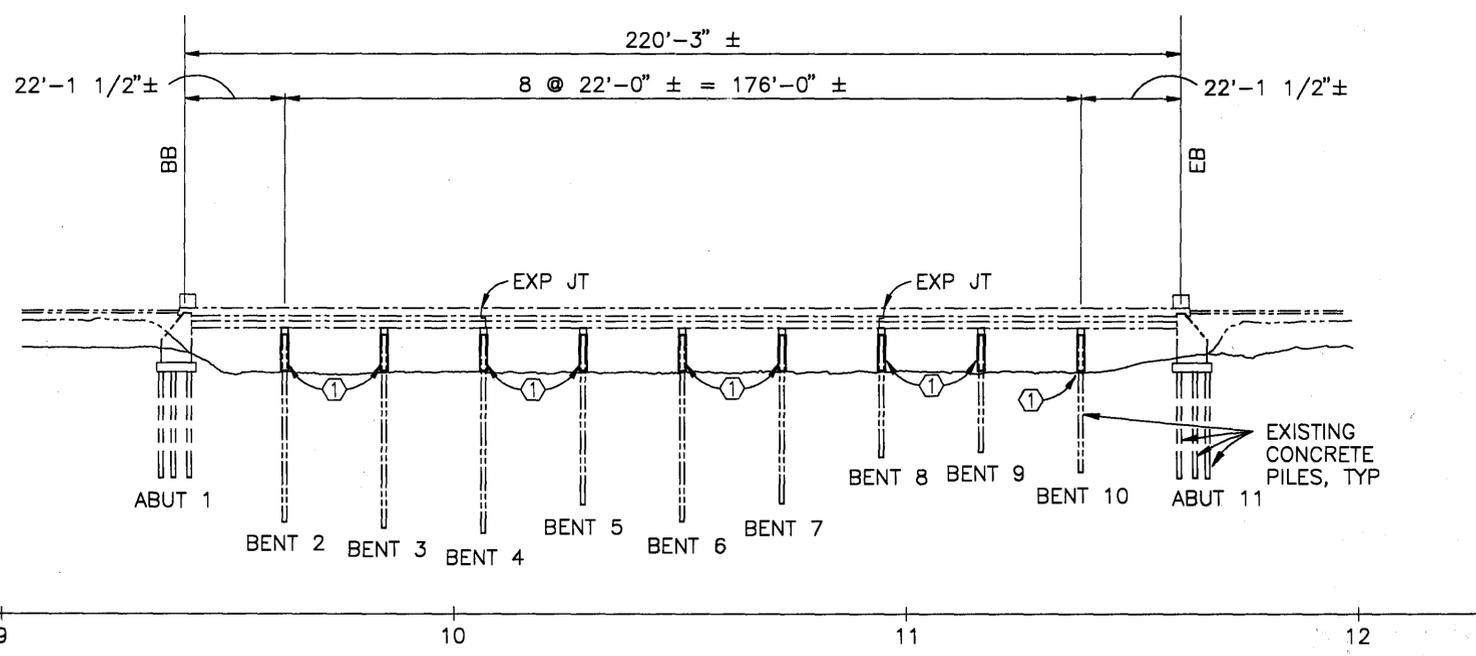
DESIGN	BY Mark P. Cuneo 6-91	CHECKED Nazih Choughari 6-91	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN 4	BRIDGE NO.	LAGUNA DE SANTA ROSA (RAIL UPGRADE) MISCELLANEOUS DETAILS NO.2	
	DETAILS	BY Stevy Lee 6-91			CHECKED Mark P. Cuneo 6-91		20-35
	QUANTITIES	BY Mark Moreno 6-91			CHECKED Stevy Lee 6-91		POST MILE 9.7
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS				CU 04334 EA 112231	REVISION DATES (PRELIMINARY STAGE ONLY)		
0 1 2 3				DISREGARD PRINTS BEARING EARLIER REVISION DATES	5-10-91 6-10-91 8-17-91 11-8-91	SHEET 3 OF 3	

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Son	12,101	9.6/16.1, 24.9/29.4	26A	26

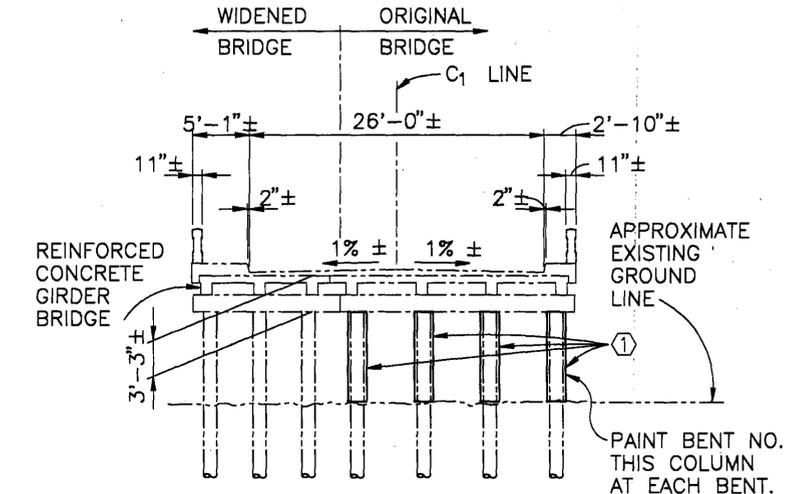
REGISTERED CIVIL ENGINEER		
11-14-94		
PLANS APPROVAL DATE		
BEN C. GERWICK, INC. 601 MONTGOMERY ST. SUITE 1400 SAN FRANCISCO, CALIFORNIA 94111		

LEGEND

- ① CLASS F STEEL CASING
- ② CABLE RESTRAINERS AND PIPE SEAT EXTENDERS
- INDICATES EXISTING WIDENING
- - - - - INDICATES EXISTING STRUCTURE
- INDICATES NEW CONSTRUCTION
- INDICATES DIRECTION OF TRAFFIC



ELEVATION
SCALE: 1"=20'-0"



TYPICAL SECTION
SCALE: 1/8"=1'-0"

AS BUILT

CORRECTIONS BY J. KRESS
 CONTRACT NO. 04-143204
 DATE 1/19/96 MET 28 Oct 96

NOTES:

- FOR EXISTING UTILITIES AND TRAFFIC CONTROL, SEE ROAD PLANS.

GENERAL NOTES

LOAD FACTOR DESIGN:

DESIGN: BRIDGE DESIGN SPECIFICATIONS (1983 AASHTO WITH INTERIMS AND REVISIONS BY CALTRANS)
 SEISMIC LOADING:
 PEAK ROCK ACCELERATION = 0.50g
 DEPTH OF ALLUVIUM = 80' TO 150'

REINFORCED CONCRETE

EXISTING (ASSUMED FOR RETROFIT EVALUATION) $f_y = 44,000$ PSI
 $f'_c = 5,000$ PSI
 NEW CONSTRUCTION: $f_y = 60,000$ PSI
 $f'_c = 3,250$ PSI

STRUCTURAL STEEL:

ASTM A36
 $F_y = 36,000$ PSI

CABLE RESTRAINERS:

