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W12a

Prepared March 6, 2017 for March 8, 2017 Hearing

To: Commissioners and Interested Persons

From: Nancy Cave, District Manager
Shannon Fiala, Coastal Planner

Subject: STAFF REPORT ADDENDUM for W12a
CDP Application Number 2-17-0018 (Caltrans Marin Highway 1 Rumble Strip and Shoulder Widening Project)

The purpose of this addendum is to modify the staff recommendation for the above-referenced item. In the time since the staff report was distributed, staff has received new input and information from the Applicant requesting one change to the staff recommendation. This change is fairly minor (in terms of construction requirements and biological monitoring). This change does not modify the basic staff recommendation, which is still approval with conditions. In addition, in response to concerns regarding the potential for rumble strip noise fronting several residences along Tomales Bay (near Post Mile 36), the Applicant has altered the proposed project to eliminate rumble strips in this small area.

With respect to the construction change, as published, the staff report includes the Commission's fairly typical parameters for buffers of nesting bird species (i.e., 300 feet for non-raptor species and 500 feet for raptor species). The Applicant has requested that their standard buffers be used instead (i.e., 50 feet for non-raptor species and 300 feet for raptor species). Given this project is for development within a heavily used travelled roadway where noise is already present to a certain degree, and the lack of alternatives for locating such development due to it being within the roadway prism itself, staff have agreed with the Applicant in this case that the Applicant's proposed standards are sufficient and appropriate to protect nesting bird species. Staff expects that the required biological monitoring and other construction specifications in the special conditions will ensure protection against any significant impacts to bird species. With this change, the Applicant is in agreement with the staff recommendation, and this item is recommended for approval on the consent calendar. Interested parties, such as the Marin County Bicycle Coalition, Marin County Department of Public Works, and members of the Stinson Beach Village Association, have all submitted letters in support of the project.

Thus, the staff report is modified as shown below (where applicable, text in <u>underline</u> format indicates text to be added, and text in ~~strikethrough~~ format indicates text to be deleted):

Modify Special Condition 3c on staff report page 8 as follows:

(c) Buffers. *Limits of construction to avoid an active nest shall be established in the field with flagging and stakes and/or construction fencing. Construction activities may occur within ~~300~~ 50 feet (~~500~~ 300 feet for raptors) of an active nest of any rare, threatened, endangered, or species of concern only if noise levels generated by the construction activities will not increase noise levels beyond 80 dB at any active nesting sites. If noise levels exceed 80 dB, construction within ~~300~~ 50 feet (~~500~~ 300 feet for raptors) of the nesting trees shall cease and shall not recommence until either sound mitigation (to decrease noise below 80 dB) can be employed or nesting is complete.*

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Filed:	1/27/2017
Action Deadline:	7/27/2017
Staff:	S. Fiala - SF
Staff Report:	2/24/2017
Hearing Date:	3/8/2017

STAFF REPORT: REGULAR CALENDAR

Application Number:	2-17-0018
Applicant:	Caltrans
Project Location:	Various locations along Highway 1 through Marin County
Project Description:	Install centerline rumble strip to prevent head-on collisions and widen highway shoulder to improve bicyclist and pedestrian safety at 40 locations along Highway 1 through Marin County.
Staff Recommendation:	Approval with Conditions

SUMMARY OF STAFF RECOMMENDATION

Caltrans, the Applicant, proposes to install a centerline rumble strip for public safety purposes, to reduce the frequency and severity of roadway cross-centerline collisions along Highway 1, and to widen existing shoulders for improved bicyclist and pedestrian safety throughout Marin County. Caltrans accident data from 2008 to 2011 shows that 34% of the total accidents on Highway 1 in Marin County were likely cross-centerline collisions. Centerline rumble strips consist of shallow indentations in the roadway pavement that create a vibratory, or rumbling, effect when driving over them. The proposed rumble strips will be installed along approximately 30 miles of the total 50 miles of Highway 1 through Marin County, avoiding all public street intersections, commercial driveways, two-way left-turn lanes, high volume turning areas, and bridge decks.

In addition, the project will also include shoulder improvements for bicycle and pedestrian safety at 40 locations along Highway 1 throughout the County to result in 4-foot wide paved shoulders in these areas. The project will thus improve access for bicyclists and pedestrians, increase public safety, help minimize vehicle miles traveled, and avoid existing vegetation removal where

feasible. However, avoidance of all vegetation is not feasible north of Stinson Beach between Highway 1 post miles (PM) 12.50 and 12.70, a 0.2-mile length of road where shoulder widening will occur adjacent to existing coastal and riparian wetlands associated with Easkoot Creek, a tributary to Bolinas Lagoon. These areas also provide habitat for the federally listed threatened California red-legged frog. As a result, Caltrans has worked with the US Fish and Wildlife Service (USFWS) to minimize impacts, and USFWS has signed off on the project through a Biological Opinion. Caltrans has also proposed to mitigate for impacts both on and offsite, with offsite restoration occurring at a 4:1 level for wetland impacts and a 2:1 level for riparian impacts.

In addition to review by USFWS, Caltrans has also collaborated with the California Department of Parks and Recreation, Marin County Department of Public Works, Golden Gate National Recreation Area, Marin County Bicycle Coalition (MCBC), and Commission staff on the project design, and all parties are generally in agreement on the project. However, MCBC has some remaining concerns, particularly regarding the roughly 8-mile section of Highway 1 between Bolinas Lagoon and Tomales Bay where rumble strips will be installed, but where shoulder widening is not proposed at this time. Although most of this area is not in the coastal zone and thus is not a part of this proposed project under the CDP, MCBC has suggested several solutions to address their concerns, including new signage and striping, and staff is recommending conditions to require the development of a signage plan applicable to the coastal zone section. Staff will continue to work with Caltrans and other interested parties, including MCBC, to identify additional improvements that could be applied to this area in the future.

Overall, this project will improve public safety for all forms of transportation along Highway 1 in Marin County, whether it be vehicular, on bicycles (and other forms of wheeled transportation) or on foot. The project has been designed consistent with the Marin County Highway 1 Repair Guidelines project, on which staff, Caltrans and others identified above collaborated for many years to address public view and habitat protection with projects like this. Appropriate special conditions have been recommended to protect coastal resources as much as feasible.

As conditioned, the project can be found consistent with the Coastal Act, and staff recommends **approval** of the CDP application as conditioned. The motion is found on page 4 below.

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I. MOTION AND RESOLUTION

Staff recommends that the Commission, after public hearing, **approve** a coastal development permit for the proposed development. To implement this recommendation, staff recommends a YES vote on the following motion. Passage of this motion will result in approval of the CDP as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

***Motion**: I move that the Commission approve Coastal Development Permit Number 2-17-0018 pursuant to the staff recommendation, and I recommend a yes vote.*

***Resolution to Approve CDP:** The Commission hereby approves Coastal Development Permit Number 2-17-0018 and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with Coastal Act policies. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.*

II. STANDARD CONDITIONS

This permit is granted subject to the following standard conditions:

1. **Notice of Receipt and Acknowledgment.** The permit is not valid and development shall not commence until a copy of the permit, signed by the Permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. **Expiration.** If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. **Interpretation.** Any questions of intent or interpretation of any condition will be resolved by the Executive Director or the Commission.

4. **Assignment.** The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. **Terms and Conditions Run with the Land.** These terms and conditions shall be perpetual, and it is the intention of the Commission and the Permittee to bind all future owners and possessors of the subject property to the terms and conditions.

III. SPECIAL CONDITIONS

This permit is granted subject to the following special conditions:

1. **Final Project Plans.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit, for the review and approval of the Executive Director, two sets of 100% design-level Final Project Plans. The Final Project Plans shall be in substantial conformance with the 65% design-level plans previously submitted and shown in **Exhibit 2**. The Final Project Plans shall include a bicycle-related signage plan designed to increase bicyclist safety that, at a minimum, includes the following for at least the coastal zone portion of Highway 1:

   (a) Existing Signs. An inventory of existing signs in Caltrans' right of way for Highway 1 through Marin County, including site plans (or mapping) showing the location of each sign, and a list of all signs (including all sign text and graphics).

   (b) New Signs. Identification of both existing signs to be retained and new bicycle safety related signs to be installed for Highway 1 through Marin County where the location and text/design of the signs are chosen based on the potential for best increasing bicycle safety, including by using available collision data, and focusing on downhill sections where speed differential is low, along sharp curves, and in any other location where passing distance is constrained, shoulders are limited or absent, and cyclists may be compelled to use the full travel lane.

   (c) Sign Siting and Design. All signs shall be sited and designed to maximize their utility to public safety at the same time as avoiding and minimizing any impacts to the scenic quality of Highway 1 and adjacent areas, and avoiding and minimizing impacts to other coastal resources (e.g., wetlands, archaeological resources, etc.).

   (d) Stakeholder Consultation. The signage plan shall include written evidence that the Permittee solicited input from interested stakeholders, including, but not limited to, Golden Gate National Recreation Area, Point Reyes National Seashore, Marin County Department of Public Works and the Marin County Bicycle Coalition, during the development of the signage plan.

   (e) Sign Installation. All signs shall be installed as part of the project according to the Executive Director-approved Final Project Plans.

   All requirements above shall be enforceable components of this CDP. The Permittee shall undertake development in accordance with this condition and the approved Final Project Plans.

2. **Restoration Plan.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit two sets of a Restoration Plan to the Executive Director for review and approval. For off-site mitigation, a copy of a final agreement for Caltrans' contribution to an existing or future restoration program by a third party may alternatively be submitted, provided that the restoration program meets the requirements specified below and demonstrates receipt of all required regulatory approvals. The Restoration Plan shall, at a minimum, include:

(a) Impacts. All temporary and permanent impacts to riparian vegetation and wetlands and any other related habitats shall be identified, including through identifying the areas in site plan and photographic views, and through acreage calculations.

(b) Site Plan. A final detailed site plan of the restoration areas both on- and off-site, with habitat acreages identified**,** showing where restoration will occur within Marin County and as near to the project impact sites as possible, preferably in the same habitat systems. The location of any off-site mitigation areas must be approved by the Executive Director.

(c) Baseline. A baseline ecological assessment of the on-site and off-site restoration areas prior to construction shall be provided at a level of detail sufficient to be able to evaluate associated restoration success criteria.

(d) Success Criteria. The goals, objectives, performance standards, and success criteria shall all be explicitly identified, and success criteria shall at a minimum include explicit cover criteria for all restoration areas. For on-site restoration, and at a minimum, wetland and riparian plantings shall recreate the nature and areal extent of the vegetation that is removed along Highway 1 (as mapped in **Exhibit 4**) such that the recreated vegetation appears similar to or better than that existing currently.

(e) Restoration Methods. All methods that will be used to ensure the restoration plan is appropriately implemented, and that it achieves the defined goals, objectives, performance standards, and success criteria, shall be clearly identified.

(f) Initial Restoration Evaluation. Provisions for submittal, within 90 days of completion of initial restoration work, of a baseline evaluation report demonstrating that initial restoration area activities have been completed in accordance with the approved Restoration Plan.

(g) Monitoring and Reporting. A reporting schedule, including that the Permittee shall submit, for the review and approval of the Executive Director, a restoration monitoring report prepared by a qualified specialist that certifies the restoration is in conformance with the approved Restoration Plan, along with photographic documentation of plant species and plant coverage, beginning the first year after initiation of implementation of the Restoration Plan, and annually for at least the first five years. Final monitoring for success shall take place no sooner than five years following the end of all remediation and maintenance activities other than weeding. If the final report indicates that the restoration project has been unsuccessful, in part or in whole, based on the approved success criteria, the Permittee shall, within 120 days of that determination, submit two sets of a revised or supplemental restoration plan for the review and approval of the Executive Director. The revised/supplemental plan shall be prepared by a qualified specialist, and shall be designed to equivalently compensate for those portions of the original approved and required restoration that did not meet the approved Restoration Plan's success criteria. The approved revised or supplemental restoration shall be carried out under the direction of the Executive Director until the restoration activities are completed consistent with the goals, objectives, and performance standards specified in

the originally approved Restoration Plan and the approved revised or supplemental restoration plan.

(h) Mitigation. Mitigation measures for all temporary impacts associated with the construction activities for the project shall be identified and implemented, and such mitigation measures shall proportionately offset any temporary impacts. For all permanent impacts, in addition to at least 1:1 on-site (i.e., in and immediately adjacent to the project area) mitigation for all impacts, the Permittee shall mitigate for the loss of wetland and riparian areas at Executive Director-approved locations off-site at a ratio of at least 4:1 for wetland impacts and at least 2:1 for riparian impacts. Off-site mitigation may restore riparian areas along streams and rivers where riparian vegetation has been lost or degraded. It may also provide for restoration or creation of wetland areas, and for enhancement of degraded habitat within riparian zones.

All requirements above shall be enforceable components of this CDP. The Permittee shall undertake development in accordance with this condition and the approved Restoration Plan.

3. Biological Monitoring. All construction and pre-construction activities in the vicinity of the California red-legged frog habitat areas identified in Stinson Beach shall be overseen by Executive Director-approved Biological Monitors, including as follows:

(a) Biological Monitors and Resident Engineer Identified. The names and qualifications of the proposed Biological Monitors shall be submitted to the Executive Director for approval at least 30 calendar days prior to required biological monitoring, and shall be accompanied by a letter from each proposed Biological Monitor verifying that they have a copy of the CDP, and that they understand and will enforce all of its terms and conditions. The Biological Monitors shall be USFWS-approved to handle California red-legged frog, and any other species reasonably expected to be present in the project area, including avian species. The approved Biological Monitors shall be onsite during all work that could reasonably result in a take of California red-legged frog, including all ground disturbance, and that could reasonably affect avian species, and shall keep a copy of the CDP in their possession when onsite. The Biological Monitors shall regularly report to the project's Resident Engineer who has the authority to stop work that may result in the unauthorized take of the California red-legged frog. In such instances, the Resident Engineer shall immediately notify the Executive Director by telephone and e-mail within no more than one (1) working day. At least 30 calendar days prior to construction, the Resident Engineer's name, e-mail address and telephone number shall be provided to the Executive Director. Upon issuance of the CDP, the Resident Engineer shall send a letter to the Executive Director verifying that they have a copy of the CDP, and that they understand and will comply with all of its terms and conditions. The Resident Engineer shall maintain a copy of the CDP onsite whenever construction is taking place.

(b) Pre-Construction Surveys. Pre-construction surveys shall be conducted by the approved Biological Monitors for California red-legged frog no more than 30 calendar days prior to ground disturbance between PM 12.50 and 12.70, and shall include areas within 50 feet

of the project limits when feasible. Native vertebrates found in cover sites that will be affected by construction activities shall be documented and relocated, and then the associated entrances and/or refuge features shall be collapsed or removed following investigation. The approved Biological Monitors shall conduct bird surveys 30 calendar days prior to construction activities to detect any active bird nests in the area to be impacted, and any other such habitat within 500 feet of the construction area. The last survey must be conducted 72 hours prior to the initiation of clearance/construction.

(c) Buffers. Limits of construction to avoid an active nest shall be established in the field with flagging and stakes and/or construction fencing. Construction activities may occur within 300 feet (500 feet for raptors) of an active nest of any rare, threatened, endangered, or species of concern only if noise levels generated by the construction activities will not increase noise levels beyond 80 dB at any active nesting sites. If noise levels exceed 80 dB, construction within 300 feet (500 feet for raptors) of the nesting trees shall cease and shall not recommence until either sound mitigation (to decrease noise below 80 dB) can be employed or nesting is complete.

(d) CRLF Provisions. The Biological Monitors shall perform a California red-legged frog clearance survey immediately prior to initial ground disturbance at sensitive locations. Safety permitting, the Biological Monitors shall investigate areas of disturbed soil for signs of the California red-legged frog within 30 minutes following initial disturbance of that given area. If a California red-legged frog gains access to a construction zone, work within 50 feet of the frog shall be halted immediately and until the frog leaves the site or is removed by the Biological Monitors.

(e) Trench Provisions. Steep-walled holes or trenches equal or more than one-foot deep shall either be covered at the close of each working day or outfitted with escape ramps. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals. California red-legged frogs and other wildlife found in excavations shall be captured and relocated by the Biological Monitors.

(f) Storage Provisions. Materials and equipment left onsite overnight shall be inspected by the Biological Monitors prior to the beginning of each day's activities.

(g) Rain Provisions. The Biological Monitors shall inspect the project site near PM 12.50 to 12.70 within one week prior to a forecasted rain event to ensure that adequate stormwater BMPs are properly installed. The Biological Monitors shall also inspect the site within 24 hours prior to the resumption of construction following a rain event to ensure that restarting activities will not result in harm to California red-legged frog and its habitat.

4. Final Construction Plan. PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit two sets of a Construction Plan to the Executive Director for review and approval. Minor adjustments to the following construction requirements may be allowed by the Executive Director if such adjustments: (1) are deemed reasonable and necessary; and (2) do not adversely impact coastal resources. The Construction Plan shall be in substantial conformance with the project plans in **Exhibit 2**, and at a minimum, shall include the

following:

(a) Construction Areas. The Construction Plan shall identify the specific locations of all construction, staging and storage areas, and all construction access corridors (such as to and from the construction, storage, debris storage and staging areas) in site plan view. Areas within which construction activities are to take place shall be minimized to avoid encroachment on sensitive habitats and species and to have the least impact on coastal resources, including public recreational access, overall. The work limits between PM 12.50 and 12.70 shall be identified with high visibility fencing, flagging, or other barriers. Limits shall also be defined near other environmentally sensitive locations, such as nest sites. The features used to identify work boundaries shall be removed at the end of construction.

(b) Construction Methods and Timing. The Construction Plan shall specify the construction methods to be used, including all methods to be used to keep the construction areas separated and buffered from sensitive habitat areas. All erosion control/water quality best management practices (BMPs) to be implemented during construction and the location of these BMPs shall be described and noted. All work shall only take place during daylight hours (i.e., one hour before sunrise to one hour after sunset). Lighting of adjacent vegetated areas is prohibited, except when construction-related safety issues require lighting to maintain construction safety, including the need for flaggers and some form of lighting. In such instances, the minimal necessary light shall be directed away (or shielded) from sensitive habitats areas. Project construction may occur only from May 1 to October 31, in order to avoid the California red-legged frog.

(c) Biological Monitor Provisions. The Construction Plan shall identify all of the Biological Monitoring provisions of Special Condition 3 above, including the names and contact information for the Executive Director-approved Biological Monitors.

(d) Construction Requirements. The Construction Plan shall include all measures for initial construction as well as for future maintenance. The Construction Plan shall include the following construction requirements specified by written notes on the Construction Plan:

1. Prior to the commencement of any development authorized under this CDP, the Permittee shall ensure that all on-site workers and contractors understand and agree to observe the standards for work and the terms and conditions outlined in this CDP and in the detailed project description included as part of the application submittal, as revised by these standard and special conditions.