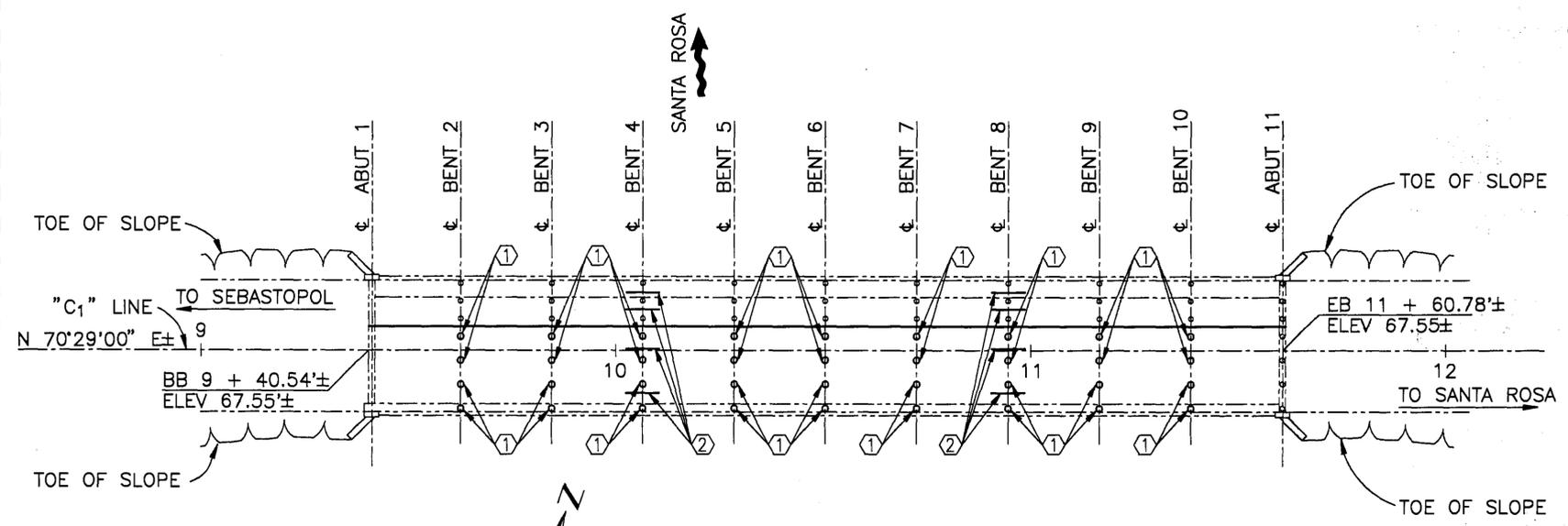
$f_y = 176,000$ PSI

STANDARD PLANS DATED JULY 1992

SHEET NO.	TITLE
A-10A	ABBREVIATIONS
A-10B	SYMBOLS

INDEX TO BRIDGE PLANS

SHEET NO.	TITLE
1	GENERAL PLAN
2	BENT RETROFIT DETAILS
3	HINGE RETROFIT DETAILS
4	STEEL COLUMN CASINGS



QUANTITIES

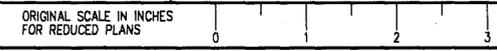
CORE CONCRETE (2" (3"))	36	LF
COLUMN CASING	15,700	LB
CORE CONCRETE (4")	11	LF
MISCELLANEOUS METAL (RESTRAINER - CABLE TYPE)	380	LB
MISCELLANEOUS METAL (RESTRAINER)	490	LB

1 ADDED PER ADDENDUM NO. 1 DATED DECEMBER 2, 1994

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

PLAN
SCALE: 1"=20'-0"

M. CULLEN DESIGN OVERSIGHT 11-1-94				DESIGN BY G. FOTINOS CHECKED P. BACH		LOAD FACTOR DESIGN CHECKED J. UZARSKI		PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO. 20-35 POST MILE 9.7		EARTHQUAKE RETROFIT PROJECT NO. 400 LAGUNA DE SANTA ROSA GENERAL PLAN			
SIGNOFF DATE		QUANTITIES BY A. HUSAIN CHECKED A. EZADDIN		SPECIFICATIONS BY K. SHUSHKEWICH CHECKED K. SHUSHKEWICH		PLANS AND SPECS COMPARED		PROJECT ENGINEER P. E. BACH		DISREGARD PRINTS BEARING EARLIER REVISION DATES		SHEET 1 OF 4			



CU 04
 EA 143201
 59Q042-3

06/30/94

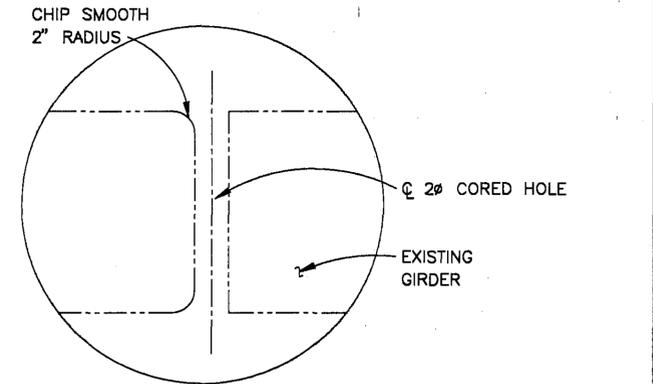
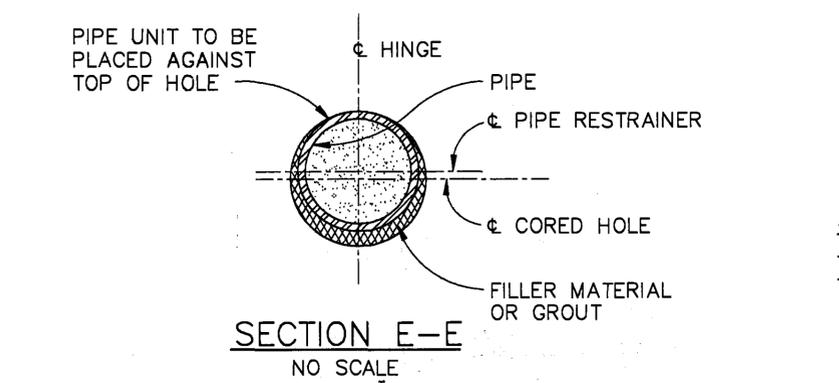
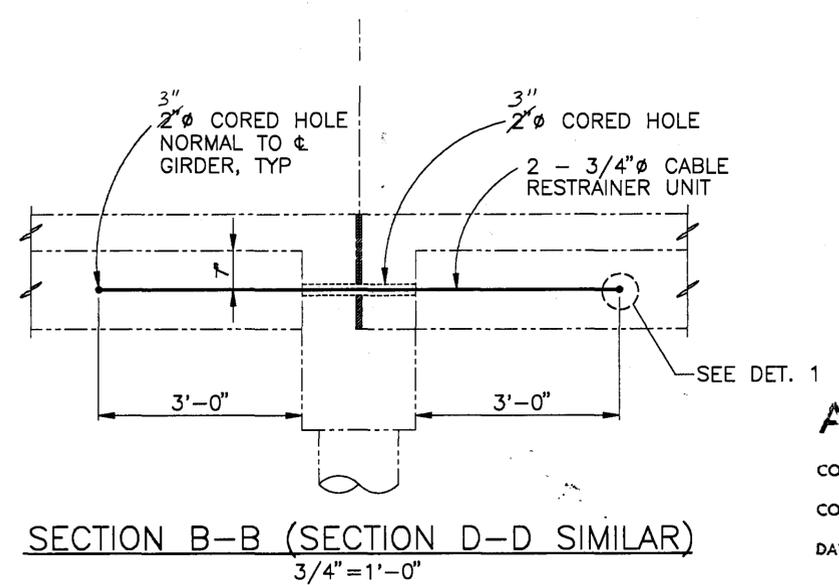
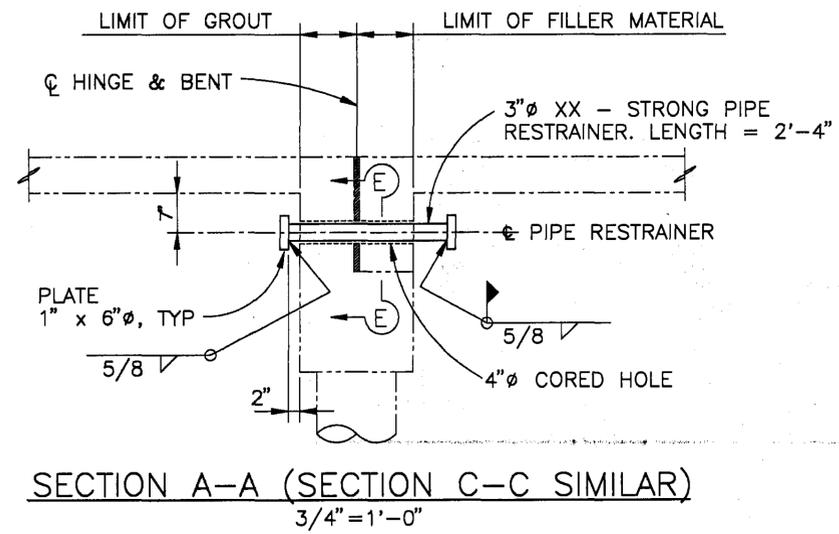
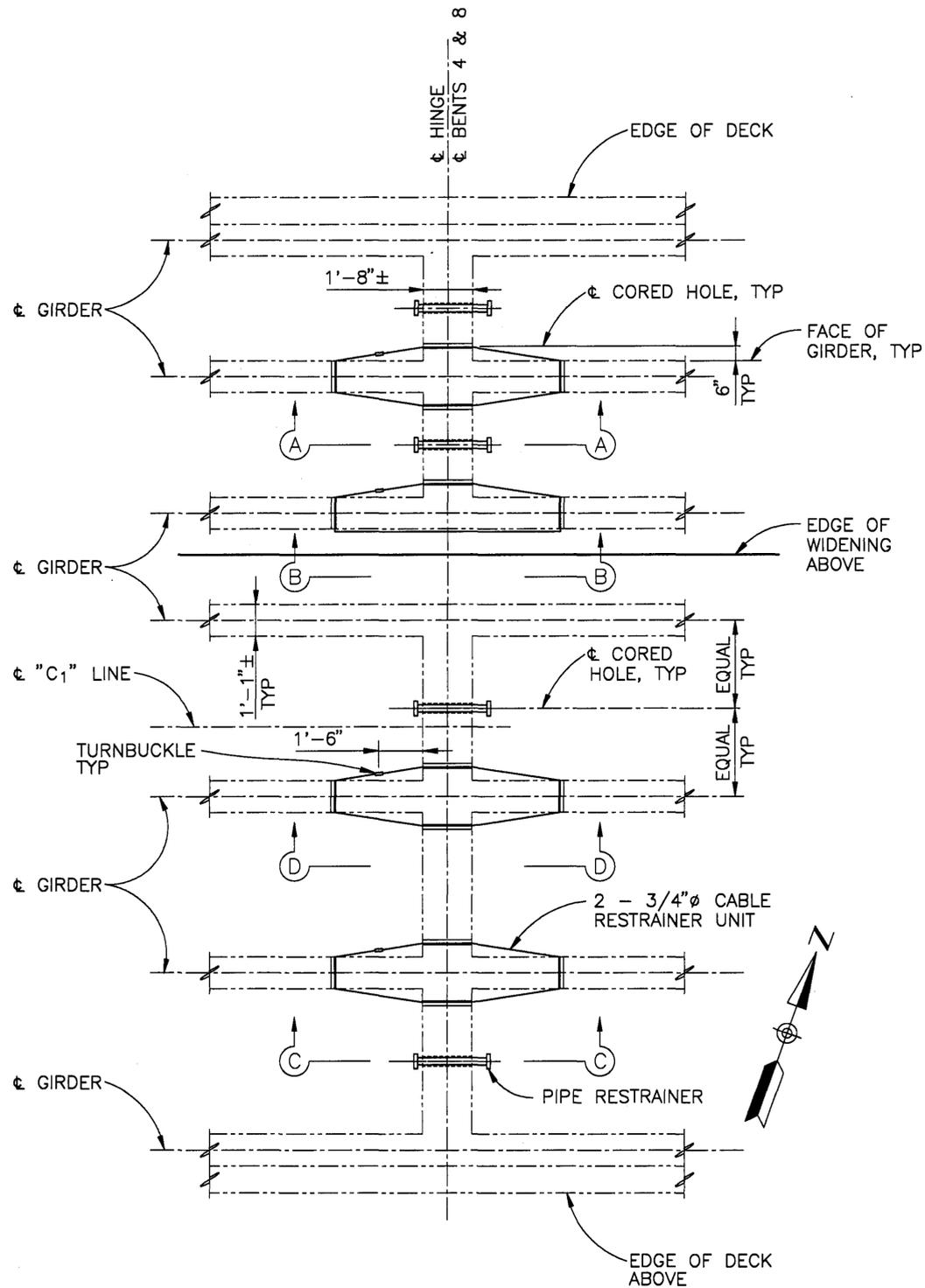
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	San	12,101	9.6/16.1, 24.9/29.4	26C	26