2. Prior to the commencement of construction, the limits of the work areas and staging areas shall be delineated in consultation with a Biological Monitors, limiting the potential area affected by construction and ensuring that all wetlands and other habitats adjacent to construction areas are avoided during construction. All vehicles and equipment shall be restricted to pre-established work areas and haul routes and to established or designated staging areas.

3. All trash shall be properly contained, removed from the work site, and disposed of on a daily basis and at last at the end of each work day to avoid contamination of habitat during construction activities. Any debris inadvertently discharged into coastal waters shall be recovered immediately and disposed of consistent with the terms and conditions of this CDP. The construction site shall maintain good construction housekeeping controls and procedures (e.g., clean up all leaks, drips, and other spills immediately; keep materials covered and out of the rain, including covering exposed piles of soil and wastes; dispose of all wastes properly, place trash receptacles on site for that purpose, and cover open trash receptacles during wet weather; remove all construction debris from the site; etc.).

4. Equipment staging, materials storage, and stockpiling areas shall be limited to the locations and sizes specified in the approved construction plans. Construction vehicles shall be restricted to designated haul routes. Construction equipment and materials shall be stored only in designated staging and stockpiling areas as depicted on the approved construction plans.

5. All construction equipment fueling and maintenance shall occur within designated construction areas and at least 100 feet away from any wetland and/or riparian areas.

6. Fuels, lubricants, and solvents shall be prevented from entering coastal waters or wetlands. Hazardous materials management equipment, including oil containment booms and absorbent pads, shall be easily available at the project site, and a registered professional first-response hazardous materials clean-up/remediation service that serves the construction area shall be on call during all construction activities. Any accidental spill shall be immediately contained and cleaned up, and, if near any habitat areas, such containment and cleanup efforts shall be coordinated with the Biological Monitors and reported to the Executive Director to identify appropriate mitigation ~~emasures~~measures.

7. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in closed containers and removed at least once a day and at the end of the day from the project site.

8. Plastic monofilament netting (erosion control matting) or similar material may not be used at the project site.

9. The spread of noxious weeds shall be controlled throughout the project area, and any plant species identified as noxious by the California Invasive Plant Council that is found within the project limits shall be removed.

10. All areas where vegetation is removed shall be re-vegetated (e.g., hydro-seeding) with locally appropriate native plant species. Narrow leaved milkweed (*Asclepias fasciulmius*) and/or showy milkweed (*A.speciosa*) shall be incorporated into the seed mix with the goal of providing habitat for the monarch butterfly (*Danaus plexippus*).

(e) Construction Site Documents. The plan shall provide that a copy of the signed CDP and the approved Construction Plan shall be maintained in a conspicuous location at the

construction job site at all times, and that the CDP and the approved Construction Plan shall be available for public review on request.

(f) Construction Coordinator. The plan shall provide that a construction coordinator be available 24 hours a day for the public to contact during construction should questions arise regarding the construction. Contact information for the coordinator, including a mailing address, e-mail address and phone number, shall be conspicuously posted at the job site in a place that is visible from public viewing areas, along with information that the construction coordinator should be contacted in the case of any questions regarding the construction. The construction coordinator shall record the name, phone number and/or e-mail address, and nature of all complaints received regarding the construction, and shall investigate complaints and take remedial action, if necessary, within 72 hours of receipt of the complaint or inquiry. All complaints and all actions taken in response shall be summarized and provided to the Executive Director on at least a weekly basis.

(g) Notification. The Permittee shall notify Commission staff at least three working days in advance of commencement of construction during all phases of approved work, and immediately upon completion of construction.

All requirements above and all requirements of the approved Construction Plan shall be enforceable components of this CDP. The Permittee shall undertake development in accordance with this condition and the approved Construction Plan.

5. Final Storm Water Pollution Prevention Plan. PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit two sets of a final Storm Water Pollution Prevention Plan (SWPPP) to the Executive Director for review and approval. Minor adjustments to the following requirements may be allowed by the Executive Director if such adjustments: (1) are deemed reasonable and necessary; and (2) do not adversely impact coastal resources. The final SWPPP shall include provisions for all of the following:

(a) Sediment Controlled. Runoff from the project site may not increase sedimentation in coastal waters or in wetlands post-construction. During construction, runoff from the project site may not increase sedimentation in coastal waters beyond what is allowed under the final Water Quality Certification approved for the project by the Regional Water Quality Control Board.

(b) Pollutants Controlled. Other than as allowed by Special Condition 5(a), no other pollutants may enter coastal waters or wetlands during construction or post-construction.

(c) BMPs. BMPs shall be used to prevent the entry of polluted stormwater runoff into coastal waters and wetlands during construction and post-construction. This includes the use of relevant BMPs in the Proposed Avoidance and Minimization Measures documented in the "Natural Environment Study" for Marin 1/Napa 29 Rumble Strip Project, dated May 2016, and dated received by the Coastal Commission on December 9, 2016.

(d) Spill Measures. An on-site spill prevention and control response program, consisting of BMPs for the storage of clean-up materials, training, designation of responsible individuals, and reporting protocols to the appropriate public and emergency services agencies in the event of a spill, shall be implemented at the project to capture and clean-up any accidental or other releases of oil, grease, fuels, lubricants, or other hazardous materials, including to prevent materials from entering coastal waters or wetlands.

All requirements above and all requirements of the approved SWPPP shall be enforceable components of this CDP. The Permittee shall undertake development in accordance with this condition and the approved SWPPP.

6. **Other Agency Review and Approval.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittee shall submit to the Executive Director written evidence that all necessary permits, permissions, approvals, and authorizations for the approved project have been granted by all applicable agencies, including but not limited to the San Francisco Bay Regional Water Quality Control Board and the United States Army Corps of Engineers, or evidence that no additional authorizations are necessary. Any changes to the approved project required by these agencies shall be reported to the Executive Director. No changes to the approved project shall occur without a Commission amendment to this CDP unless the Executive Director determines that no amendment is legally necessary.

7. **As-Built Plans.** WITHIN ONE-YEAR OF COMPLETION OF CONSTRUCTION, or within such additional time as the Executive Director may grant for good cause, the Permittee shall submit two copies of full size As-Built Plans showing all development completed as part of the approved project. The As-Built Plans shall be substantially consistent with the approved Final Project Plans (see **Special Condition 1**), including providing for all of the same requirements specified in those plans. The As-Built Plans shall include the submittal of color photographs (in hard copy and electronic form) that clearly show all components of the as-built project, accompanied by a site plan that notes the location of each photo point and the date and time of each photograph. The As-Built Plans shall be submitted with a certification by a licensed civil engineer acceptable to the Executive Director verifying that all development was undertaken in conformance with the Final Project Plans (**Special Condition 1**).

IV. COASTAL DEVELOPMENT PERMIT DETERMINATION

A. STANDARD OF REVIEW

The proposed project is located within both the coastal development permit (CDP) jurisdiction of Marin County and the retained CDP jurisdiction of the Coastal Commission. Marin County has a certified Local Coastal Program (LCP). The Commission retains jurisdiction in a portion of the project area because a portion of the project is located within an area defined as former tidelands, submerged land, or land subject to the public trust. Under these circumstances, the Applicant would normally have to obtain two individual CDPs in order to move forward with this project. However, as allowed by Section 30601.3 of the Coastal Act, Marin County and the Applicant have requested the Commission process a consolidated CDP for this project, and the Executive Director has agreed. Therefore, in treating this project as a consolidated permit, the standard of review for this CDP application is the Chapter 3 policies of the Coastal Act, with the certified County LCP used as guidance.

B. PROJECT LOCATION

The proposed project is located along Highway 1 between post miles (PM) 3.1 and 50.5 in Marin County. All project activities would occur within the existing Caltrans' right of way along Highway 1. In addition to constructing rumble strips in the roadway centerline, the Applicant also plans to widen roadway shoulders in 40 locations to provide improved access for bicyclists and pedestrians. These locations are all generally uphill or flat sites and, except for the shoulder widening that will occur between PM 12.50 and PM 12.70 in Stinson Beach, they are sited on existing gravel pullout areas, where no existing vegetation is present.

The habitat surrounding the project area along Highway 1 in Marin County largely consists of northern coastal scrub habitat and coastal hills with redwood stands and open grassland habitat. The habitat adjacent to the southbound travel lanes of Highway 1 between PM 12.50 and 12.70 in Stinson Beach consists of vegetation and wetland areas that line the Easkoot Creek riparian corridor. Easkoot Creek is a tributary to Bolinas Lagoon that starts on the western slope of Mount Tamalpais, crosses under Highway 1 in Stinson Beach, and then flows north between Highway 1 and the Calles and Patios residential areas before meeting Bolinas Lagoon.

See **Exhibit 1** for a map of the project location and approximate shoulder widening locations.

C. PROJECT DESCRIPTION

The Applicant proposes to install centerline rumble strips along Highway 1 for approximately 30 miles in Marin County, as well as extending roadway shoulders at 40 locations in the same area. Of these 40 locations, 39 will be sited within existing gravel pullouts or ruderal areas adjacent to the roadway. Centerline rumble strips will not be placed: a) in areas where existing travel lanes are less than 11 feet wide; b) at public road intersections, and where public streets and commercial driveways being used by approximately 500 or more vehicles per day intersect with Highway 1; c) in commercial town centers and residential zones; d) on any bridge decks; e) at any two-way left turn lanes; or f) where passing is permitted. The purpose of the proposed project is to reduce the frequency and severity of cross centerline collisions, and to enhance the safe mobility of all of the traveling public, including bicyclists and pedestrians, via shoulder widening.

Rumble strips are defined as a series of shallow indentations made in the roadway pavement that create a vibratory, or rumbling, effect when driving a vehicle over them. Rumble strips are typically 11 inches wide, 3 inches long, and about 1-inch deep and are spaced 12 inches apart continuously along the center median. The proposed operation includes specialized machines to grind the existing asphalt; sweepers to pick up the debris and clean the roadway; and dump trucks to load and haul the ground-up debris to an approved off-site location. Permanent pavement delineation markings will be applied with a 4-inch double-yellow thermoplastic stripe on the roadway centerline and 4-inch white thermoplastic striping on the outer edge of the travel lane.

Shoulder widening is an extension of the paved portion of the roadway beyond the edge of the travel lane. The proposed widening construction consists of excavating the shoulder areas at specified locations to a depth of 14 inches and a width of 4 feet, then placing subbase material and compacting it and, finally, placing hot mix asphalt and rolling it. A taper of 10:1 where the widened shoulder transitions back to a narrower shoulder will be maintained at the end of each shoulder widening location. The Applicant conducted site visits with certain interested parties in 2015 to identify all the potential shoulder widening locations that would be the most optimal for improving bicycle and pedestrian safety.

To construct the centerline rumble strips and widened shoulders, one-way reverse control flagging would be used to accommodate traffic through most construction work areas. Traffic in one direction would be temporarily stopped, while opposite traffic would be allowed to proceed through the work areas. Because the grinding operations would occur along the centerline, traffic in both directions would be temporarily stopped for a maximum of ten minutes in narrow roadway sections. The contractor would temporarily store equipment on gravel pull-outs throughout the project area, with the exception of PMs 4.7-6.9, 15.2-30.7, 46.4-47.9, and 50.1-50.2, in order to avoid impacts to special status species habitat. The Applicant proposes to start the project beginning in May 2018; proposed project activities would require approximately 50 days to complete, except between PM 12.50 and PM 12.70 north of Stinson Beach where project construction may take up to 160 days to complete. Thus, most of the project would be completed within 50 days of commencement with a small portion taking up to 160 days to finish.

Although not a part of the certified Marin County LCP, the proposed project is identified as a priority in the 1985 Stinson Beach Community Plan:[1] including:

> ***Objective 1.0: Circulation and traffic conditions should be improved.***
> …
> *Policy H. Safe and easily reached pathways for pedestrians, bicyclists and equestrians should be developed. Limited shoulder improvements along State Highway 1 together with striping could provide a bikeway within Stinson Beach.*

[1] Marin County Planning Department, "Stinson Beach Community Plan," 1985.

Communities along Highway 1 in Marin County have long sought these types of pedestrian and bicyclist improvements for over thirty years. On February 4, 2017, Caltrans staff presented project information to members of the Stinson Beach Village Association and other local residents, and received unanimous support from those in attendance. The existing paved shoulder of Highway 1 is very narrow between southbound PM 12.50 and 12.70 north of Stinson Beach, and the adjacent gravel between these two post mile markers is impassable almost year-round due to standing water, which creates a public safety issue by forcing pedestrians and bicyclists into the southbound vehicular travel lanes. The existing paved shoulder is also very narrow on the northbound side with an adjacent drainage ditch.

See **Exhibit 2** for project plans and **Exhibit 3** for project photos, including photos and simulations of the four shoulder widening sections between PM 12.50 and 12.70 north of Stinson Beach.

D. ENVIRONMENTALLY SENSITIVE HABITAT AREAS AND WETLANDS

Applicable Policies

Environmentally Sensitive Habitat Areas (ESHAs) are defined in Section 30107.5 of the Coastal Act as areas in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem, and which could be easily disturbed or degraded by human activities and development. Section 30240 of the Coastal Act states that ESHAs shall be protected against disruption of habitat values and that only uses dependent on the resources shall be allowed within an ESHA. Section 30240 also requires that development adjacent to such areas be sited and designed to prevent impacts that would significantly degrade those areas, and to be compatible with the continuance of the ESHA. Coastal Act Section 30240 states:

> *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
>
> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

Coastal Act Section 30233 protects open coastal waters, wetlands, estuaries and lakes, and only allows for filling of these areas where there is no feasible less environmentally damaging alternative, where feasible mitigation measures have been provided to minimize adverse environmental effects, and only for certain specific types of development and uses. Coastal Act Section 30233 states:

> *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:*

(l) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.

(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.

(3) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.

(4) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.

(5) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.

(6) Restoration purposes.

(7) Nature study, aquaculture, or similar resource dependent activities

(c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary. Any alteration of coastal wetlands identified by the Department of Fish and Game, including, but not limited to, the coastal wetlands identified in its report entitled, "Acquisition Priorities for the Coastal Wetlands of California", shall be limited to very minor incidental public facilities, restorative measures, nature study, commercial fishing facilities in Bodega Bay, and development in already developed parts of south San Diego Bay, if otherwise in accordance with this division.

Coastal Act Section 30231 requires that the quality of coastal waters and streams be maintained, stating:

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Analysis

The rumble strip portion of the project takes place in the middle of the highway, and thus will not take place within any sensitive areas. Similarly, almost all of the 30 mile-long shoulder widening area consists of existing gravel and ruderal areas along the side of the paved highway, and also is not within any sensitive areas. However, within a 0.2 mile portion of the project area

wetlands are present adjacent to the area where shoulders would be widened. These wetlands are confined to the area between PM 12.50 and 12.70 north of Stinson Beach. These wetlands consist of drainage areas along the highway, as well as willow thickets associated with the drainages, all of which are associated with the hydrologic function of adjacent Easkoot Creek. At that location, the proposed project would cover some 700 square feet of wetland area with pavement, and would affect another approximately 750 square feet of wetlands due to temporary construction incursion into these areas. According the Applicant's biological reports and the USFWS, California red-legged frog (*Rana draytonii)* also has potential to occur in these wetland locations. The California red-legged frog is a state species of special concern and is listed as threatened under the federal Endangered Species Act.

See **Exhibit 4** for a map of coastal wetland impacts and **Exhibit 5** for the USFWS Biological Opinion for this project.

Environmentally Sensitive Habitat Areas

California red-legged frogs predominately inhabit permanent water sources, such as streams, lakes, marshes, and natural and man-made ponds, and typically breed between November and April in still or slow-moving water, often in areas with emergent vegetation and overhanging willows. During other parts of the year, their habitat includes nearly any area within 1-2 miles of a breeding site that stays moist enough and cool enough through the summer. This can include vegetated areas with coyote brush, California blackberry thickets, and root masses associated with willow and California bay trees. Sheltering habitat for California red-legged frogs can encompass all aquatic, riparian, and upland areas within the range of the species and include any landscape features that provide cover, such as existing animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Incised stream channels narrower and deeper than about 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

Although not specifically observed on site, the California red-legged frog has been observed 3.7 miles south of Stinson Beach in ponds and wet drainages near Redwood Creek in Muir Beach. Based on these sightings, and because the project is located within the species' range and current distribution, USFWS concluded in its Biological Opinion that the California red-legged frog could occur within the project area and that non-breeding habitat exists within the construction footprint.[2] Coastal Commission biologists concur, and note in addition that the lack of direct observations of California red-legged frog in the project area may be due more to limited sampling activities than to their actual absence.

Shoulder widening between PM 12.50 and PM 12.70 will result in impacts to 0.25 acres of California red-legged frog habitat from the above-referenced fill of wetlands along the existing

[2] USFWS Formal Consultation on the Centerline Rumble Strip and Shoulder Widening Project, Marin and Napa Counties, California, May 2016, page 16.

roadway, as well as from related vegetation removal.[3] Construction disturbance will likely impose direct impacts (e.g., species or habitat displacement, contact with construction equipment, etc.) on California red-legged frog. Use of the area by the California red-legged frog may also be reduced until riparian and wetland features of the site are fully restored, a period that may take several years.

Because the California red-legged frog is a federally-listed species, and because California red-legged frogs potentially use wetlands in the project area for foraging, sheltering and aestivation, all wetland areas in the project footprint meet the definition of environmentally sensitive habitat areas (ESHA) under Section 30107.5 of the Coastal Act, and are therefore subject to the provisions of Section 30240. These areas constitute ESHA because they are especially valuable due to their role in the ecosystem of providing essential habitat for a diverse assemblage of sensitive wetland species, including CRLF. Since these areas constitute ESHA, project impacts to the wetland areas are in conflict with Section 30240(a) of the Coastal Act which states that "only uses dependent on those resources shall be allowed within those areas" because road paving is not such a use.

At the same time, these affected ESHA areas are also wetlands. And the Coastal Act's provisions for wetlands are materially different and more specific to that type of resource than for ESHA more generally. In cases where there are more general requirements and there are more specific requirements, the laws of statutory construction generally defer to the more specific.[4] With respect to the wetlands that are also ESHA, there have also been very specific Court decisions. As stated in *Bolsa Chica Land Trust et al. v. The Superior Court of San Diego County ((1999) 71 Cal.App.4th 493, 515)*:

> *...the ESHA protections provided by section 30240 are more general provisions and the wetland protections provided by section 30233 are more specific and controlling when a wetland area is also an ESHA.... Section 30240, a more general policy, also applies, but the more specific language in the former sections is controlling where conflicts exist with general provisions of Section 30240.*

As such, the aspects of the proposed project which result in or are related to the fill of wetlands that are *also* considered ESHA may be allowed under Section 30233 if all requirements of this Section of the Act are met. Coastal Act Section 30233(a) requires that the fill of wetlands may occur only for 1) certain enumerated allowable uses, 2) where there is no feasible less environmentally damaging alternative, and 3) where mitigation measures have been provided to minimize adverse environmental impacts.

Allowable Use in Wetlands

[3] Total CRLF habitat impacted includes all of the 0.03 acres of wetland area described above, and an additional 0.22 acre of non-wetland area that would be affected by the project, for a total of 0.25 acres of impacted CRLF habitat.

[4] Giving precedence to the more particular provisions of a section over the more general provisions of another section of the same law is in accord with generally applicable principles of California law (see, for example, Civil Code Section 3534 ("Particular expressions qualify those which are general")).

As presented by the Applicant, the project is proposed as a safety project to reduce head-on collisions and improve bicycle and pedestrian safety along Highway 1 in Marin County. Based on this set of intended purposes, construction of the rumble strip and shoulder widening is an allowable use under Coastal Act Section 30233(a) because the project's purpose is to render an incidental public service, as allowed by Section 30233(a)(4).

The Commission has considered what constitutes an incidental public service many times. First and foremost is whether the project is initiated by a public agency for a public purpose, such as replacement of old railroad bridges (CC-059-09); expansion of a railroad line (CC-052-05, CC-086-03) or modifications to an airport (CC-058-02). In this case, the project has been initiated by a public agency, Caltrans, for a public purpose (i.e., public safety), and to ensure continued public use of Highway 1, which provides access for the public to, from, and along the coast. Thus, the proposed project represents a public service project.

Second, the use must be incidental. The Commission has also had many times considered that question as well. *Bolsa Chica*, cited above, supported the Commission's use of incidental public service purposes and elaborated as follows (*supra*, 71 Cal.App4th at p. 517):

> *In particular we note that under Commission's interpretation, incidental public services (IPS) are limited to temporary disruptions and do not usually include permanent roadway expansions. Roadway expansions are permitted only when no other alternative exists and the expansion is necessary to maintain existing traffic capacity.*

In this case, the paved area is expanding, but it is almost entirely expanding over existing highway turnouts that are graveled or ruderal in nature. It is only expanding over wetlands in the 0.2 mile stretch near Stinson Beach. In that area, there is no other alternative, and the expansion is necessary to maintain existing traffic capacity safely, consistent with the Court's findings in *Bolsa Chica*. In any case, although the new shoulders of the roadway will be larger and wider than the current shoulders in that 0.2 mile area, the project will not expand the vehicular traffic capacity of Highway 1 in this area or the project area overall. Therefore, the Commission concludes the fill required by the project is for an incidental public service purpose. Thus, the project qualifies as an allowable use under Section 30233(a).

Least Environmentally Damaging Alternative

Coastal Act Section 30233(a) further requires that any fill in wetlands employ the least environmentally damaging alternative. In this case, an alternative that avoids impacting wetlands is not feasible because: 1) any shoulder widening project that addresses the issue of pedestrian safety and improved non-automobile circulation would involve permanent and temporary impacts to wetlands between PM 12.50 and PM 12.70; and 2) the current design minimizes, but does not eliminate, the amount of wetland areas impacted.

The Commission finds that the proposed shoulder widening minimizes disturbance to wetland ESHA, proposes adequate mitigation where there is disturbance to wetland ESHA, and, as conditioned to provide that mitigation occurs in a timely manner, is therefore the least damaging environmental alternative available, consistent with that provision of Section 30233(a).

Mitigation

To satisfy the remaining requirements of Coastal Act Section 30233(a), the project must incorporate appropriate mitigation measures to minimize adverse impacts. To minimize impacts to California red-legged frog, the Applicant proposes a complete list of avoidance and minimization measures that are detailed in the "Natural Environment Study" prepared for the project.[5] Measures include the presence of biological monitors on-site, pre-construction surveys of vegetation clearance and ground disturbance areas, and the restriction of vegetation clearance and ground disturbance to appropriate time periods, among others. Water quality best management practices are also proposed to prevent dust and sediment from washing into or entering adjacent wetland habitat or creeks.

The Applicant also proposes to restore appropriate native vegetation to all wetland and upland areas that will be temporarily and permanently disrupted by construction activities. Temporarily impacted areas will be restored onsite at a ratio of 1:1 or greater immediately following construction. In addition, mitigation will occur off-site at a ratio of 4:1 for wetland vegetation removal and 2:1 for areas cleared of riparian vegetation. All of these things will also ensure that the project maintains, and in some ways enhances, the functional capacity of the wetland area involved, consistent with the requirements of Section 30233(c).

To ensure consistency with Sections 30233(a) and (c), the Commission requires several special conditions regarding the project components that involve fill in wetlands. Specifically, **Special Condition 2** requires submission and Executive Director approval of a Restoration Plan to ensure all impacted wetland areas on-site are properly restored, and as feasible, improved from their pre-construction condition, and that a comprehensive mitigation plan be prepared and carried out for all onsite and off-site mitigation at proposed ratios. This condition further requires that the Restoration Plan include a detailed site plan of the restoration area, a baseline assessment of the habitat, design and construction methods that would be used to restore the habitat, and that a reporting schedule including annual reports be submitted to the Commission. **Special Condition 3** requires biological monitoring during project implementation and adherence to the USFWS-required avoidance and minimization measures. **Special Condition 4** requires the submittal of a Construction Plan that assures construction areas are contained, construction is timed not to interfere with California red-legged frog breeding season, that BMPs for erosion control and water quality are incorporated, and that a designated construction site coordinator is available to be contacted if there are problems or questions regarding construction. S**pecial Condition 4** also requires that areas where construction and staging activities occur are minimized; that they avoid sensitive habitat; that work be confined to daylight hours to reduce lighting impacts and to protect species habitat at night; that earth-moving activities occur only outside of the California red-legged frog breeding season; that construction best management practices as detailed in the CDP be included in construction plans and conspicuously posted at the construction site; that construction workers are educated in these methods and agree to abide by them; that areas used during construction be restored immediately after construction is completed; and that Commission staff be notified before and after construction begins and ends. **Special Condition 5** requires a final storm water pollution prevention plan to be submitted that

[5] Marin 1/Napa 29 Rumble Strip Project Natural Environment Study – Minimal Impacts, May 2016.

requires that runoff from the project does not increase sedimentation, pollutants associated with construction do not pollute coastal waters, BMPs are implemented and scheduled to prevent pollution of coastal waters, and that on-site spill prevention and control response program are in place and implemented. Finally, **Special Condition 6** requires the submittal of approvals from other agencies, such as the Regional Water Quality Control Board, for any other permits, approvals, or permissions required for the proposed project from those agencies.

Conclusion

As proposed, and as conditioned by the Commission, the project is consistent with Coastal Act Sections 30231 and 30233. Appropriate protections are provided to minimize potential adverse environmental effects associated with wetland fill activities. Given the project's purposes of public safety and enhanced cyclist and pedestrian access, the proposed protection measures, and the project alternatives the Applicant examined, the Commission finds that there is no feasible less environmentally damaging alternative that could also ensure species and habitat protection while improving public safety and access. Moreover, the overall amount of fill impacting the wetlands is minimized to the extent feasible, and small enough to be described as fulfilling an incidental public purpose under Section 30233(a). Therefore, the activity of fill required by the project is consistent with the limited purposes proscribed by this subsection of 30233.

E. PUBLIC RECREATIONAL ACCESS

Applicable Policies

Coastal Act Section 30210 requires public recreational access is provided consistent with public safety needs and states:

> *In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

Coastal Act Section 30211 requires that development not interfere with the public's ability to access the sea, and states:

> *Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

Coastal Act Section 30252(3) encourages new development to facilitate alternative transportation by:

> *providing non-automobile circulation within the development...*

Coastal Act Section 30253 states:

> *New development shall do all of the following:*
>
> *(a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*

(d) Minimize energy consumption and vehicle miles traveled.

Although not the standard of review, County LCP Unit II policies regarding transportation and public services state:

Transportation

13. Highway 1 provides an important and limited access route to the coastal zone. The narrow, twisting two-lane roadway successfully complements the rugged, open character of this coastal area. Highway 1 shall remain a scenic, two-lane roadway. Roadway improvement projects shall not, either individually or cumulatively distract from the rural scenic characteristics of the present roadway. Improvements (beyond repair and maintenance) shall be limited to minor roadway improvements as identified below:

- *Expansion of roadway shoulder paving to accommodate bicycle/ pedestrian traffic along the highway shoulder.*

Public Services

4. Transportation and road capacity.

c. Alternative methods of transportation. The County discourages the excessive use of private automobiles and strongly supports the development of expanded public transit and other alternative methods of transportation in the coastal zone, such as bicycles. Bicycle and pedestrian paths, separated from roads where possible, are especially encouraged.

Analysis

Highway 1 importantly serves as the primary access route and a critical link to a large stretch of the Pacific coastline in this area north of San Francisco. Currently, coastal access along this route is generally adequate for motor vehicles. However, it is inadequate or unsafe for cyclists and pedestrians in many places, including due to the lack of a sufficient shoulder and the lack of off-highway alternatives (such as separated pedestrian/bicyclist pathways) in most places. For example, in the Stinson Beach area affected by the project between PM 12.50 and 12.70, the western shoulder experiences seasonal flooding. According to the Applicant, a narrow groundwater depression wetland feature parallels the existing road shoulder. Easkoot Creek's lower reach backs up during high tide, historically resulting in flooding that reaches the project footprint. When flooding occurs in the shoulder, pedestrians and bicyclists are forced to travel in the southbound lane. The proposed centerline rumble strip and shoulder widening project would not only reduce head-on collisions, but it would also improve public access in this area by widening the shoulder by four feet in strategic locations that would most benefit pedestrians (e.g., in the village core of Stinson Beach where the shoulder is currently impassable with standing water), and that would most benefit cyclists (e.g., flat and uphill locations where the existing shoulder is insufficient). Thus, with implementation of this project, safety conditions will be improved for cyclists and pedestrians seeking access to the coast via this route.

Highway 1 is recognized as the Pacific Coast Bicycle Route and, including due to its spectacular scenery, draws many recreational bicycle riders. The Marin County Bicycle Coalition (MCBC) has remaining concerns over the installation of the centerline rumble strip between PM 18.0, located at the northern end of Tomales Bay, and PM 25.9 at the southern end of Bolinas Lagoon,

because the installation will not be accompanied by shoulder widening in this 8 mile-long section. Most of this area is not in the coastal zone and thus is not a part of this proposed project under the CDP. Although shoulder widening in this section may be feasible in the future, the Applicant was not able to include it in the currently proposed project due to unresolved visual resource protection concerns associated with the Golden Gate National Recreation Area's Olema Valley Ranches Historic District, which is administered by Point Reyes National Seashore. The District is one of twelve historic cultural landscapes within the National Seashore, all of which are being evaluated and, where necessary, rehabilitated, following guidelines of the National Register of Historic Places. Due to timing concerns, Caltrans is not pursuing widening in this area now, but has indicated it will consider a future widening project in the area provided issues associated with the Historic District can be addressed.

In a letter dated February 7, 2017, MCBC has requested that, if shoulder widening cannot be included in this section of Highway 1, that the Applicant install signage near northbound PM 18.0 and southbound PM 25.9, stating that "Bicycles May Use Full Lane." Likewise, MCBC has requested that the Applicant install green-backed "sharrows" (i.e., shared-lane markings painted on pavement)[6] in the center of the vehicular lanes along Highway 1 through Marin County, with an emphasis on the Olema Valley section identified above. Those symbols would serve to alert motorists of the presence of bicyclists sharing the lanes. Similar suggestions for the shoulder widening between PM 12.50 and 12.70 were made by attendees at the Stinson Beach Village Association meeting on February 4, 2017, including a desire to explore the feasibility of "No Parking" signs, painted symbols, or flexible delineator posts, in order to protect the pedestrian improvements from vehicles that might park in the widened shoulder.

See **Exhibit 6** for public correspondence, including letters from the Marin County Bicycle Coalition and the Stinson Beach Village Association.

To ensure consistency with Sections 30210, 30211, and 30252, the Commission finds it is necessary to require special conditions regarding the project components that involve bicyclist safety. Specifically, **Special Condition 1** requires the Applicant to install additional bicycle safety signage in the context of existing signage along Highway 1 in Marin County, based on demonstrated public safety concerns at particular locations, avoidance of coastal resource impacts, and agency approvals. With respect to sharrows, they have not been used along Highway 1 in Marin County, and may detract from its rural, scenic character. Furthermore, they may not be appropriate where the speed limit exceeds 35 miles per hour.[7] As far as the proposed no parking signs, it is not clear at the current time that such signs are warranted or would be beneficial to public access at the current juncture. The Applicant and the County have not yet determined that such signage is necessary, and the Commission finds it is not necessary to require that particular signage at this time. Nothing in this action prevents the County and the

[6] See Federal Highway Administration's Bicycle and Pedestrian Program, Bicycle Facilities and the Manual on Uniform Traffic Control Devices, Green-Colored Pavement with the Shared-Lane Marking: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/mutcd/gcp_slm.cfm.

[7] See Federal Highway Administration's Manual of Uniform Traffic Control Devices, Markings, Shared Lane Markings https://mutcd.fhwa.dot.gov/htm/2009/part9/part9c.htm.

Applicant from pursuing additional signage, subject to regulatory review and approval, in the future. Finally, the Applicant is required through **Special Condition 7** to submit As-Built Plans to document the final condition of project construction.

As proposed, construction will require one-way reverse control flagging in order to provide for continuous public access to the coast via Highway1. Traffic in one direction would be temporarily stopped, while opposite traffic would be allowed to proceed through the work area. For narrow roadway sections, traffic in both directions would be temporarily stopped for a maximum of up to ten minutes. Given the provision of continued access for one-way traffic, there should be limited impacts to vehicle and pedestrian travel and as a result, no significant adverse impacts to public access to and along Highway 1.

As conditioned, the construction of this project would increase public access and safety to these important recreational areas of the northern coast and provide improved opportunities for non-automobile circulation, thereby minimizing risk in an area prone to floods, and minimizing energy consumption and vehicle miles traveled, consistent with Coastal Act Sections 30210, 30211, 30252, and 30253. Increased safety for cyclists and pedestrians additionally helps promote those public recreational uses of the coastline. Therefore, this project as conditioned is consistent with Coastal Act Sections 30210, 30211, 30252, and 30253. Moreover, the completed project will enhance public access in the project area and is consistent with the public access and recreation policies of the Coastal Act.

F. VISUAL RESOURCES

Applicable Policies

The scenic and visual qualities of coastal areas are protected under Coastal Act Section 30251, which states:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas…*

Analysis

The proposed project design is consistent with the Marin State Route 1 Repair Guidelines, prepared by Caltrans through a multi-year collaboration with the Marin County Bicycle Coalition, National Park Service, Marin County Department of Public Works, California Coastal Commission, and California State Parks. Specifically regarding recommended shoulder widths, the Guidelines state:

> ***Shoulder Width:*** *A 4-foot-wide shoulder is the recommended shoulder width in rural areas… narrower shoulders may be appropriate in some downhill sections where bicycle traffic has the opportunity to use the full lane width or where wider shoulders would*

individually or cumulatively adversely affect sensitive or scenic coastal resources and to avoid development outside of the right-of-way.[8]

Bicycle and Pedestrian Facilities
In some locations, it may be appropriate to increase the paved shoulder width, such as where with poor line of sight, vertical elements such as MBGR [metal beam guardrail] or bridge rail are present or proposed for extended lengths because these elements limit the ability of bicyclists to use the full width of the shoulder. Shoulders wider or narrower than 4 feet in a rural environment should also be based on sensitivity of adjacent land, severely constrained conditions where narrower or wider shoulders would be appropriate given the actual or expected volume of bicycle and pedestrian traffic using the shoulder for mobility, taking into account site-specific topography and particular user needs from a corridor perspective.[9]

These Guidelines were created in part to address the concern that highway projects, such as this, could have adverse public view impacts, among other issues. The Guidelines identify ways to ensure the protection of the significant public views associated with Highway 1 through Marin County at the same time as allowing for necessary and prudent highway projects, including repairs, and reflect an effective balancing of sometimes competing objectives. Absent compelling information to the contrary, the Commission has relied extensively on the Guidelines in helping Caltrans to develop projects, as well as in approving CDPs for projects. This project meets all of the Guidelines' parameters.

Moreover, a fundamental component of the project is to use the 4-foot shoulder widened area to enhance public recreation and access to the coast. Thus, and consistent with the Guidelines, the proposed shoulder widening will occur only in uphill and flat locations, rather than in downhill locations where bicycle traffic has the opportunity to use the full lane width. As discussed above, additional shoulder widening through the Olema Valley Ranches Historic District between PM 18.0 and PM 25.9 is not proposed currently and will require additional Caltrans analysis.

In the interim, the Commission finds that it is necessary to install signage for bicyclist safety to reduce conflicts between vehicles and cyclists through this section. This request is consistent with the Marin State Route 1 Repair Guidelines, which state that "only signs that are necessary for the safety of the traveling public and that convey essential information to the traveler, including wayfinding/directional signs, should be installed." Thus, **Special Condition 1** requires the Applicant to revise the Final Project Plans to include a signage plan that will propose new signage targeting areas where public safety concerns are greatest, while avoiding impacts to coastal resources, including the significant public view along Highway 1 in Marin.

Conclusion
As conditioned, the proposed development will protect views of a scenic coastal area and minimize alteration of natural landforms. Therefore, the Commission finds the current design to

[8] Caltrans, "Final Marin State Route 1 Repair Guidelines," July 2015, p. 33.

[9] Final Marin State Route 1 Repair Guidelines, p. 49.

be visually compatible with the character of the surrounding area and consistent with Coastal Act Section 30251.

G. OTHER

Several public comments have raised concerns over noise that could potentially be generated by the rumble strips in residential areas. However, the rumble strips will not be installed through town centers including Muir Beach, Stinson Beach, Woodville, Five Brooks, Olema, Point Reyes, Marconi, Marshall, Blake's Landing, Nick's Cove, Tomales and Fallon, nor will the rumble strips be installed adjacent to residential zones. In other areas, there would be some increased intermittent noise due to the rumble strips, but it is not expected that noise concerns with the rumble strips rise to a level requiring mitigation in any case.

H. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Section 13096 of the California Code of Regulations requires that a specific finding be made in conjunction with coastal development permit applications showing the application to be consistent with all applicable requirements of CEQA. Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment.