REGISTERED CIVIL ENGINEER
P. E. BACH
 No. C48130
 Exp. 6/30/96
 CIVIL
 STATE OF CALIFORNIA

11-14-94
 PLANS APPROVAL DATE

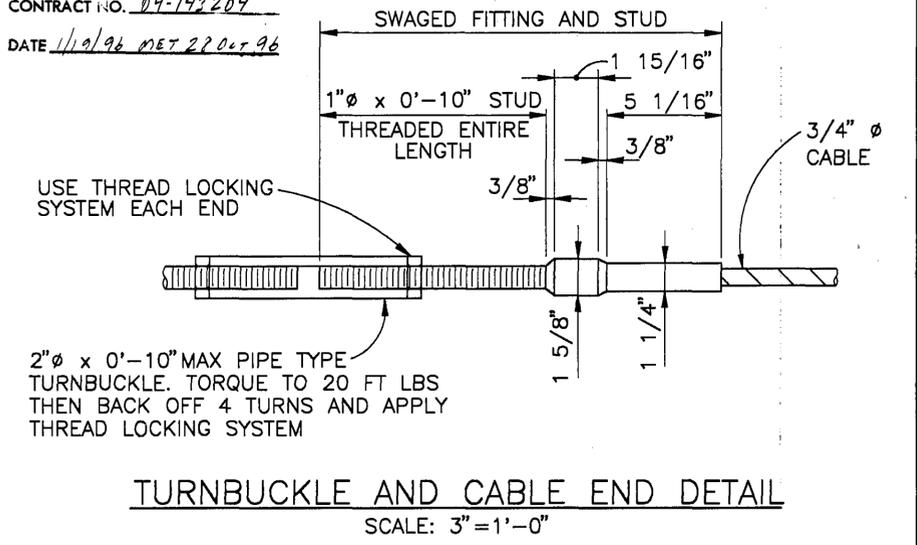
BEN C. GERWICK, INC.
 601 MONTGOMERY ST. SUITE 1400
 SAN FRANCISCO, CALIFORNIA 94111

NOTE:
 LOCATIONS OF CORED AND DRILLED HOLES SHOWN IN THE PLANS ARE APPROXIMATE. PRIOR TO PLACING HOLES IN CONCRETE, THE CONTRACTOR SHALL LOCATE ALL REINFORCING STEEL AND ADJUST THE LOCATION OF THE HOLES TO CLEAR ALL REINFORCING BARS. FINAL HOLE LOCATIONS ARE SUBJECT TO THE APPROVAL OF THE ENGINEER.



AS BUILT

CORRECTIONS BY J. KRESI
 CONTRACT NO. 04-142207
 DATE 11/10/96 NET 22 OCT 96



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

ADDED PER ADDENDUM NO. 1 DATED DECEMBER 2, 1994

M. CULLEN
 DESIGN OVERSIGHT
 11-1-94

DESIGN	BY G. FOTINOS	CHECKED P. BACH
DETAILS	BY A. HUSAIN	CHECKED J. UZARSKI
QUANTITIES	BY A. HUSAIN	CHECKED A. EZADDIN

PREPARED FOR THE
STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION

P. E. BACH
 PROJECT ENGINEER

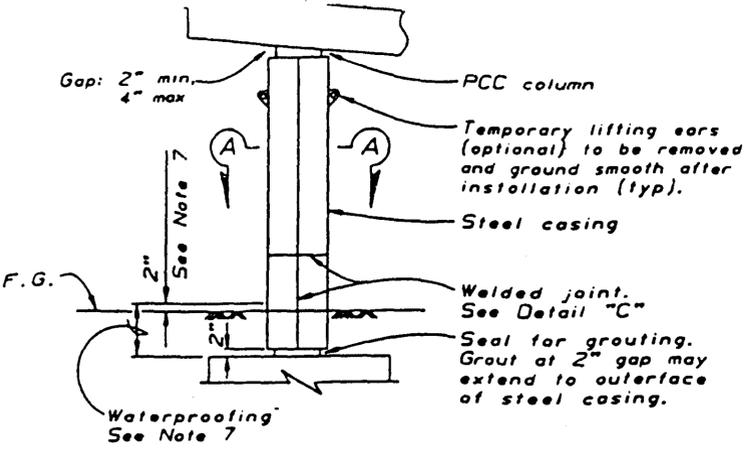
BRIDGE NO.	20-35
POST MILE	9.7

EARTHQUAKE RETROFIT PROJECT NO. 400
 LAGUNA DE SANTA ROSA
 HINGE RETROFIT DETAILS

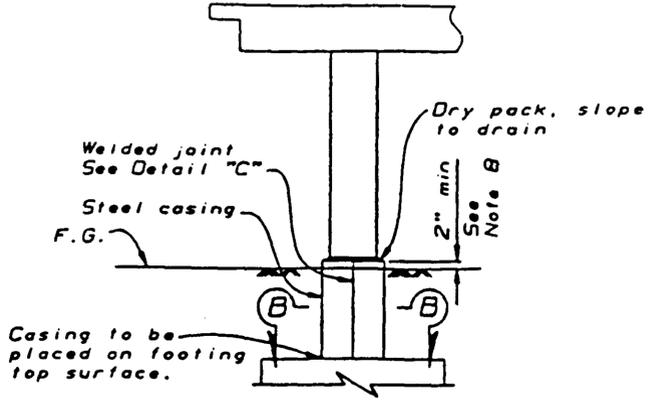
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS	0 1 2 3	CU 04 EA 143201
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DISREGARD PRINTS BEARING EARLIER REVISION DATES	08/30/84	SHEET 3 OF 4
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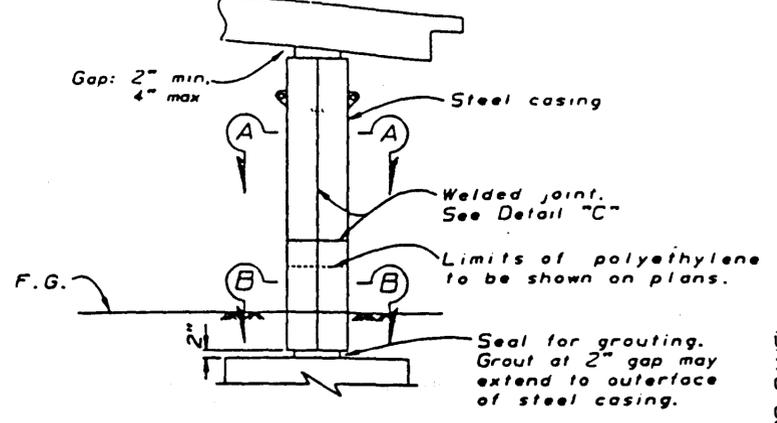
DIST.	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO	TOTAL SHEETS
04	Sqn.	12,101	9.6/16.1 24.9/29.4	26D	26
			REGISTERED ENGINEER - CIVIL P. E. BACH No. C48130 Exp. 05/30/96 CIVIL STATE OF CALIFORNIA		
			11-14-94 PLANS APPROVAL DATE		