Caltrans, the Applicant, is the lead agency responsible for CEQA review. The Applicant approved a Categorical Exemption for this project on May 17, 2016 (CEQA Guideline 15301(c), minor alteration of an existing highway). The initial study found potential impacts to biological resources, cultural resources, and water quality, but found all impacts to be less than significant.

The Coastal Commission's review and analysis of land use proposals has been certified by the Secretary of Resources as being the functional equivalent of environmental review under CEQA. The Commission has reviewed the relevant coastal resource issues associated with the proposed project, and has identified appropriate and necessary modifications to address adverse impacts to such coastal resources. The preceding findings in this report have discussed the relevant coastal resource issues with the proposal, and the permit conditions identify appropriate mitigations to avoid and/or lessen any potential for adverse impacts to said resources consistent with the requirements of the Coastal Act. All public comments received to date have been addressed in the findings above. All above findings are incorporated herein in their entirety by reference.

The Commission finds that only as modified and conditioned by this permit will the proposed project avoid significant adverse effects on the environment within the meaning of CEQA. As such, there are no additional feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse environmental effects that approval of the proposed project, as modified, would have on the environment within the meaning of CEQA. If so modified, the proposed project will not result in any significant environmental effects for which feasible mitigation measures have not been employed consistent with CEQA Section 21080.5(d)(2)(A).

APPENDIX A – SUBSTANTIVE FILE DOCUMENTS

1. State of California, Department of Transportation, Marin 1/Napa 29 Rumble Strip Project, Marin and Napa Counties, California, Natural Environment Study – Minimal Impacts, May 2016.
2. State of California, Department of Transportation, Marin State Route 1 Repair Guidelines, July 2015.

APPENDIX B – STAFF CONTACT WITH AGENCIES AND GROUPS

1. Applicant (Caltrans)
2. Marin County Department of Public Works
3. Marin County Planning Department
4. Marin County Bicycle Coalition
5. United States Fish and Wildlife Service
6. Golden Gate National Recreation Area
7. Point Reyes National Seashore
8. California Department of Parks and Recreation
9. Stinson Beach Village Association

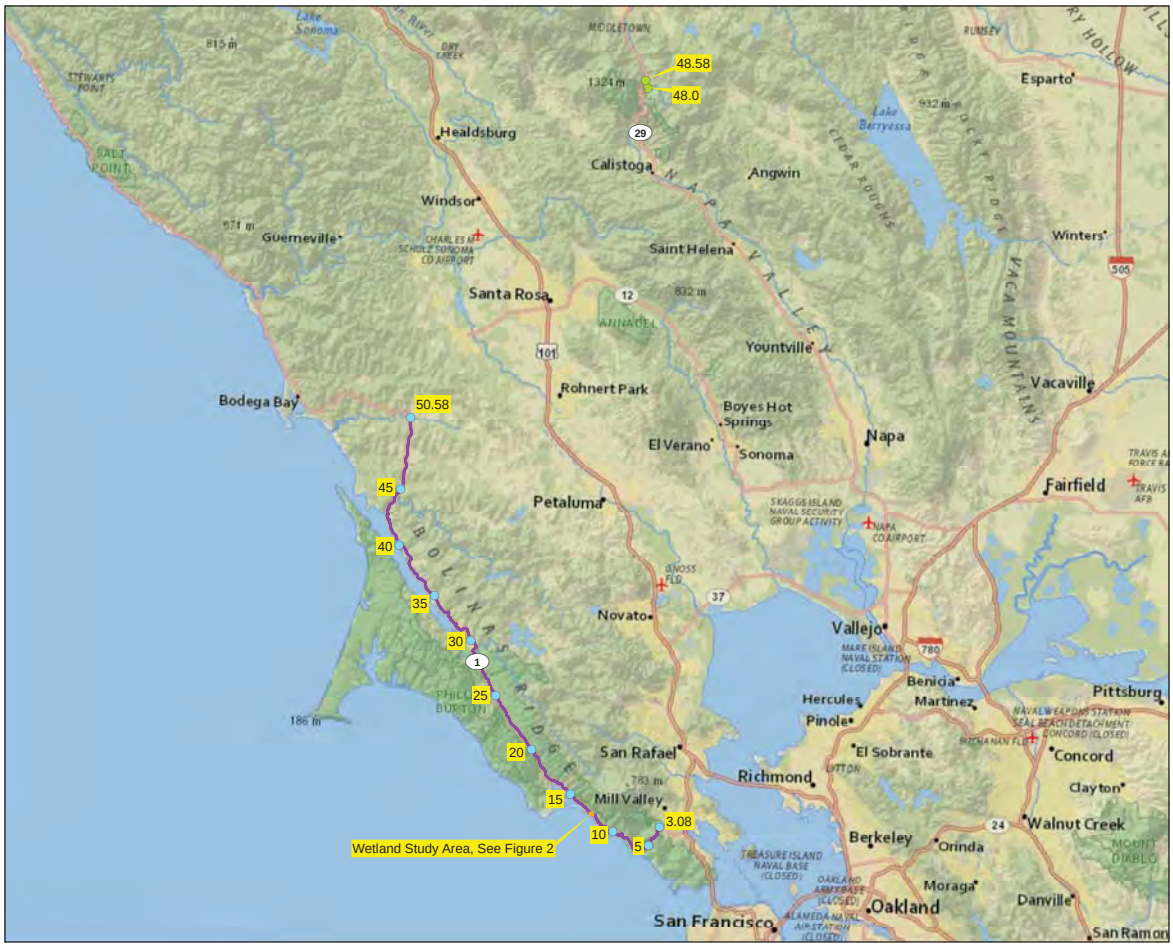
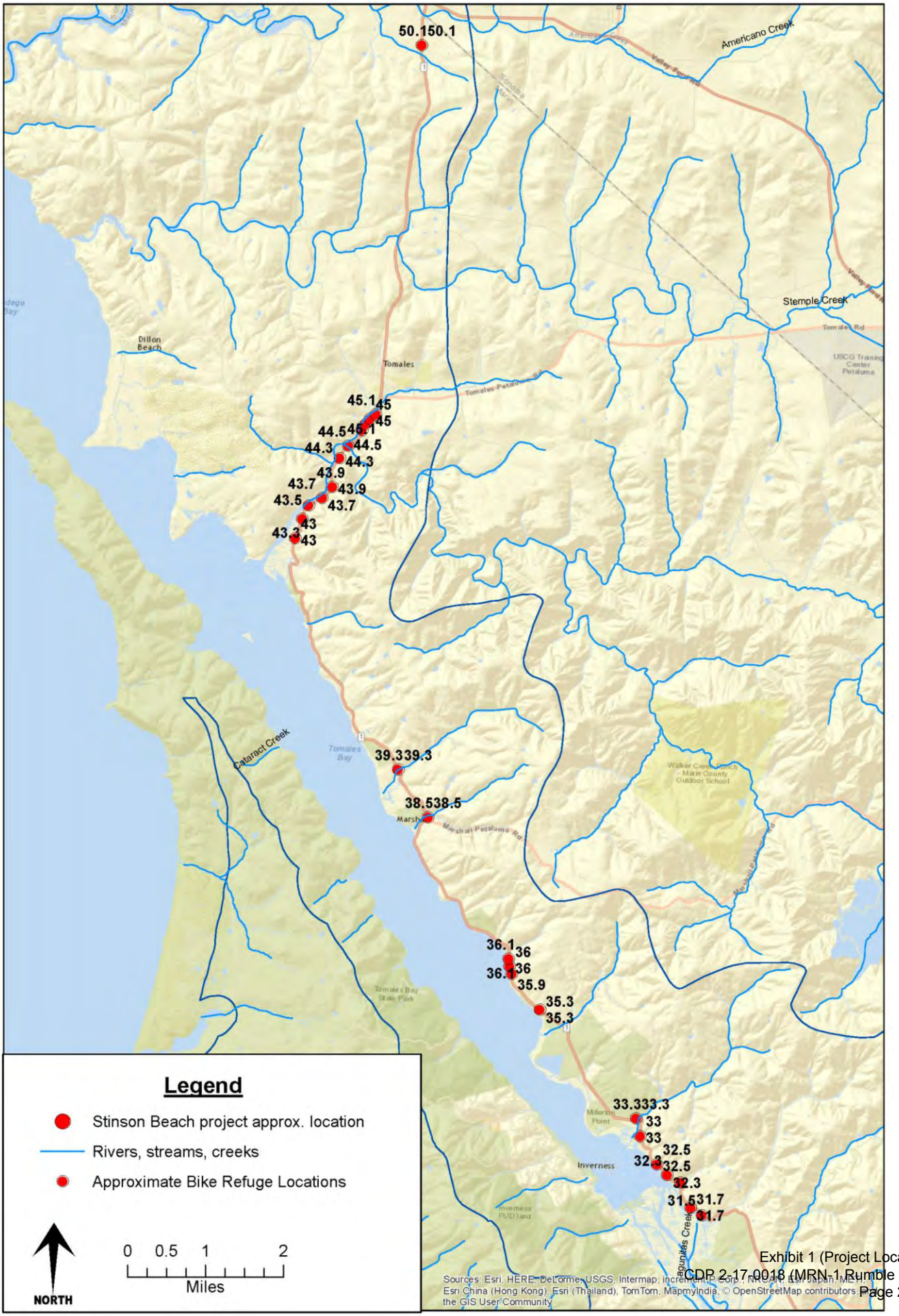


FIGURE 1
Project Location
State Route 1, 29
Rumble Strip Project
EA 04-4H870 MRN-1 Post Mile 3.08 - 50.5,
NAP-29 Post mile 48.0 - 48.58
Marin and Napa County, California

BAOFPP01 C:\PROJ\CALTRANS\666239_D4ENVONCALL2015-2018\TO1_BIOLOGICAL_SUPPORT\4H870_MRN1_RUMBLESTRIP\GIS\MAPFILES\2015\WETLANDS\FIG1_PROJECT_LOCATION_4H870.MXD CARCHER 12/11/2015 6:49:16 PM


50.150.1
Americano Creek
Stemple Creek
Dillon Beach
Tomales
Tomales Rd
USCG Training Center Petaluma
45.145
45
44.545
45.1
44.5
44.3
44.3
43.9
43.7
43.9
43.5
43.7
43
43.3
43
Cataract Creek
Tomales Bay
39.339.3
38.538.5
Marshall-Petaluma Rd
Walker Creek Ranch - Marin County Outdoor School
36.136
36
36.1
35.9
35.3
35.3
Tomales Bay State Park
33.333.3
Miller Point
33
33
32.5
32.3
32.5
32.3
31.531.7
31.7
Inverness
Inverness PUD Land
Lagunitas Creek
Legend
Stinson Beach project approx. location
Rivers, streams, creeks
Approximate Bike Refuge Locations
NORTH
0 0.5 1 2
Miles
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Big Carson Creek
Cascade Creek
Fairfax Creek
Sleepy Hollow Creek
San Rafael
San Rafael Creek
San Anselmo Creek
Laguntias Creek
Bon Tempe Creek
Phoenix Creek
Ross Creek
Ross
Kentfield
Tamalpais Creek
Van Wyck Creek
Swede George Creek
Middle Fork Laguntias Creek
East Fork Laguntias Creek
Larkspur Creek
Larkspur
Corte Madera
Corte Madera Del Ronstado Arroyo
Cataract Creek
Old Mill Creek
Cascade Creek
Rattlesnake Creek
Spike Buck Creek
Fern Creek
Bolinas Lagoon
Bolinas
Bolinas Bay
Stinson Beach
Webb Creek
Kent Creek
Lone Tree Creek
Redwood Creek
Coyote Creek
14.5 14.5
13.8 13.8
13.5
13.5
12.9
12.9
12.5 12.5 12
12
11.2
9.3
9.3
8.4
8.4
3.9 3.9
6.4
6.4
Legend
Stinson Beach project approx. location
Rivers, streams, creeks
Approximate Bike Refuge Locations
NORTH
0 0.5 1 2
Miles
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

INDEX OF PLANS

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	3.1/50.5 48.0/48.6	A	A

STATE OF CALIFORNIA

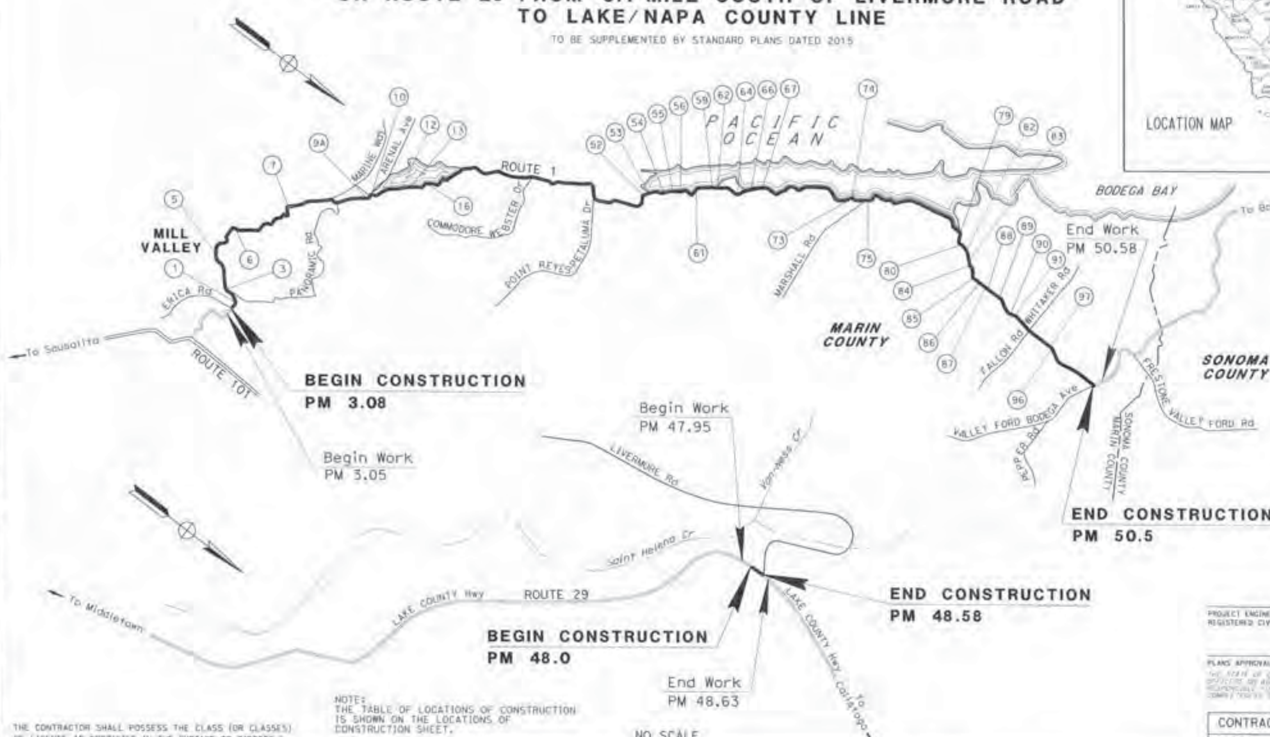
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON

STATE HIGHWAY

IN MARIN AND NAPA COUNTIES ON ROUTE 1 FROM 0.3 MILE WEST OF ERICA ROAD TO THE MARIN/SONOMA COUNTY LINE AND ON ROUTE 29 FROM 0.1 MILE SOUTH OF LIVERMORE ROAD TO LAKE/NAPA COUNTY LINE

TO BE SUPPLEMENTED BY STANDARD PLANS DATED 2015



NOTE:
THE TABLE OF LOCATIONS OF CONSTRUCTION IS SHOWN ON THE LOCATIONS OF CONSTRUCTION SHEET.

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

NO SCALE

PROJECT ENGINEER DATE
REGISTERED CIVIL ENGINEER

Patrick Yip
44277
Exp. 6-30-17
CIVIL

PLANS APPROVAL DATE

CONTRACT No.	04-4H8704
PROJECT ID	0413000295

UNIT 0704 PROJECT NUMBER & PHASE 04130002951

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF PLANS, SPECS, OR ESTIMATES.

LOCATIONS OF CONSTRUCTION

Loc No.	PM	DIRECTION	ROUTE	COUNTY	DESCRIPTION	COMMENT
1	3.91	SB	1	Mrn	UPHILL, BUT NEAR BEGINNING OF INCLINE	L-1
3	6.4	NB	1	Mrn	UPHILL, LEADING INTO A CURVE	L-1
5	8.45	SB	1	Mrn	NEAR TOP OF INCLINE	L-1
6	9.30	NB	1	Mrn	SLIGHT INCLINE, LONG	L-2
7	11.2	SB	1	Mrn	GOOD, BUT MAY ALREADY BE PAVED	L-2
9A	12.55	SB	1	Mrn		L-3
10	12.95	SB	1	Mrn	FLAT, MAY BE USED TO ACCESS VACANT PARCEL, PARKING	L-4
12	13.49	SB	1	Mrn	FLAT	L-4
13	13.79	SB	1	Mrn	LEADS TO CROSSWALK, POTENTIAL PARKING/DROP OFF FOR SCHOOL	L-5
16	14.48	NB	1	Mrn	FLAT, GOOD LENGTH - EXISTING EDGE DROP-OFF SHOULD BE FIXED	L-5
52	31.50	SB	1	Mrn	NEAR TOP OF INCLINE	L-6
53	31.70	SB	1	Mrn	MOSTLY FLAT, UNPAVED DRIVEWAY ENTRY/EXIT	L-6
54	32.06	SB	1	Mrn	UPHILL, AFTER A LEFT CURVE	L-7
55	32.31	SB	1	Mrn	MORE FLAT THAN DOWNHILL, GOOD VIEW	L-7
56	32.45	SB	1	Mrn	SLIGHT UPHILL AND AFTER A BLIND CURVE	L-8
59	32.95	SB	1	Mrn	FLAT TO SLIGHTLY UPHILL, GOOD VIEW	L-8
61	33.13	NB	1	Mrn	FLAT TO SLIGHTLY UPHILL	L-9
62	33.13	SB	1	Mrn		L-9
64	35.31	SB	1	Mrn	TOP OF INCLINE	L-9
66	35.90	SB	1	Mrn	FLAT, BUT AFTER AN INCLINE	L-10
67	36.00	SB	1	Mrn	NEAR TOP OF INCLINE	L-10
73	38.50	NB	1	Mrn	MORE UPHILL THAN FLAT	L-11
74	38.50	SB	1	Mrn	FLAT	L-11
75	39.26	NB	1	Mrn	UPHILL	L-11
79	42.97	SB	1	Mrn	TOP OF INCLINE, GOOD LENGTH	L-12
80	43.30	NB	1	Mrn	SOUTHBOUND - MIDDLE OF INCLINE	L-12
82	43.52	SB	1	Mrn	FLAT	L-13
83	43.68	SB	1	Mrn	FLAT	L-13
84	43.88	SB	1	Mrn	FLAT	L-14
85	44.32	NB	1	Mrn	UPHILL, GRAVEL AREA OUTSIDE PAVED SHOULDER	L-15
86	44.54	NB	1	Mrn	UPHILL, GRAVEL AREA OUTSIDE PAVED SHOULDER	L-15
87	44.85	NB	1	Mrn	FLAT	L-16
88	44.85	SB	1	Mrn	FLAT	L-16
89	44.92	SB	1	Mrn	FLAT	L-16
90	45.00	SB	1	Mrn	FLAT	L-16
91	45.10	SB	1	Mrn	FLAT	L-17
96	50.12	NB	1	Mrn	TOP OF INCLINE, GOOD LENGTH	L-17
97	50.15	SB	1	Mrn	TOP OF INCLINE, GOOD LENGTH	L-17

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
FUNCTIONAL SUPERVISOR: GEORGE LO
CALCULATED/DESIGNED BY: KAN YU
DRAWN BY: PATRICK KIM
REVISED BY: A
DATE REVISED: A

LOCATIONS OF CONSTRUCTION

LC-1

UNIT 0704 | PROJECT NUMBER & PHASE 04130002951

DATE PLOTTED = 01-05-17
TIME PLOTTED =

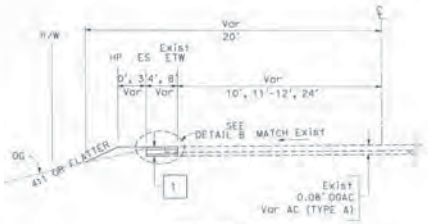
NOTE:
DIMENSIONS OF THE PAVEMENT STRUCTURES (STRUCTURAL SECTIONS) ARE SUBJECT TO TOLERANCES

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

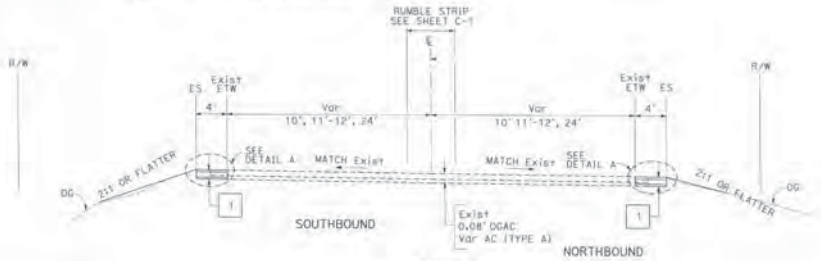
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF COMPUTER FURNISHED PLANS. (CIVIL)



SOUTHBOUND

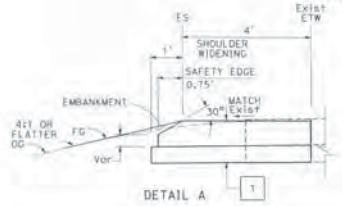
ROUTE 1

LOCATION: 9A (STINSON BEACH AREA)
"ALNST" FROM 100+00 TO 115+00

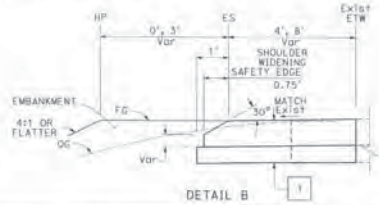


ROUTE 1

LOCATION: 1-97 EXCEPT 9A (STINSON BEACH AREA)
STATION VAR



DETAIL A



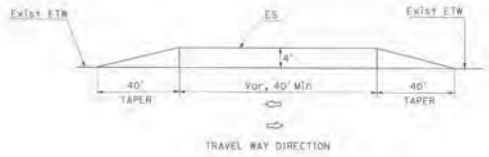
DETAIL B

LEGEND:

No.	STRUCTURAL SECTION NUMBER

TYPICAL PAVEMENT STRUCTURE SECTION

1	0.2' RHMA 0.65 HMA-A 0.33' AS (4)



LONGITUDINAL TYPICAL PLAN

TYPICAL CROSS SECTIONS
NO SCALE

X-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
FUNCTIONAL SUPERVISOR: GEORGE LO
CALCULATED/DESIGNED BY: KAN YU
CHECKED BY: PATRICK YIP
REVISED BY
DATE REVISED
A

UNIT 0704 PROJECT NUMBER & PHASE 04130002951

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

"COORDINATE VALUES SHOWN ARE CCS 83 ZONE 3". Horiz DATUM CCS 83 Vert DATUM NAVD 88

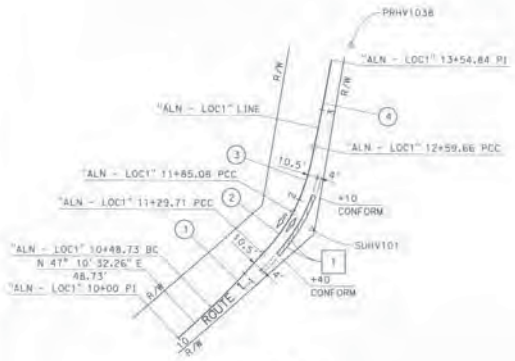
CURVE DATA

No. ⊙	R	Δ	T	L
1	1312.29'	03° 32' 09"	40.50'	80.98'
2	212.05'	14° 57' 38"	27.84'	55.37'
3	242.25'	17° 38' 21"	37.59'	74.58'
4	2667.44'	02° 02' 40"	47.60'	95.18'
5	364.12'	31° 41' 58"	103.38'	201.45'
6	695.87'	07° 22' 47"	44.88'	89.63'
7	311.73'	10° 58' 02"	29.93'	59.67'
8	123.46'	33° 23' 21"	37.03'	71.94'
9	226.46'	20° 58' 18"	41.91'	82.89'

LEGEND:
- SHOULDER WIDENING WITH SAFETY EDGE
- SEE TYPICAL CROSS SECTION X-1
- (No.) CURVE DATA NUMBER
- DIRECTION OF TRAFFIC

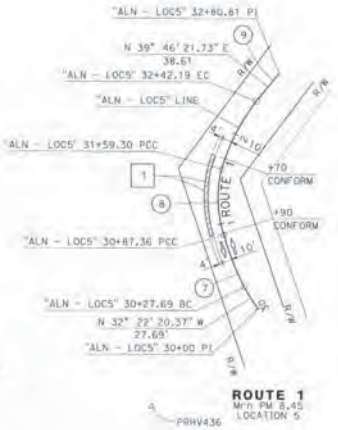
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF ELECTRONIC FORMATS OF PLANS, SPECIFICATIONS, AND ESTIMATES OTHER THAN THOSE SEALED AND SIGNED.



ROUTE 1
Mrn PM 3.91
LOCATION 1

ROUTE 1
Mrn PM 6.4
LOCATION 3



ROUTE 1
Mrn PM 8.45
LOCATION 5

LAYOUT
SCALE: 1" = 50'

L-1

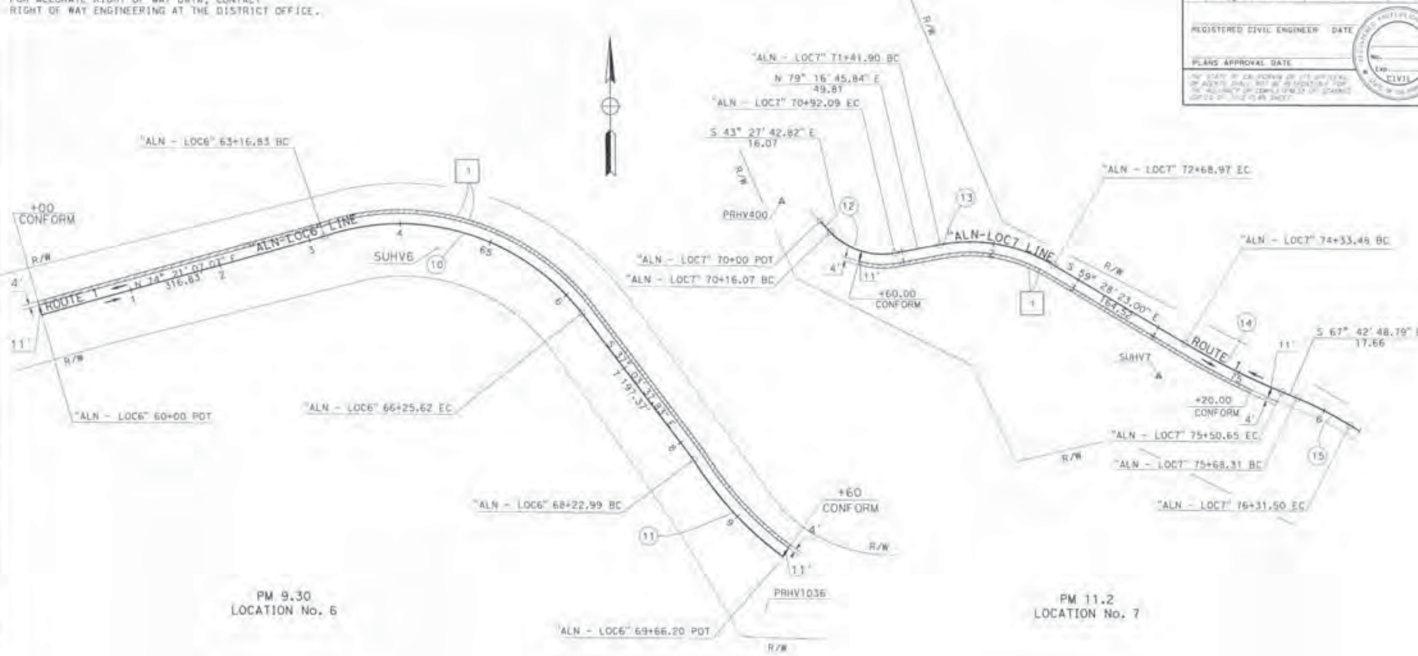
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
GEORGE LO
PATRICK TIP
KAN YU
UNIT 0704
PROJECT NUMBER & PHASE 0413D0002951

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

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE



ROUTE 1
(MARIN)

CURVE DATA

No.	R	Δ	T	L
10	248.93'	71° 04' 23"	177.80'	308.79'
11	360.74'	22° 44' 49"	72.56'	143.21'
12	76.07'	57° 15' 31"	41.53'	76.02'
13	176.51'	41° 14' 51"	66.43'	127.07'
14	814.65'	08° 14' 26"	58.68'	117.17'
15	369.57'	09° 47' 46"	31.67'	63.19'

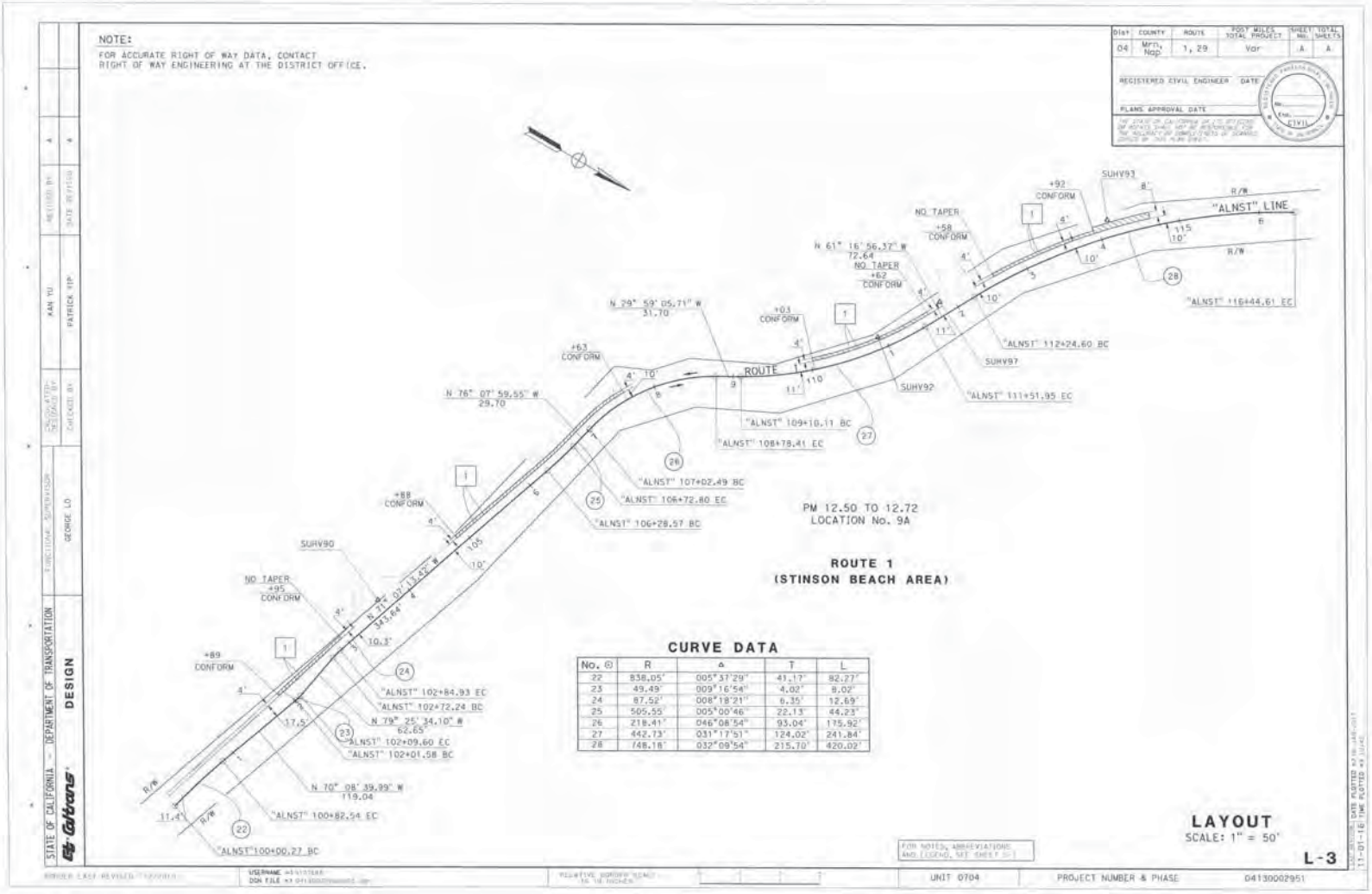
FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET L-1

LAYOUT
SCALE: 1" = 50'

L-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
FUNCTIONAL SUPERVISOR GEORGE LO
CALCULATED/DESIGNED BY KAN YU
CHECKED BY PATRICK YIP

UNIT 0704 PROJECT NUMBER & PHASE 04130002951


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET NO. | TOTAL SHEETS
04 | Mrn, Nap | 1, 29 | Var | A | A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
CIVIL
STATE OF CALIFORNIA — DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
KAN YU
PATRICK YIP
"ALNST" LINE
ROUTE
PM 12.50 TO 12.72
LOCATION No. 9A
ROUTE 1
(STINSON BEACH AREA)
CURVE DATA
No. | R | Δ | T | L
22 | 838.05' | 005°37'29" | 41.17' | 82.27'
23 | 49.49' | 009°16'54" | 4.02' | 8.02'
24 | 87.52' | 008°18'21" | 6.35' | 12.69'
25 | 505.55' | 005°00'46" | 22.13' | 44.23'
26 | 218.41' | 046°08'54" | 93.04' | 175.92'
27 | 442.73' | 031°17'51" | 124.02' | 241.84'
28 | 748.16' | 032°09'54" | 215.70' | 420.02'
"ALNST" 100+00.27 BC
"ALNST" 100+82.54 EC
"ALNST" 102+01.58 BC
"ALNST" 102+09.60 EC
"ALNST" 102+72.24 BC
"ALNST" 102+84.93 EC
"ALNST" 106+28.57 BC
"ALNST" 106+72.80 EC
"ALNST" 107+02.49 BC
"ALNST" 108+78.41 EC
"ALNST" 109+10.11 BC
"ALNST" 111+51.95 EC
"ALNST" 112+24.60 BC
"ALNST" 116+44.61 EC
N 70° 08' 39.99" W 119.04
N 79° 25' 34.10" W 62.65
N 21° 07' 13.42" W 343.64
N 76° 07' 59.55" W 29.70
N 29° 59' 05.71" W 31.70
N 61° 16' 56.37" W 72.64
NO TAPER +95 CONFORM
NO TAPER +58 CONFORM
NO TAPER +62 CONFORM
+89 CONFORM
+88 CONFORM
+63 CONFORM
+03 CONFORM
+92 CONFORM
SURV90
SUHV92
SUHV97
SUHV93
LAYOUT
SCALE: 1" = 50'
L-3
UNIT 0704
PROJECT NUMBER & PHASE
04130002951

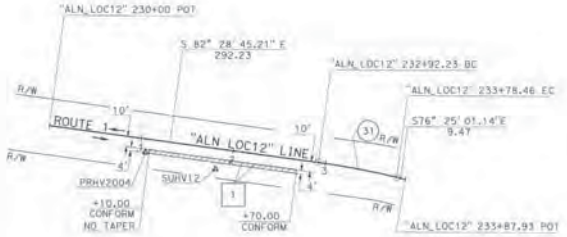
NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

PM 12.95
LOCATION No. 10



PM 13.49
LOCATION No. 12

CURVE DATA

No.	R	Δ	T	L
29	679.71'	023°03'14"	138.62'	273.49'
30	421.41'	025°40'39"	96.04'	188.86'
31	814.95'	006°03'44"	43.15'	86.23'

ROUTE 1
(MARIN)

LAYOUT
SCALE: 1" = 50'