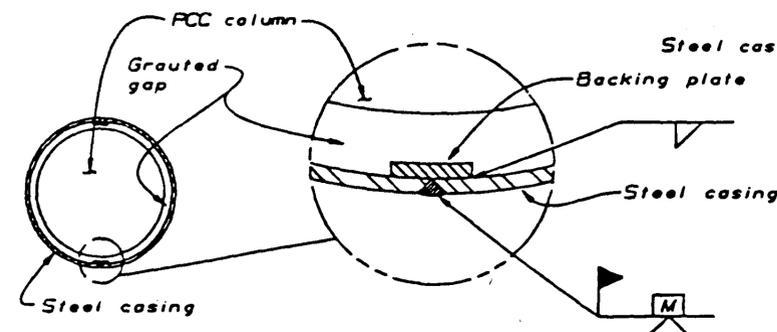
CLASS F COLUMN



CLASS P COLUMN

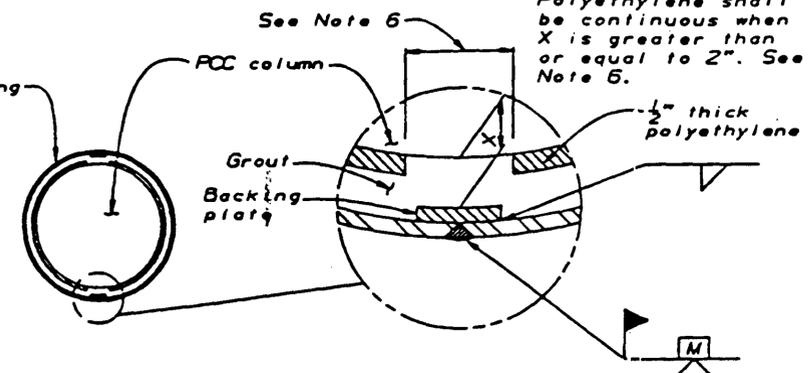


CLASS P/F COLUMN



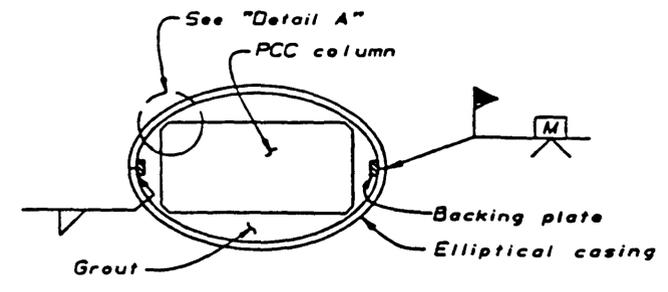
**SECTION A-A
ROUND COLUMN**

Minimum inside diameter of steel casing = 1/2" greater than nominal column diameter for Class F and 2/3" for Class P/F.

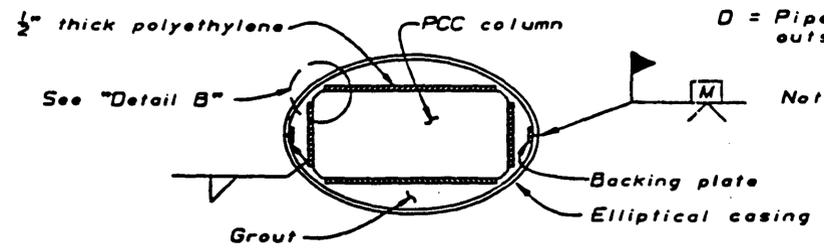


**SECTION B-B
ROUND COLUMN**

Minimum inside diameter of steel casing $\geq 2/3$ " greater than nominal column diameter for Class P and Class P/F.



**SECTION A-A
RECTANGULAR COLUMN**

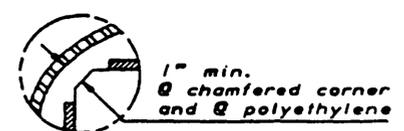


**SECTION B-B
RECTANGULAR COLUMN**

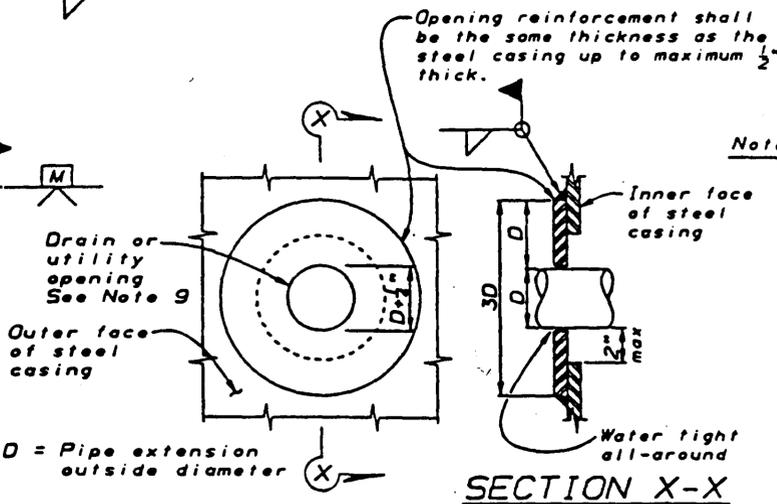


DETAIL A

1 ADDED PER ADDENDUM NO. 1
DATED DECEMBER 2, 1994

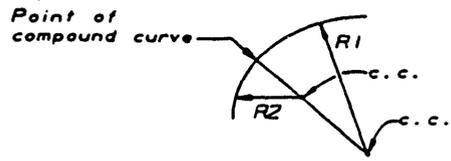


DETAIL B



**SECTION X-X
CASING OPENING**

Note: Opening reinforcement required for drain or utility openings larger than 4".

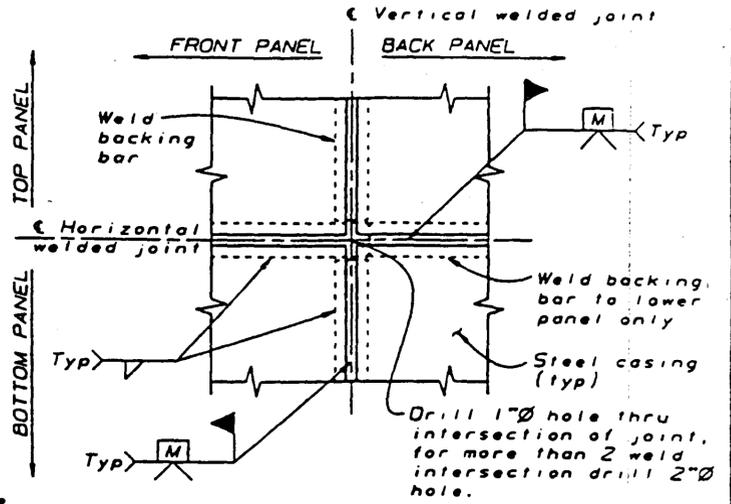


**ELLIPTICAL CASING DETAIL
CLASS P, F AND P/F COLUMN**

Radii R1 & R2 to be determined by the Contractor subject to the approval of the Engineer.

**NO AS BUILT CHANGES
AS BUILT**

CORRECTIONS BY J. KREZZ
CONTRACT NO. 04-143204
DATE 11/19/96 MET 28 Oct 96



**(TWO WELDED INTERSECTION JOINT)
DETAIL C**

Notes:

- 1) For varying thickness steel casing inside surface to remain flush. Minimum clearance from PCC column to casing shall be maintained.
- 2) Appropriate injection nozzles to be provided on casing, but removed and ground flush following completion of grouting operation.
- 3) All voids between steel casing and polyethylene (Class P and Class P/F), and steel casing and PCC column (Class F) to be filled with grout.
- 4) Location and number of vertical and horizontal welds to be determined by the Contractor, and subject to the approval of the Engineer. The location of casing welds are for illustration. No skip welds allowed.
- 5) Circular steel casing to be 1/2" thick minimum for casings with a 4'-4" diameter or less; all other steel casings to be 3/8" thick unless noted differently on contract plans. Backing plates to be the same thickness as casing up to maximum 1/2" thick.
- 6) Contractor shall remove 12" polyethylene strip behind backing plate if backing plate is closer than 1/2" from polyethylene.
- 7) Waterproof limits for steel casings. Typical for Types "P", "F" and "P/F".
- 8) Minimum length of Types "P" and "F" casing shall be 1.50 times the largest dimension of prismatic section of column, or 2" above finished grade whichever is greater. Lengths other than the specified minimum shall be shown on Detail sheets.
- 9) For pipe extensions, opening shall be no more than 1/4" greater than the pipe extension diameter. For other openings, the opening diameter to be determined by the Engineer.

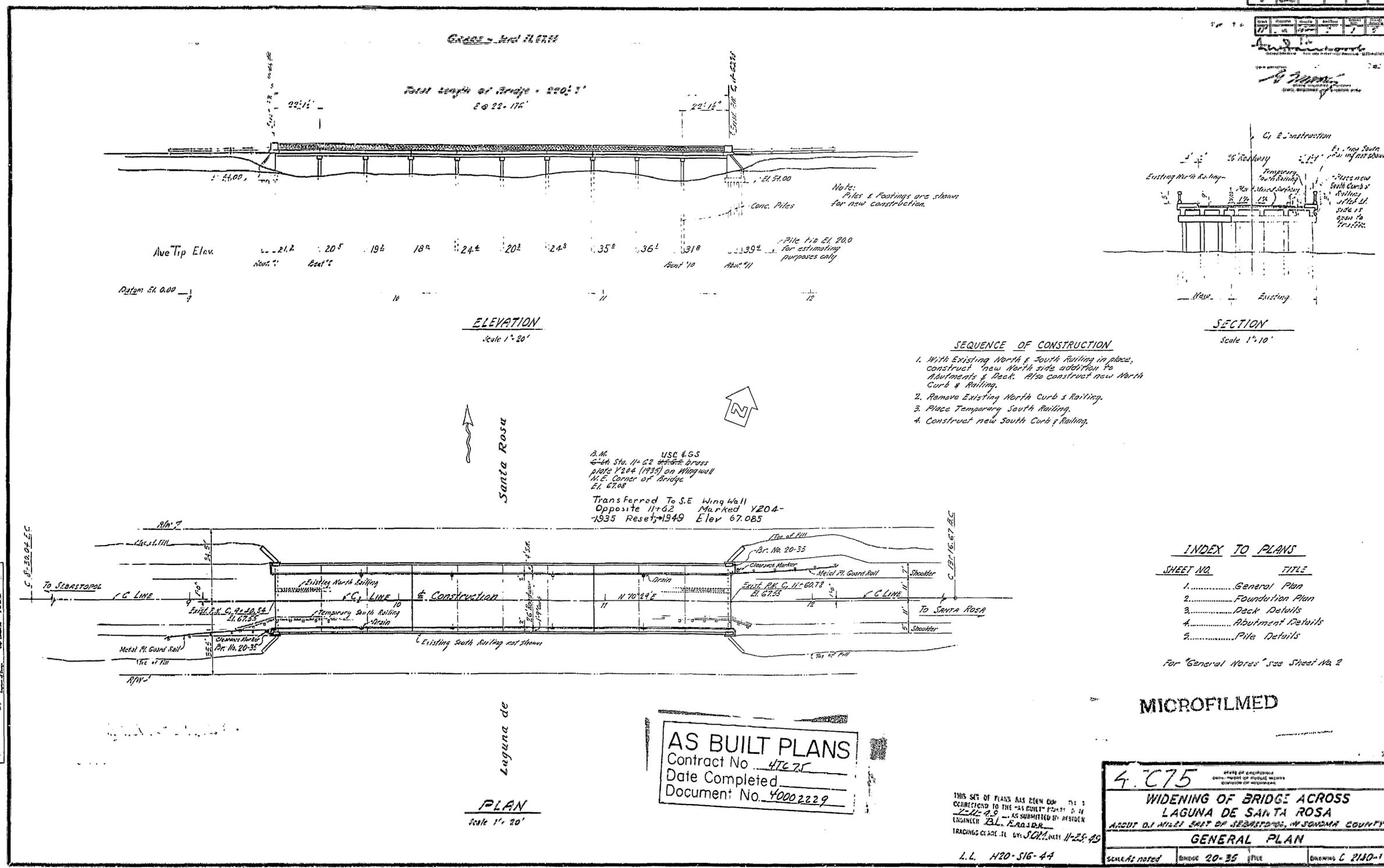
EARTHQUAKE RETROFIT PROJECT NO. 400

LAGUNA DE SANTA ROSA
STEEL COLUMN CASINGS

STANDARD DRAWING			
FILE NO. XS 12-77	DESIGN BY BRIAN MARONEY	CHECKED BY R.J. ZELINSKI	APPROVAL AUTHORITY
DRAWING DATE 8/93	DETAILS BY K. CHRISTOPHER	DESIGNED BY PAT WIPLEY	DESIGN SUPERVISOR
SUBMITTED BY R.J. ZELINSKI			

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO. 20-35 POST MILE 9.7
---	--	-----------------------------------

DATE	BY	REVISION
2	CALL	

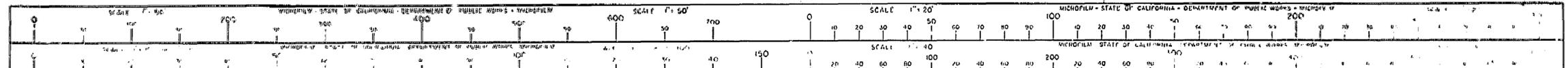


BRIDGE DEPARTMENT

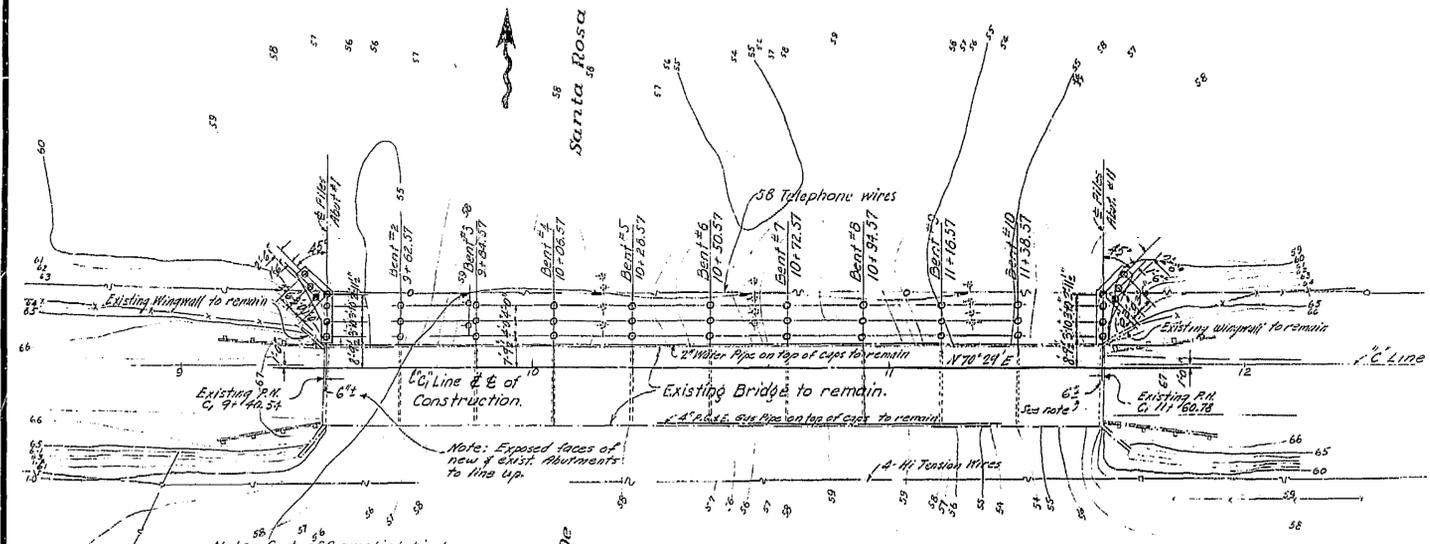
DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ENGINEER'S DRAWING TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN ACCORDANCE WITH THE AUTHORITY OF THE DIRECTOR OF PUBLIC WORKS.