L-4

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE, LO
PATRICK YIP
KAN YU

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET L-1

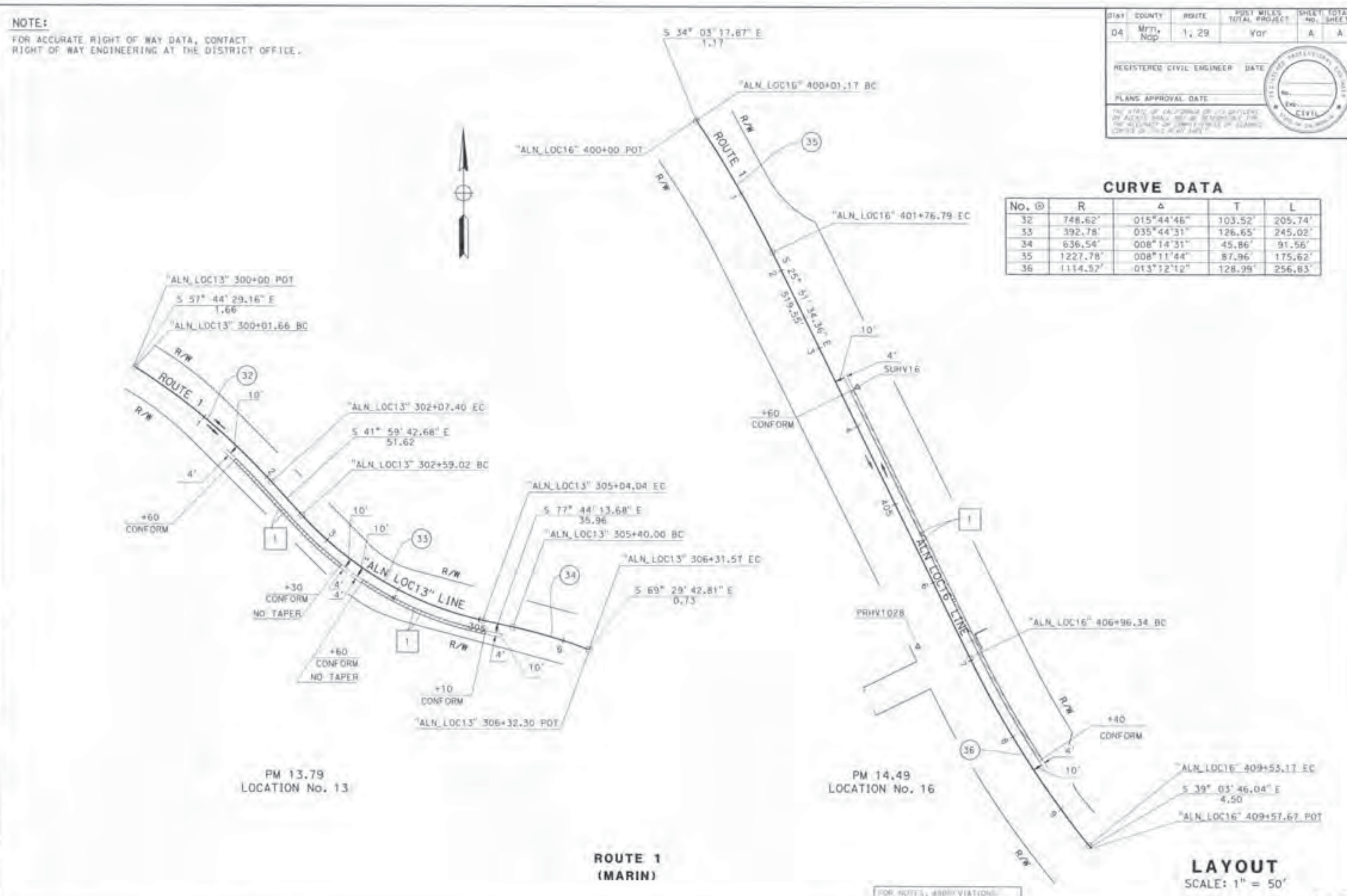
UNIT 0704 | PROJECT NUMBER & PHASE 04130002951

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

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE



CURVE DATA

No.	R	Δ	T	L
32	748.62'	015°44'46"	103.52'	205.74'
33	392.78'	035°44'31"	126.65'	245.02'
34	636.54'	008°14'31"	45.86'	91.56'
35	1227.78'	008°11'44"	87.96'	175.62'
36	1114.57'	013°12'12"	128.99'	256.83'

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET L-1

LAYOUT

SCALE: 1" = 50'

L-5

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

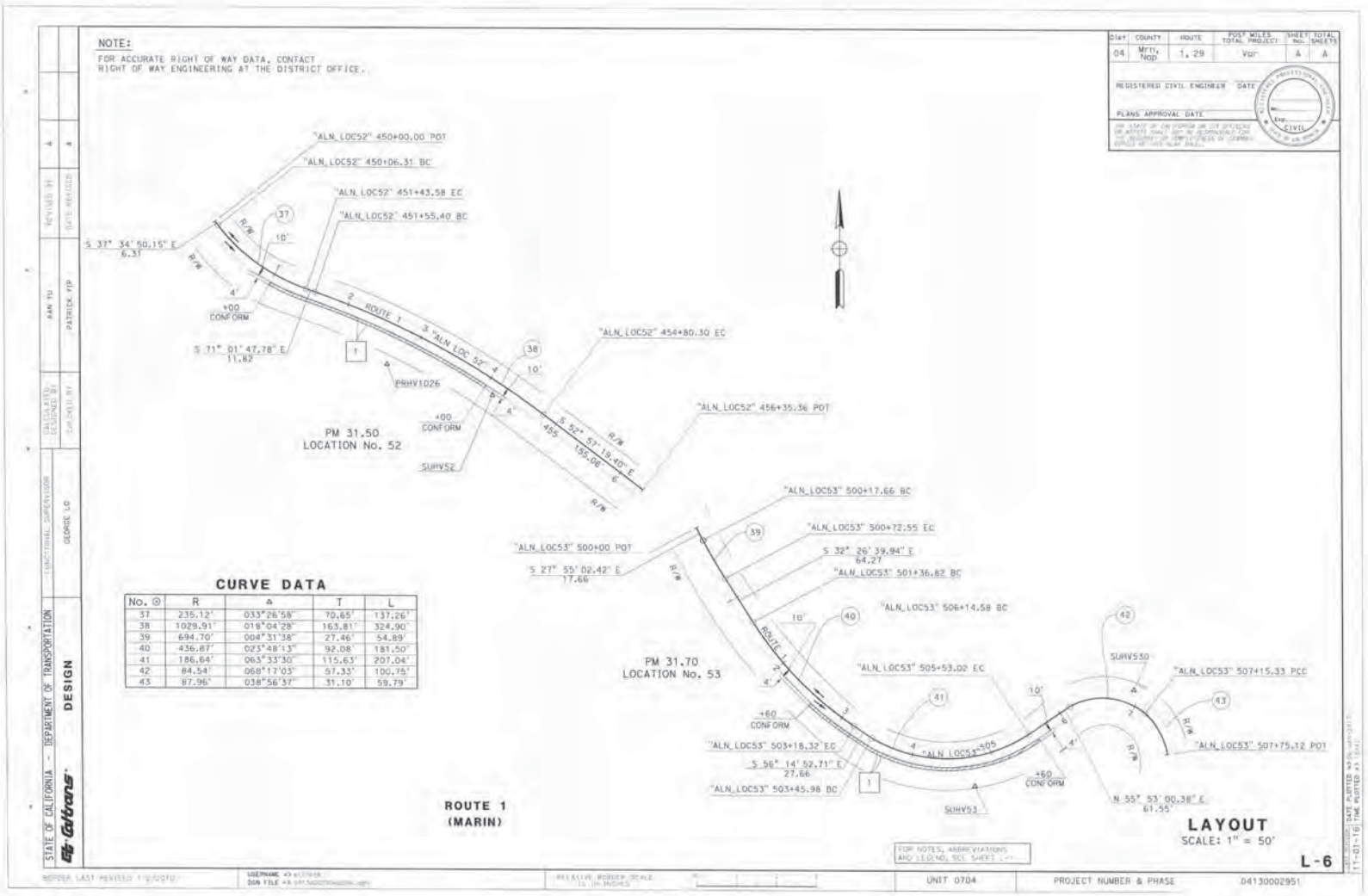
DESIGN

FUNCTIONAL SUPERVISOR GEORGE LO

CALCULATED/DESIGNED BY KAN YU

CHECKED BY PATRICK YIP

UNIT 0704 PROJECT NUMBER & PHASE 04130002951


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
"ALN_LOC52" 450+00.00 POT
"ALN_LOC52" 450+06.31 BC
"ALN_LOC52" 451+43.58 EC
"ALN_LOC52" 451+55.40 BC
S 37° 34' 50.15" E
6.31
+00
CONFORM
S 71° 01' 47.78" E
11.82
PRHV1026
SURV52
PM 31.50
LOCATION No. 52
"ALN_LOC52" 454+80.30 EC
"ALN_LOC52" 456+35.36 POT
S 52° 57' 19.45" E
155.08
"ALN_LOC53" 500+17.66 BC
"ALN_LOC53" 500+00 POT
S 27° 55' 02.42" E
17.66
"ALN_LOC53" 500+72.55 EC
S 32° 26' 39.94" E
64.27
"ALN_LOC53" 501+36.82 BC
"ALN_LOC53" 506+14.58 BC
PM 31.70
LOCATION No. 53
"ALN_LOC53" 505+53.02 EC
SURV530
"ALN_LOC53" 507+15.33 PCC
+60
CONFORM
"ALN_LOC53" 503+18.32 EC
S 56° 14' 52.71" E
27.66
"ALN_LOC53" 503+45.98 BC
"ALN_LOC53" 505+
SURV53
+60
CONFORM
"ALN_LOC53" 507+75.12 POT
N 55° 53' 00.38" E
61.55
ROUTE 1
(MARIN)
LAYOUT
SCALE: 1" = 50'
CURVE DATA
No. ◎ | R | Δ | T | L
37 | 235.12' | 033°26'58" | 70.65' | 137.26'
38 | 1029.91' | 018°04'28" | 163.81' | 324.90'
39 | 694.70' | 004°31'38" | 27.46' | 54.89'
40 | 436.87' | 023°48'13" | 92.08' | 181.50'
41 | 186.64' | 063°33'30" | 115.63' | 207.04'
42 | 84.54' | 068°17'03" | 57.33' | 100.75'
43 | 87.96' | 038°56'37" | 31.10' | 59.79'
DIST | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS
04 | Mrn, Nap | 1, 29 | Var | A | A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
PATRICK YIP
SAM TO
L-6
UNIT 0704
PROJECT NUMBER & PHASE
0413000295

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

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	MRN, NAP	1, 29	Var	A	A

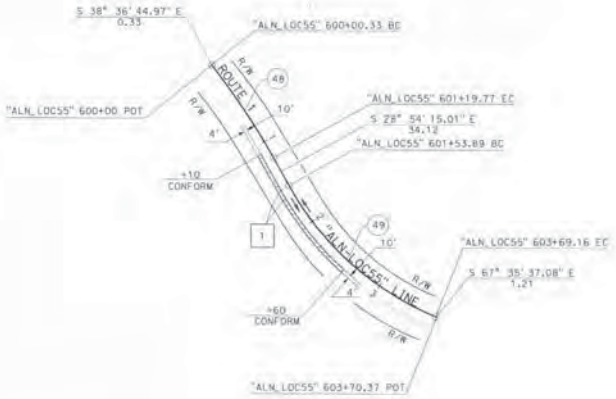
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

CURVE DATA

No. ⊙	R	Δ	T	L
44	221.76'	037°05'24"	74.39'	143.55'
45	183.94'	023°04'11"	37.54'	74.06'
46	8539.52'	000°29'26"	36.57'	73.13'
47	192.05'	021°51'16"	37.08'	73.25'
48	704.91'	009°42'30"	59.86'	119.44'
49	318.79'	038°41'22"	111.92'	215.26'

PM 32.06
LOCATION No. 54



PM 32.31
LOCATION No. 55

ROUTE 1
(MARIN)

LAYOUT
SCALE: 1" = 50'

L-7

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
FUNCTIONAL SUPERVISOR: GEORGE LO
CALCULATED/DESIGNED BY: CHENNAI BY
DRAWN BY: PATRICK YIP
CHECKED BY: KAN YU
REVISED BY: A
DATE REVISED: A

USERNAME
DGN FILE
UNIT 0704
PROJECT NUMBER & PHASE 04130002951

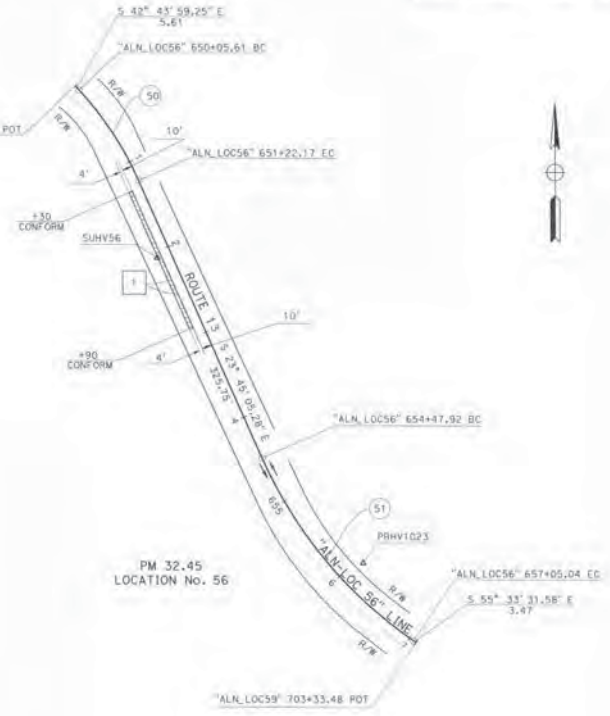
NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA

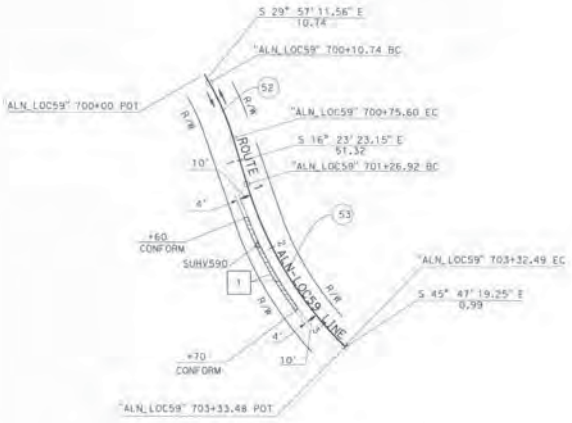
No. ⓒ	R	Δ	T	L
50	351.83'	018°58'54"	58.82'	116.56'
51	463.17'	031°48'26"	131.97'	257.13'
52	274.00'	013°33'48"	32.56'	64.86
53	400.64'	029°23'56"	105.10'	205.57'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	MRN, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
CIVIL



PM 32.45
LOCATION No. 56



PM 32.95
LOCATION No. 59

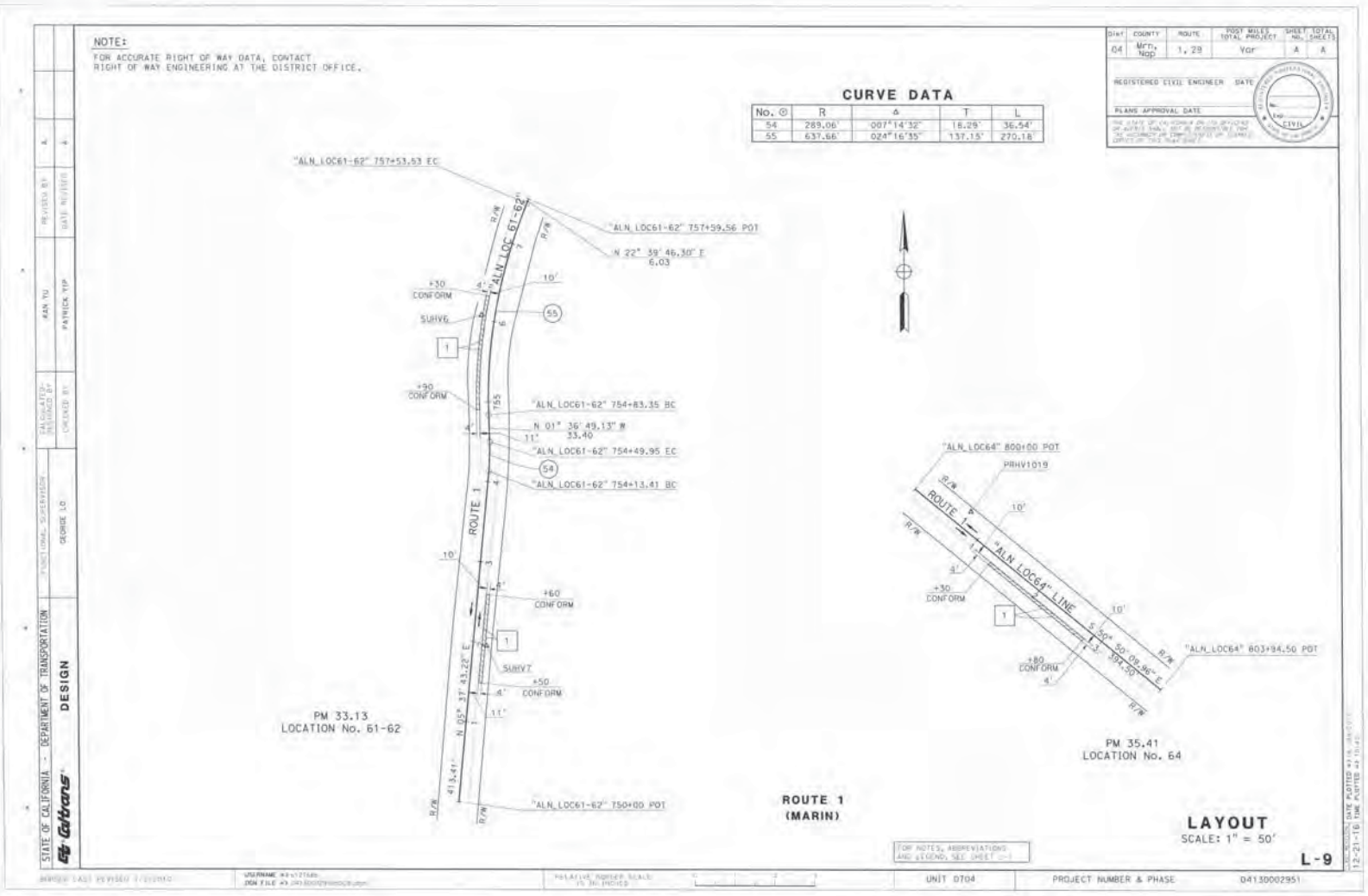
ROUTE 1
(MARIN)

LAYOUT
SCALE: 1" = 50'

L-8

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
FUNCTIONAL SUPERVISOR: GEORGE LO
CALCULATED/DESIGNED BY: KAN YU
CHECKED BY: PATRICK YIP
REVISED BY: A
DATE REVISED: A