DATE: 11-25-29 SIGNATURE: [Signature]

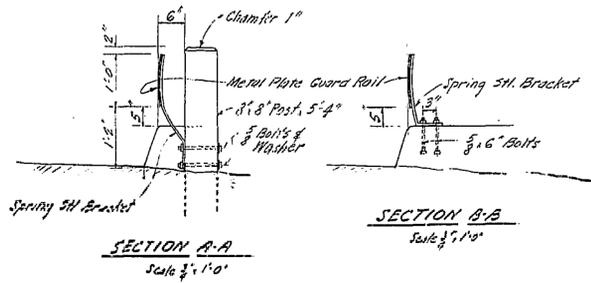


BRIDGE DEPARTMENT



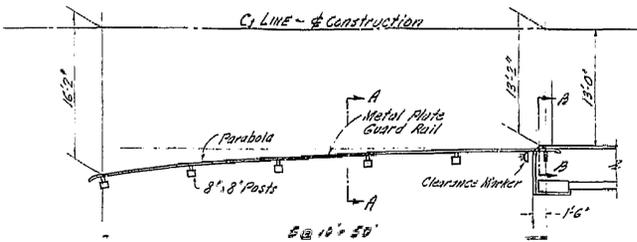
FOUNDATION PLAN
Scale: 1" = 20'

-B.M. Y-204
Std. Brass Disc in Wing Wall
North end Br. No. 20-35
Stamped Y-204 1935
Elev. 67.08

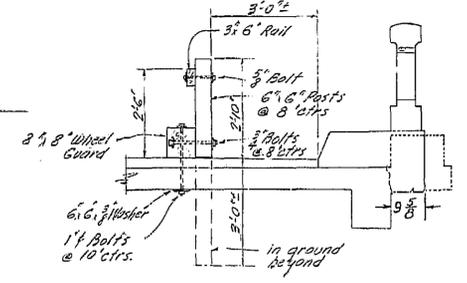


SECTION A-A
Scale 3/4" = 1'-0"

SECTION B-B
Scale 3/4" = 1'-0"



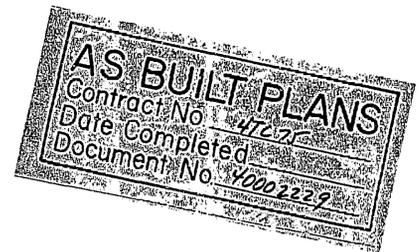
PLAN OF GUARD RAIL
Scale 3/4" = 1'-0"



TEMPORARY RAILING
Scale 1/2" = 1'-0"

To be installed with replacing 1st Railing.

THIS SET OF PLANS HAS BEEN CAREFULLY CHECKED TO THE "AS BUILT" PRINT. T-21-49 SUBMITTED BY ENGINEER B. L. EBBEL. TRACINGS CORRECTED BY B. L. EBBEL DATE 11-25-49



MICROFILMED

STATE OF CALIFORNIA DEPARTMENT OF PUBLIC WORKS DIVISION OF HIGHWAYS			
WIDENING OF BRIDGE ACROSS LAGUNA DE SANTA ROSA			
FOUNDATION PLAN			
SCALE AS NOTED	BRIDGE 20-35	FILE	DRAWING C-240-2

GENERAL NOTES

Specifications:
Design; A. A. S. H. O. dated 1944 with subsequent revisions and Bridge Department Supplement dated 1944.

Construction; State of California, Division of Highways Standard Specifications dated April, 1945 and the Special Provisions accompanying this set of plans.

Live Loading; H20-316-44.

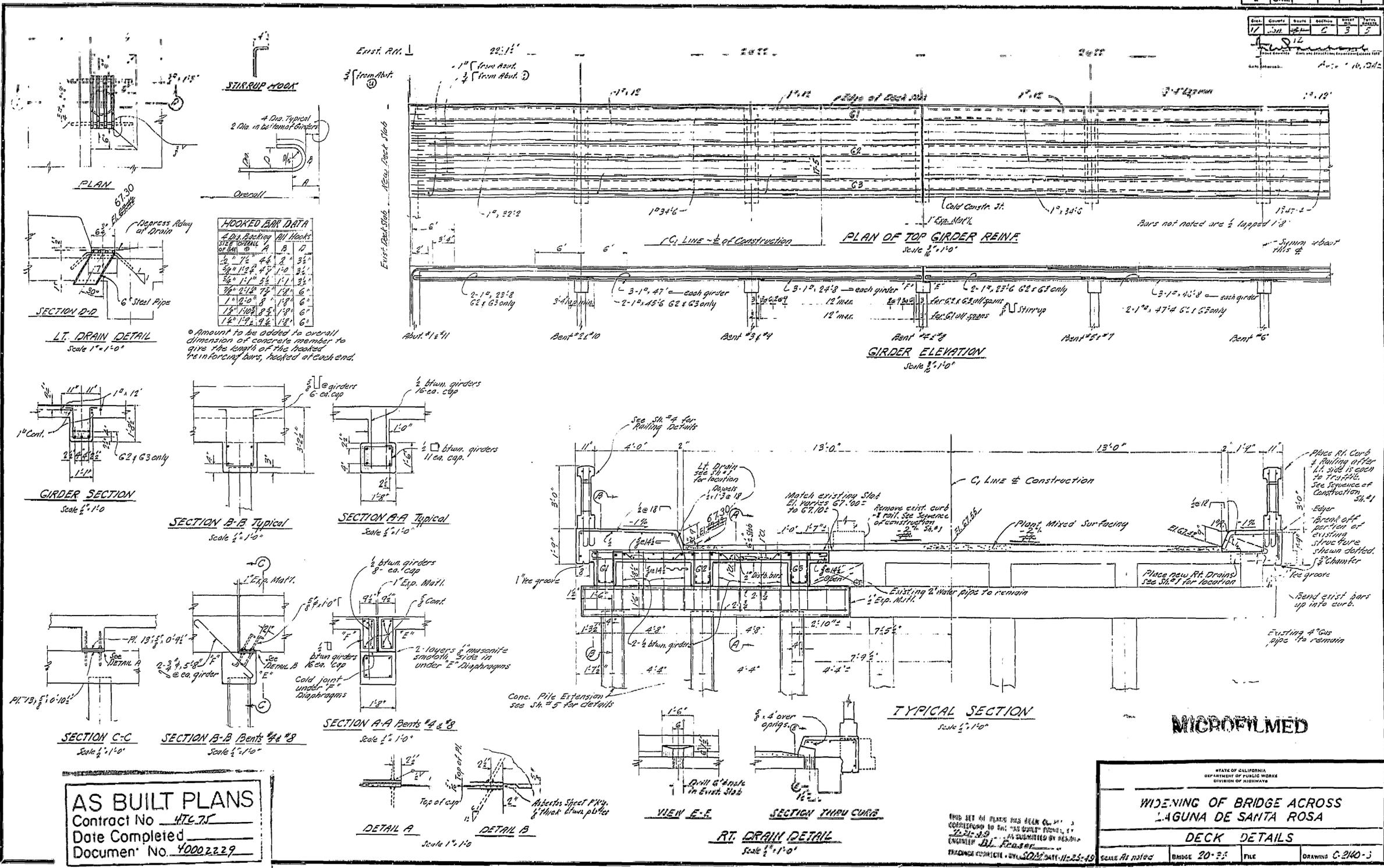
Unit Stresses; f_c -1000 p.s.i., f_s -16000 p.s.i., n -10

Pile Loading; For Conc. Pile Br. #20-35 = 27 Tons
For Timber Piles Br. #20-36 = 24 Tons

Contractor to verify all dependent dimensions in the field.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.
DATE April 24, 1971 SIGNATURE [Signature] TITLE Highway Administration Officer

Rev.	Change	Date	By	Checked
1	1	11/10/55	W. J.
2	2	11/10/55	W. J.



AS BUILT PLANS
Contract No. 476.75
Date Completed 11/10/55
Document No. 40002229

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

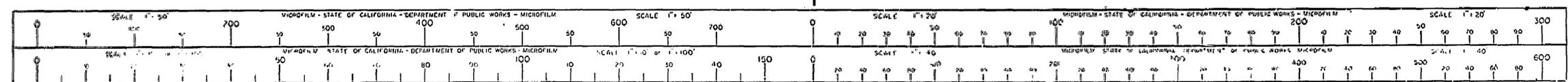
WIDENING OF BRIDGE ACROSS LAGUNA DE SANTA ROSA

DECK DETAILS

SCALE AS NOTED BRIDGE 20-55 FILE DRAWING C-240-3

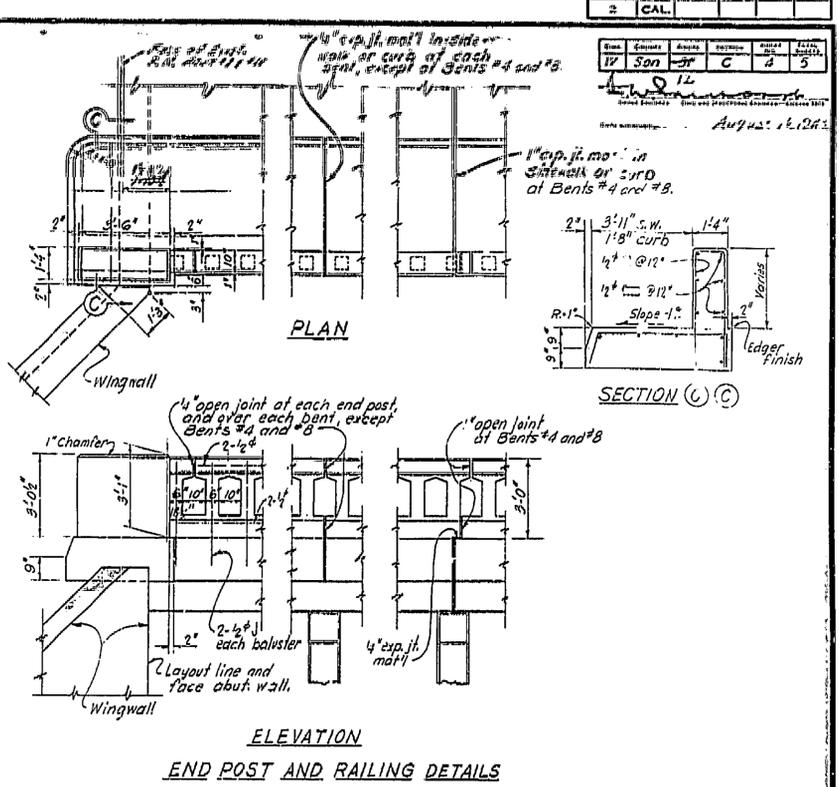
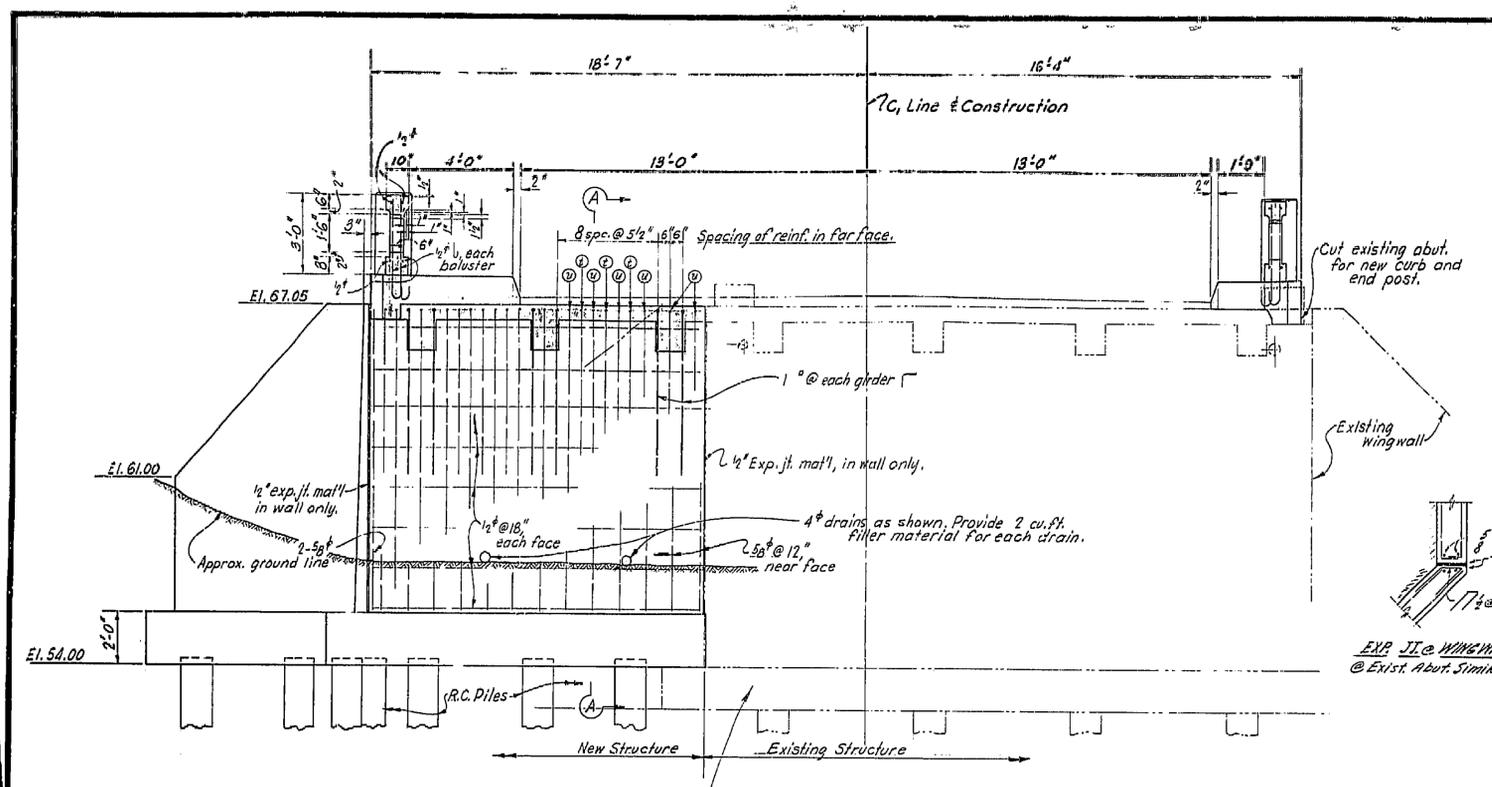
I HEREBY CERTIFY THAT THIS IS A TRUE AND CORRECT COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY SUPERVISION AND CONTROL ON THIS DATE IN ALHAMBRA, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

DATE 11/10/55 SIGNATURE W. J. ... TITLE Surveyor

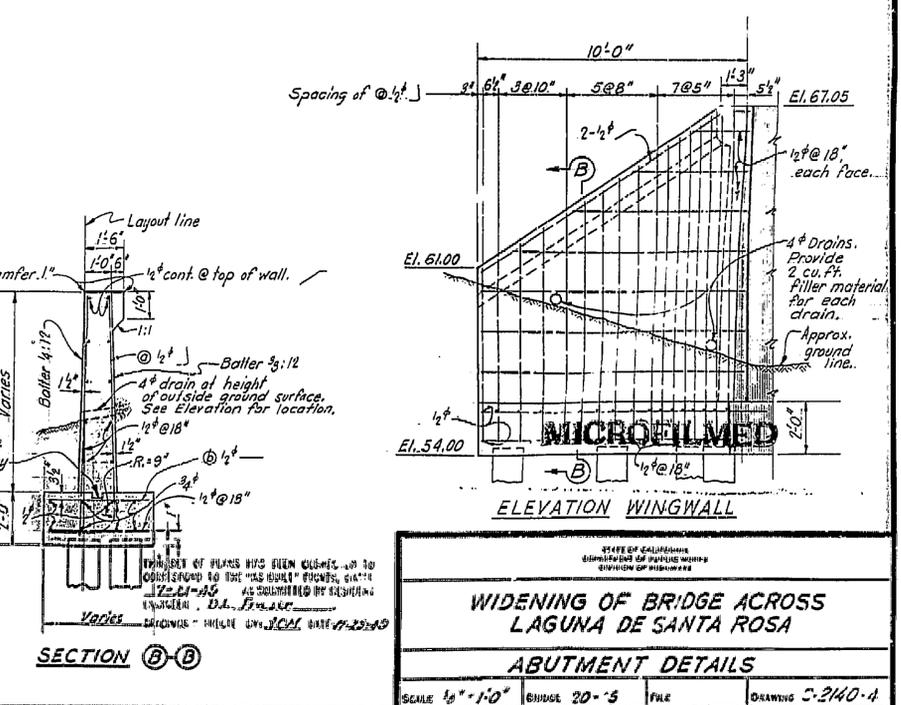
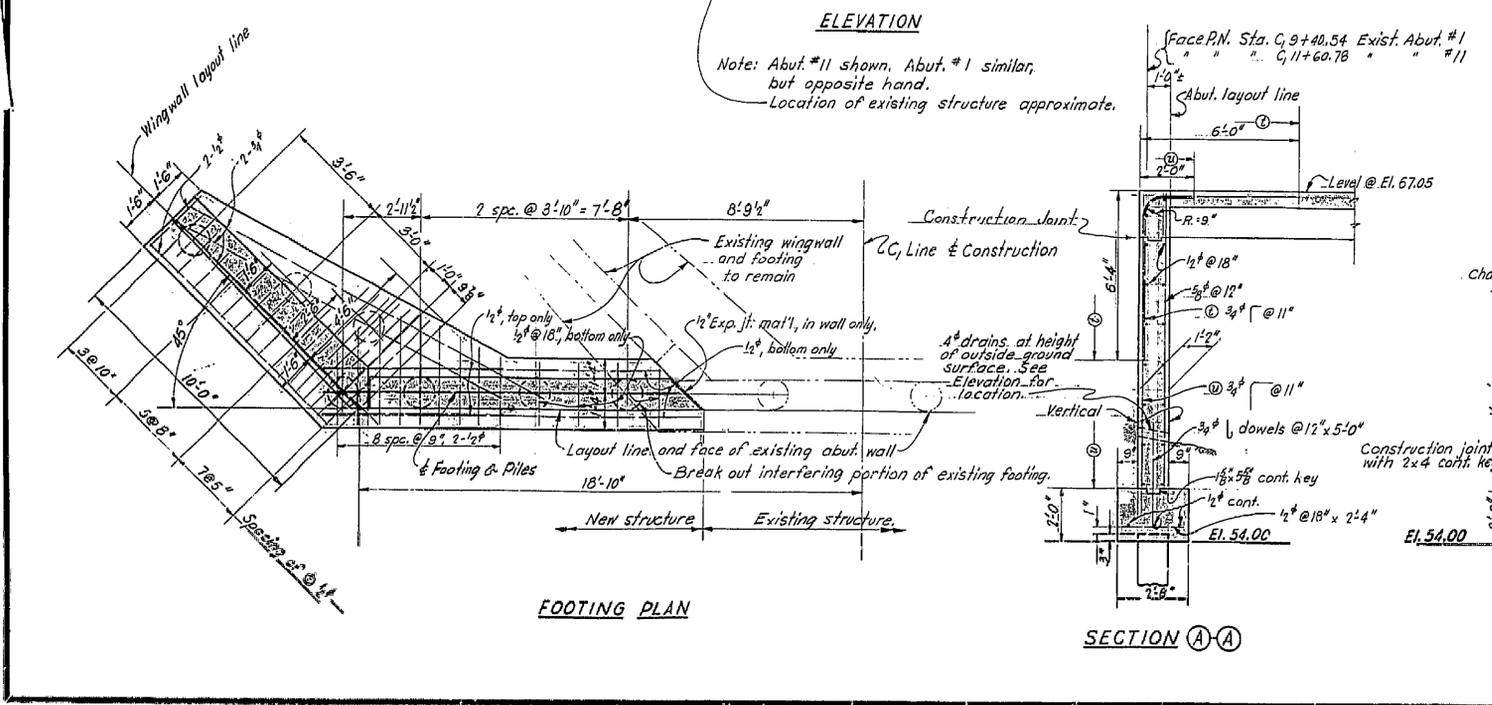