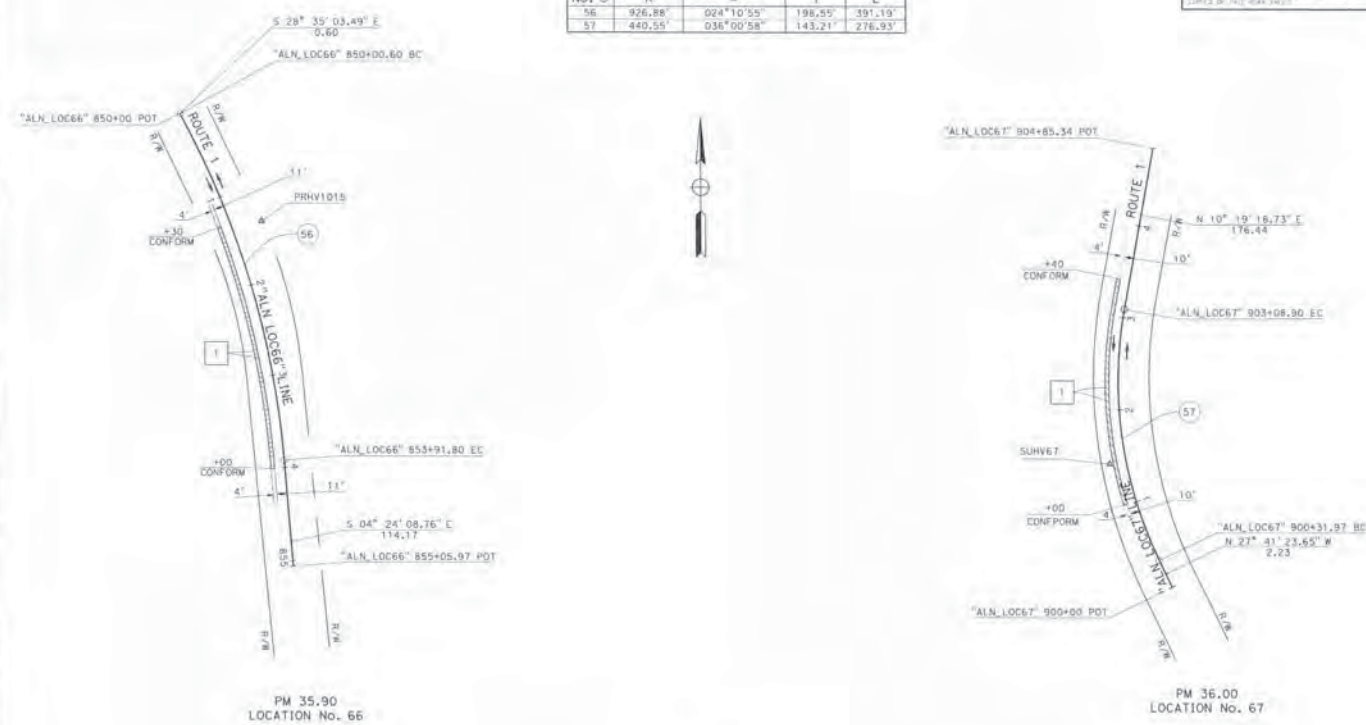
UNIT 0704 | PROJECT NUMBER & PHASE 04130002951


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
CURVE DATA
No. | R | Δ | T | L
54 | 289.06' | 007°14'32" | 18.29' | 36.54'
55 | 637.66' | 024°16'35" | 137.15' | 270.18'
"ALN_LOC61-62" 757+53.53 EC
"ALN_LOC61-62" 757+59.56 POT
N 22° 39' 46.30" E 6.03
"ALN_LOC61-62" 754+83.35 BC
N 01° 36' 49.13" W 33.40
"ALN_LOC61-62" 754+49.95 EC
"ALN_LOC61-62" 754+13.41 BC
"ALN_LOC61-62" 750+00 POT
N 05° 37' 43.22" E 413.41'
ROUTE 1
"ALN_LOC64" 800+00 POT
PRHV1019
"ALN_LOC64" LINE
S 50° 50' 09.96" E 394.50'
"ALN_LOC64" 803+94.50 POT
PM 33.13
LOCATION No. 61-62
PM 35.41
LOCATION No. 64
ROUTE 1
(MARIN)
LAYOUT
SCALE: 1" = 50'
L-9
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
AAN TU
PATRICK YIP
UNIT 0704
PROJECT NUMBER & PHASE
0413000295I

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

CURVE DATA

No.	R	Δ	T	L
56	926.88'	024°10'55"	198.55'	391.19'
57	440.55'	036°00'58"	143.21'	276.93'



ROUTE 1
(MARIN)

LAYOUT
SCALE: 1" = 50'

L-10

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
KAN YU
PATRICK YIP

UNIT 0704
PROJECT NUMBER & PHASE 04130002951

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

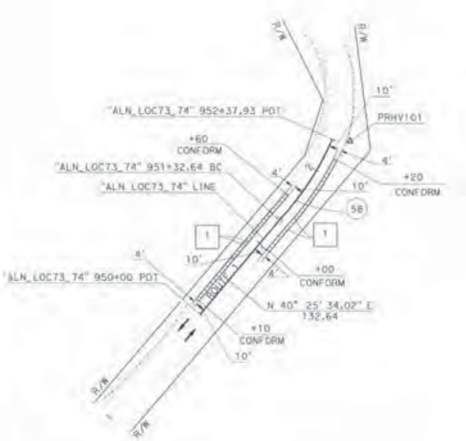
PLANS APPROVAL DATE

NOTE:

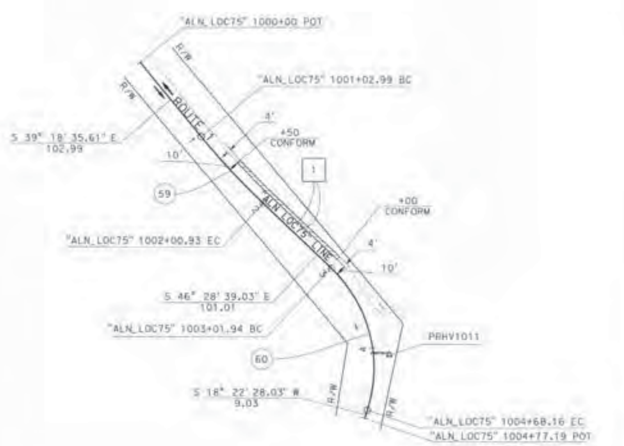
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA

No. ⊙	R	Δ	T	L
58	300.70'	020°03'39"	53.19'	105.29'
59	782.94'	007°10'03"	49.04'	97.94'
60	146.85'	064°51'07"	93.29'	166.22'



PM 38.5
LOCATION No. 73, 74



PM 39.25
LOCATION No. 75

ROUTE 1
(MARIN)

LAYOUT
SCALE: 1" = 50'

L-11

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION

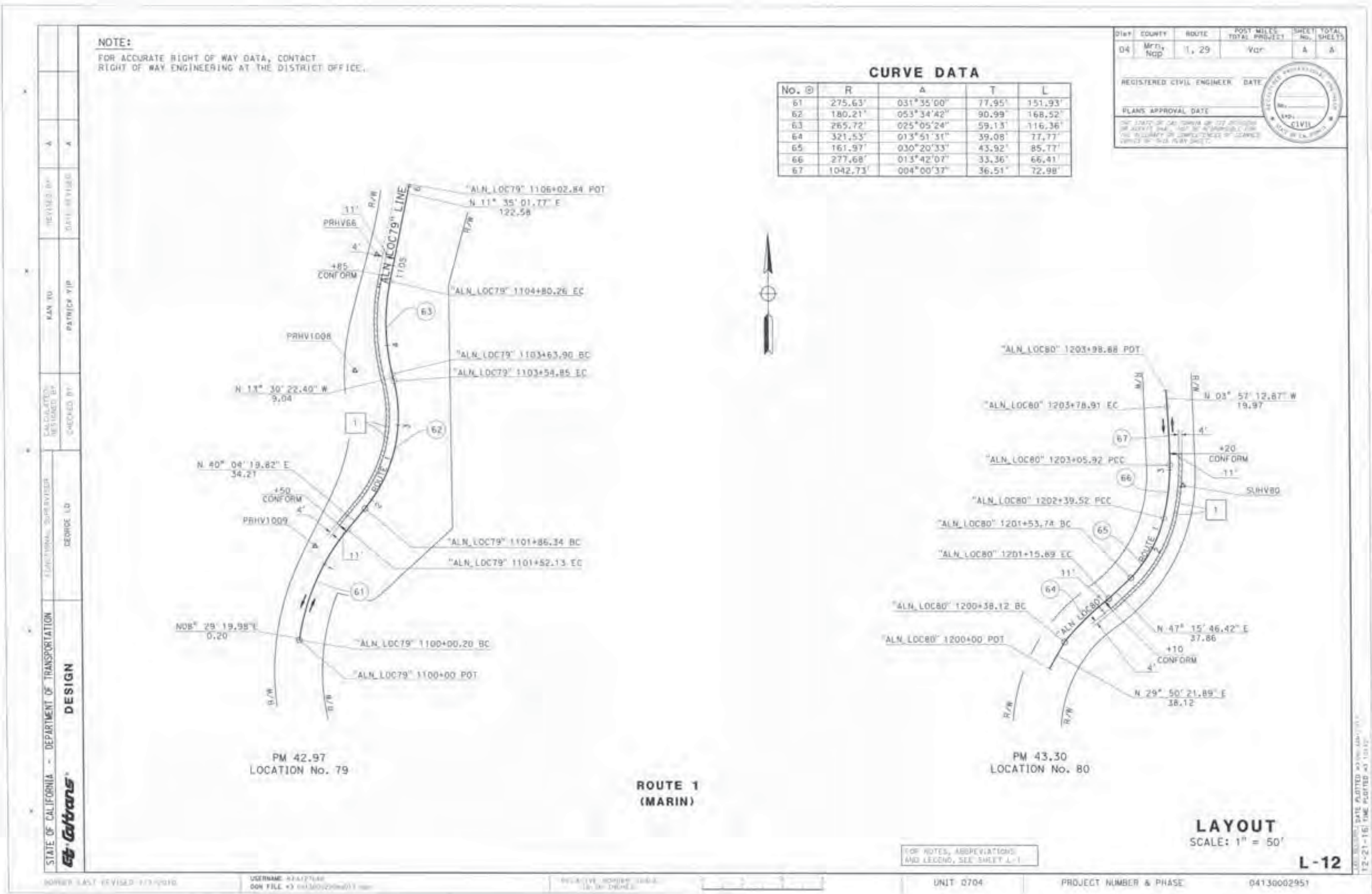
DESIGN

GEORGE LO

KAN YU

PATRICK YIP

UNIT 0704 PROJECT NUMBER & PHASE 04130002951



CURVE DATA

No.	R	Δ	T	L
61	275.63'	031°35'00"	77.95'	151.93'
62	180.21'	053°34'42"	90.99'	168.52'
63	265.72'	025°05'24"	59.13'	116.36'
64	321.53'	013°51'31"	39.08'	77.77'
65	161.97'	030°20'33"	43.92'	85.77'
66	277.68'	013°42'07"	33.36'	66.41'
67	1042.73'	004°00'37"	36.51'	72.98'

NOTE:

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

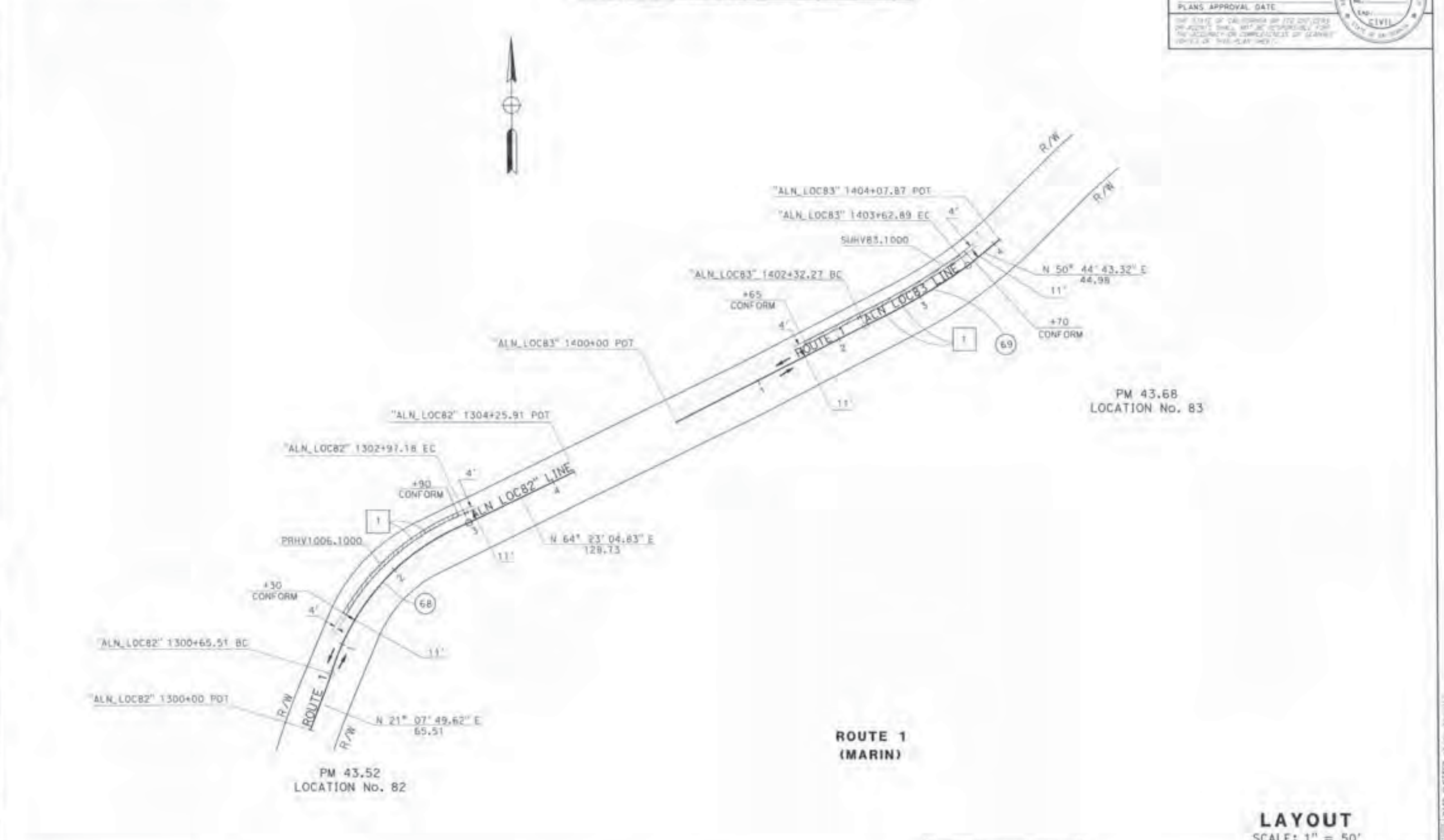
CURVE DATA

No.	R	Δ	T	L
68	257.33'	051°34'57"	124.35'	231.67'
69	715.77'	010°27'19"	65.49'	130.61'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE



STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION

DESIGN

FUNCTIONAL SUPERVISOR: GEORGE LO

CALCULATED-DESIGNED BY: KAN YU

CHECKED BY: PATRICK YIP

LAYOUT

SCALE: 1" = 50'

L-13

UNIT 0704

PROJECT NUMBER & PHASE 04130002951

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

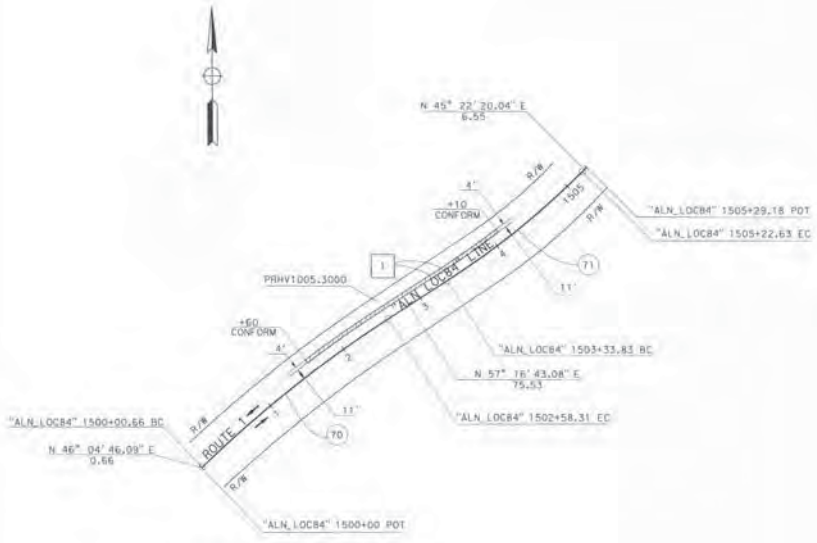
CURVE DATA

No. ⊙	R	Δ	T	L
70	1318.14'	011°11'57"	129.23'	257.65'
71	908.50'	011°54'23"	94.74'	188.79'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL No. SHEETS
04	Mrn, Nap	1, 29	Var	A A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE



PM 43.88
LOCATION No. 84

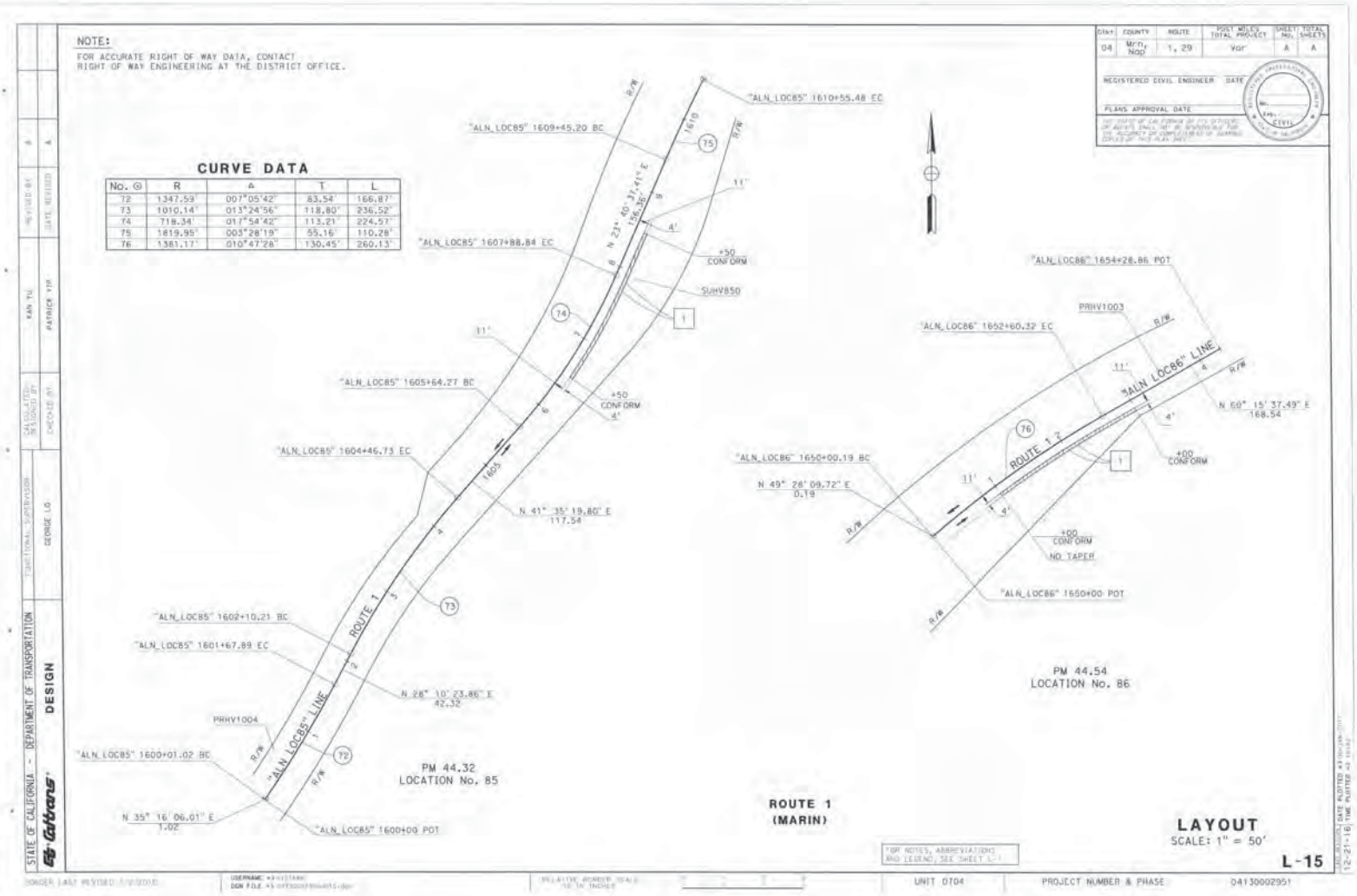
ROUTE 1
(MARIN)