DATE	STATE	PROJECT NO.	DATE	DATE	DATE
2	CAL.				

NO.	DATE	BY	REVISION
1	5-21-55	J.C.	PREPARED
2	6-1-55	J.C.	REVISED
3	6-1-55	J.C.	REVISED
4	6-1-55	J.C.	REVISED
5	6-1-55	J.C.	REVISED



AS BUILT PLANS
 Contract No. 472-71
 Date Completed 4/20/55
 Document No. 40002229



STATE OF CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF HIGHWAYS

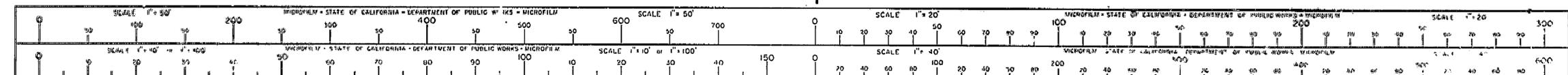
WIDENING OF BRIDGE ACROSS LAGUNA DE SANTA ROSA

ABUTMENT DETAILS

SCALE 1/8" = 1'-0" BRIDGE 20-5 FILE DRAWING C-240-4

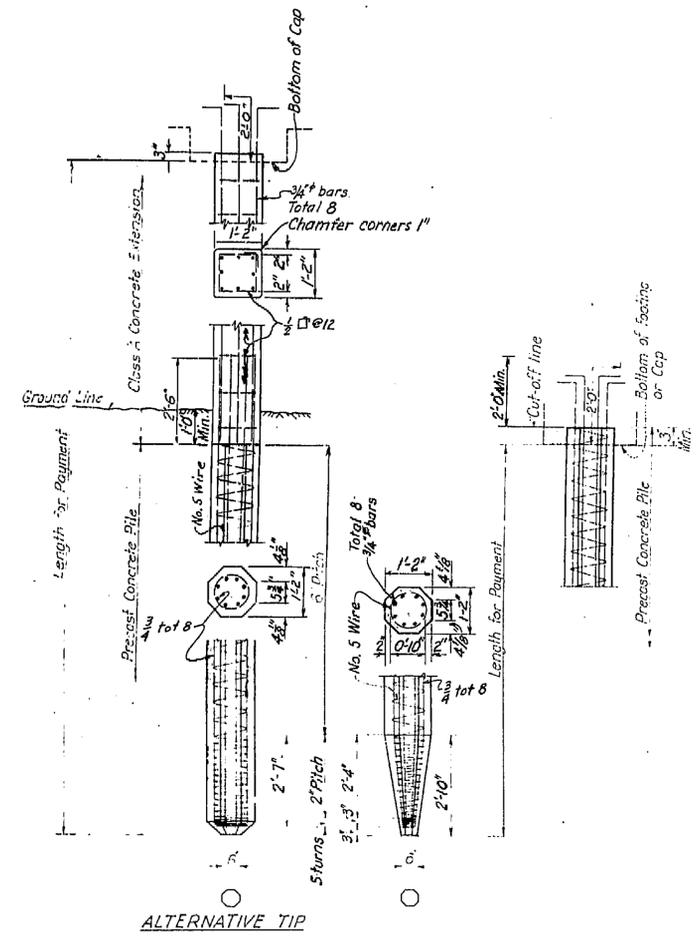
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT GIVEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN ACCORDANCE WITH THE AUTHORITY AND POWER OF THE DIRECTOR OF PUBLIC WORKS.

DATE: 4/20/55 BY: J.C.



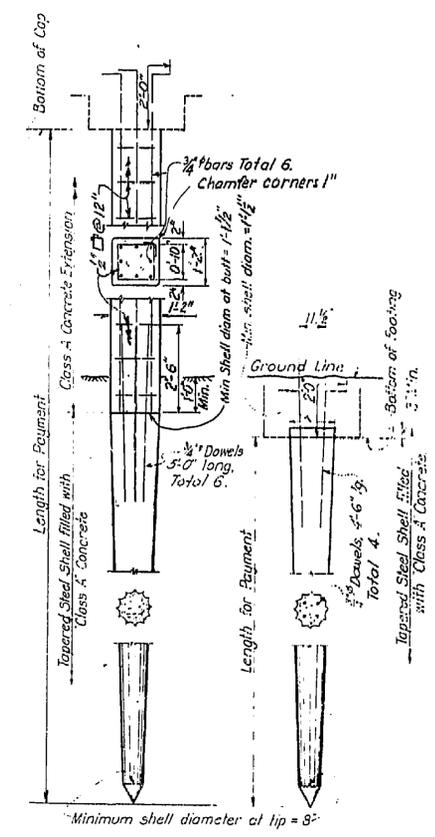
11 Jan 12
 August 10, 1925

BRIDGE DEPARTMENT



**PRECAST CONCRETE PILE
 ALTERNATIVE "A"**

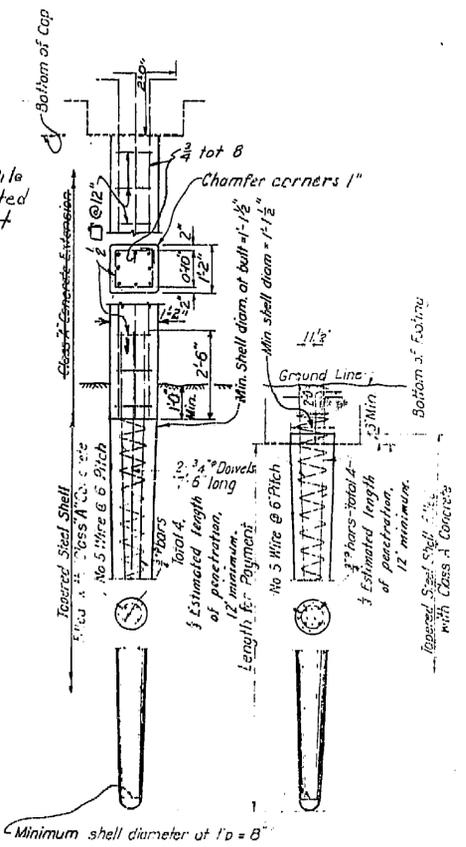
Design Load 27 tons
 Drive to 35 tons bearing value.



**CAST-IN-PLACE CONCRETE PILE
 ALTERNATIVE "B"**

Design Load 27 tons
 Drive to 32 tons bearing value.

Raymond Step Taper Pile
 Extended To Caps & Painted
 with Two Coats of Paint



**CAST-IN-PLACE CONCRETE PILE
 ALTERNATIVE "C" (FORMED)**

Design Load 27 tons
 Drive to 32 tons bearing value.

AS BUILT PLANS
 Contract No. 47270
 Date Completed
 Document No. 40002229

AS BUILT PLANS
 Contract No. 47270
 Date Completed
 Document No. 40002229

WIDENING OF BRIDGE ACROSS
 LAGUNA DE SANTA ROSA
 PILE DETAILS
 Bridge No. 20-35
 DRAWING NO. C-2140-5

WIDENING OF BRIDGE ACROSS
 LAGUNA DE SANTA ROSA
 PILE DETAILS
 Bridge No. 20-35
 DRAWING NO. C-2140-5

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN
 UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO
 AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.
 DATE: April 23, 1971 SIGNATURE: [Signature] TITLE: Highway Administrator