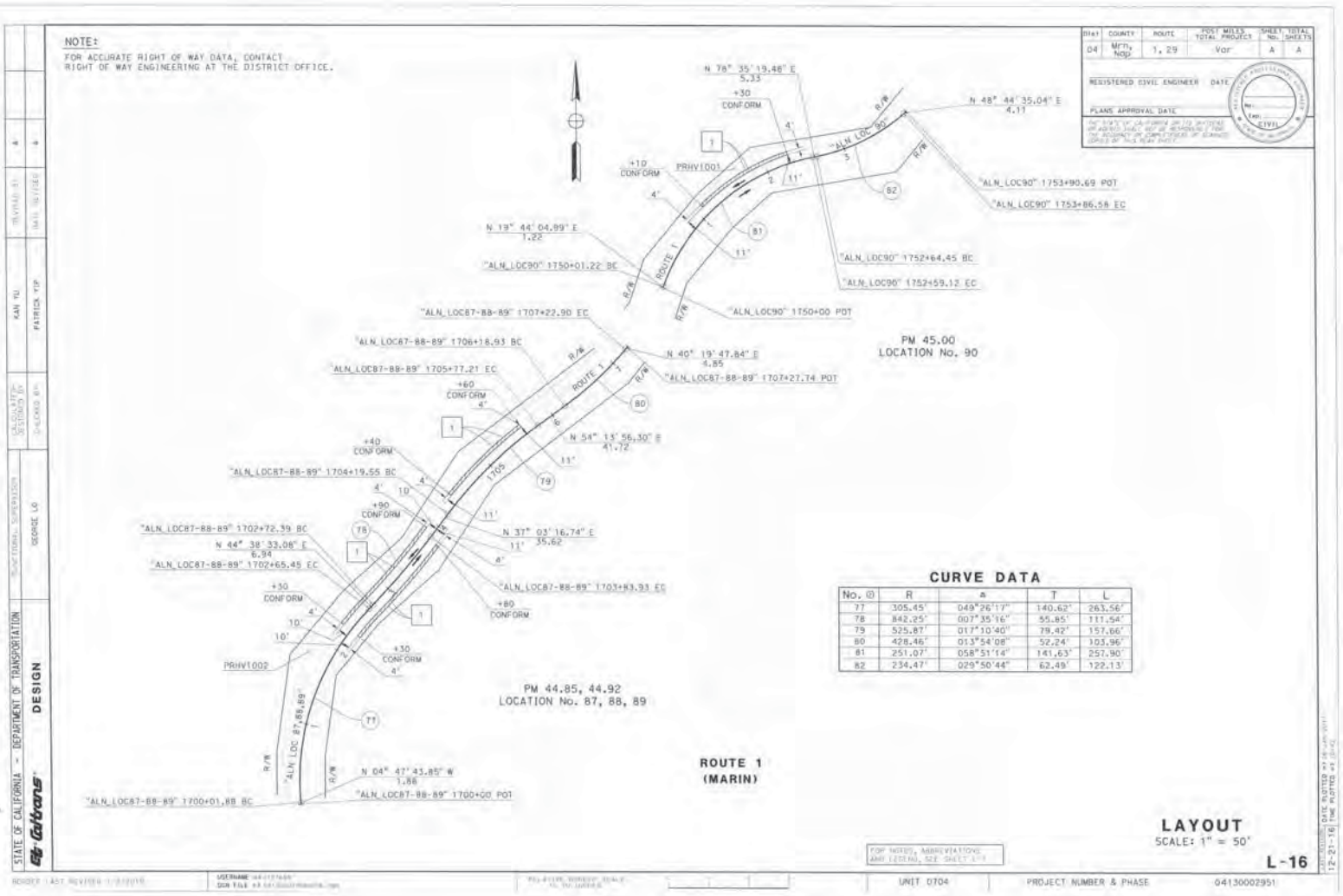
LAYOUT
SCALE: 1" = 50'

L-14

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
FUNCTIONAL SUPERVISOR: GEORGE LO
CALCULATED/DESIGNED BY: KAN TU
CHECKED BY: PATRICK YIP
REVISED BY
DATE REVISED
4
A

BORDER LAST REVISED 7-17-2013
USERNAME =>
DGN FILE =>
UNIT 0T04
PROJECT NUMBER & PHASE 04130002951


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
CURVE DATA
No. | R | Δ | T | L
72 | 1347.59' | 007°05'42" | 83.54' | 166.87'
73 | 1010.14' | 013°24'56" | 118.80' | 236.52'
74 | 718.34' | 017°54'42" | 113.21' | 224.57'
75 | 1819.95' | 003°28'19" | 55.16' | 110.28'
76 | 1381.17' | 010°47'28" | 130.45' | 260.13'
"ALN_LOC85" 1610+55.48 EC
"ALN_LOC85" 1609+45.20 BC
"ALN_LOC85" 1607+88.84 EC
"ALN_LOC85" 1605+64.27 BC
"ALN_LOC85" 1604+46.73 EC
"ALN_LOC85" 1602+10.21 BC
"ALN_LOC85" 1601+67.89 EC
"ALN_LOC85" 1600+01.02 BC
"ALN_LOC85" 1600+00 POT
N 23° 40' 31.41" E 186.36'
N 41° 35' 19.80" E 117.54
N 28° 10' 23.86" E 42.32
N 35° 16' 06.01" E 1.02
+50 CONFORM
SUHV850
PRHV1004
ROUTE 1
"ALN_LOC85" LINE
PM 44.32
LOCATION No. 85
"ALN_LOC86" 1654+28.86 POT
"ALN_LOC86" 1652+60.32 EC
"ALN_LOC86" 1650+00.19 BC
"ALN_LOC86" 1650+00 POT
PRHV1003
"ALN_LOC86" LINE
N 60° 15' 37.49" E 168.54
N 49° 28' 09.72" E 0.19
+00 CONFORM
+00 CONFORM NO TAPER
PM 44.54
LOCATION No. 86
ROUTE 1
(MARIN)
LAYOUT
SCALE: 1" = 50'
L-15
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
Caltrans
DISTRICT | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET NO. | TOTAL SHEETS
04 | Mrn, Nap | 1, 29 | Var | A | A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
UNIT 0704
PROJECT NUMBER & PHASE 0413000295


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
PATRICK YIP
KAN YU
"ALN_LOC87-88-89" 1707+22.90 EC
"ALN_LOC87-88-89" 1706+18.93 BC
"ALN_LOC87-88-89" 1705+77.21 EC
"ALN_LOC87-88-89" 1704+19.55 BC
"ALN_LOC87-88-89" 1702+72.39 BC
"ALN_LOC87-88-89" 1702+65.45 EC
"ALN_LOC87-88-89" 1703+83.93 EC
"ALN_LOC87-88-89" 1700+01.88 BC
"ALN_LOC87-88-89" 1700+00 POT
"ALN_LOC87-88-89" 1707+27.74 POT
"ALN_LOC90" 1750+01.22 BC
"ALN_LOC90" 1750+00 POT
"ALN_LOC90" 1752+64.45 BC
"ALN_LOC90" 1752+59.12 EC
"ALN_LOC90" 1753+90.69 POT
"ALN_LOC90" 1753+86.58 EC
N 78° 35' 19.48" E 5.33
N 48° 44' 35.04" E 4.11
N 19° 44' 04.89" E 1.22
N 40° 19' 47.84" E 4.85
N 54° 13' 56.30" E 41.72
N 37° 03' 16.74" E 35.62
N 44° 38' 33.08" E 6.94
N 04° 47' 43.85" W 1.88
+10 CONFORM
+30 CONFORM
+40 CONFORM
+60 CONFORM
+80 CONFORM
+90 CONFORM
PRHV1001
PRHV1002
ROUTE 1
ALN LOC 87-88-89
ALN LOC 90
PM 45.00
LOCATION No. 90
PM 44.85, 44.92
LOCATION No. 87, 88, 89
ROUTE 1
(MARIN)
CURVE DATA
No. Ø | R | Δ | T | L
77 | 305.45' | 049°26'17" | 140.62' | 263.56'
78 | 842.25' | 007°35'16" | 55.85' | 111.54'
79 | 525.87' | 017°10'40" | 79.42' | 157.66'
80 | 428.46' | 013°54'08" | 52.24' | 103.96'
81 | 251.07' | 058°51'14" | 141.63' | 257.90'
82 | 234.47' | 029°50'44" | 62.49' | 122.13'
LAYOUT
SCALE: 1" = 50'
L-16
UNIT 0704
PROJECT NUMBER & PHASE 04130002951

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

CURVE DATA

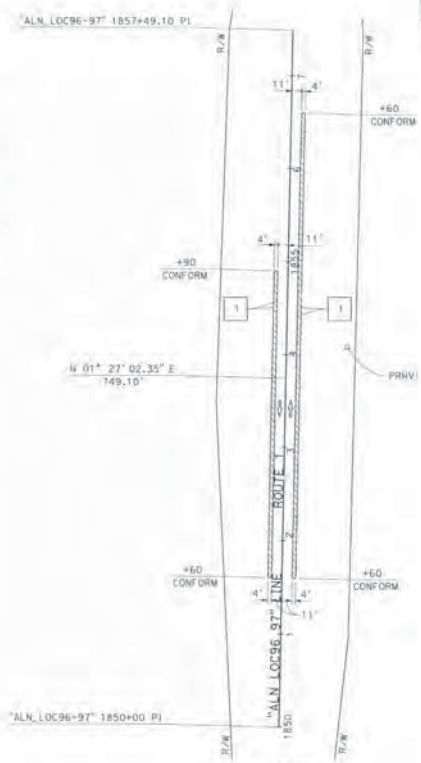
No. ⊙	R	Δ	T	L
83	496.47'	26° 03' 17"	114.87'	225.77'
84	203.80'	26° 40' 27"	48.32'	94.88'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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



ROUTE 1
(MARIN)

FOR NOTES, ABBREVIATIONS, AND LEGEND, SEE SHEET L-1

LAYOUT
SCALE: 1" = 50'

L-17

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
KAN HU
PATRICK YIP
REVISED BY
DATE REVISED
CALCULATED/DESIGNED BY
CHECKED BY
DIRECTIONAL SUPERVISOR
4
4

BORDER LAST REVISED 7/2/2010
USERNAME
DGN FILE
UNIT 0704
PROJECT NUMBER & PHASE 04130002951

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

NOTES

1. Exist UTILITY FACILITIES ARE NOT PLOTTED ON THESE PLANS.
2. REMOVE Exist THERMOPLASTIC TRAFFIC STRIPE PAVEMENT AND MARKERS PRIOR TO PLACING THE RUMBLE STRIP.
3. APPLY FOG SEAL COAT AFTER CONSTRUCTING RUMBLE STRIP AND PRIOR TO RESTRIPING. ASPHALTIC EMULSION (FOG SEAL COAT) SHALL BE EITHER GRADE SS1h OR CSS1h.
4. SEE SHEET Q-1 FOR DETAILS BETWEEN INTERSECTIONS.
5. NO RUMBLE STRIP ON THE BRIDGE.

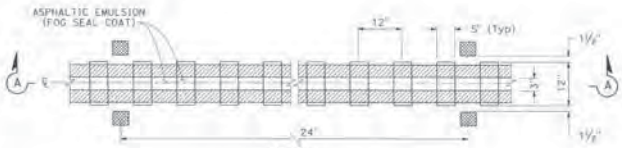
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Ncd	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

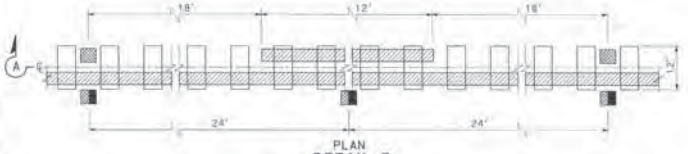
PLANS APPROVAL DATE

LEGEND

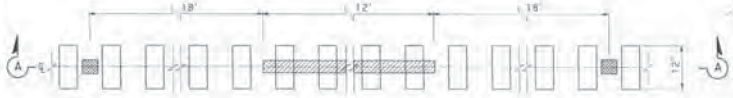
- 4" YELLOW LINE
- RUMBLE STRIP
- PAVEMENT MARKER TYPE D
- PAVEMENT MARKER TYPE H



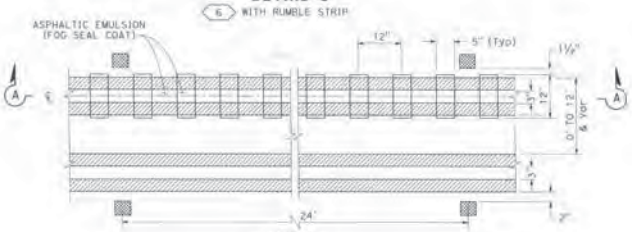
PLAN
DETAIL A
(22) WITH RUMBLE STRIP



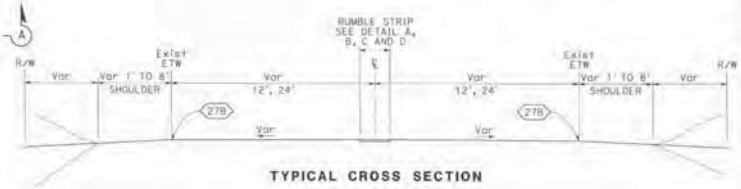
PLAN
DETAIL B
(19) WITH RUMBLE STRIP



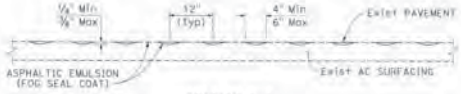
PLAN
DETAIL C
(6) WITH RUMBLE STRIP



PLAN
DETAIL D
(29) WITH RUMBLE STRIP ON CENTERLINE ADJACENT TO DIRECTION WITH NARROWER TRAVELED WAY



TYPICAL CROSS SECTION



SECTION A-A

CONSTRUCTION DETAILS
NO SCALE

C-1

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
FUNCTIONAL SUPERVISOR: GEORGE LO
CALCULATED/DESIGNED BY: KAN TO
CHECKED BY: PATRICK YIP
REVISED BY: #
DATE REVISED: A

BORDER LAST REVISED 7/5/2010 | USERNAME | DGN FILE | UNIT 0704 | PROJECT NUMBER & PHASE 04130002951

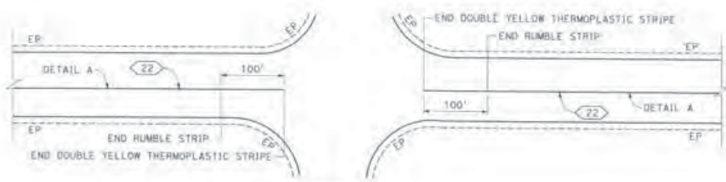
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

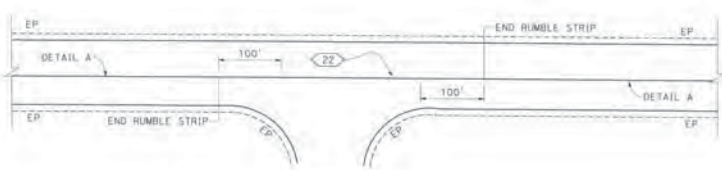
PLANS APPROVAL DATE

NOTES:

1. EXACT CRS LIMITS TO BE DETERMINED BY THE ENGINEER.
2. REFER TO SHEETS Q-2 AND Q-3 FOR CRS LOCATIONS.



CASE 1



CASE 2

INTERSECTION DETAILS

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: GEORGE LO

CALCULATED/DESIGNED BY: KAN YU

CHECKED BY: PATRICK YIP

REVISED BY: A

DATE REVISED: A

CONSTRUCTION DETAILS

NO SCALE

C-2

UNIT 0704

PROJECT NUMBER & PHASE 0413000295I

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	MRN NAP	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

CENTERLINE RUMBLE STRIP (CRS) SECTIONS

CSR STATION No.	START LOCATION OF THE CRS SECTION	INTERSECTION DETAIL CASE #	BEGINNING OF CRS (PM)	TO	END OF CRS (PM)	END LOCATION OF THE CRS SECTION	INTERSECTION DETAIL CASE No.	CRS LENGTH (IN MILES)
MARIN COUNTY, HIGHWAY-1 (PM 3.08 - PM 50.51)								
R-1	BEGIN CRS (BEGINNING OF PROJECT LIMIT)	N/A	3.08	TO	3.33	END CRS BEFORE PANARAMIC HIGHWAY INTERSECTION	CASE 1	0.25
R-2	BEGIN CRS AFTER PANARAMIC HIGHWAY INTERSECTION	CASSE 1	3.36	TO	5.04	END CRS BEFORE GREEN GULCH FARM ZEN CENTER DRIVEWAY	CASE 2	1.68
R-3	BEGIN CRS AFTER GREEN GULCH FARM ZEN CENTER DRIVEWAY	CASSE 2	5.07	TO	5.60	END CRS BEFORE TOWN OF MUIR BEACH	N/A	0.53
R-4	BEGIN CRS AFTER TOWN OF MUIR BEACH	N/A	7.10	TO	12.10	END CRS BEFORE TOWN OF STINSON BEACH	N/A	5.00
R-5	BEGIN CRS AFTER TOWN OF STINSON BEACH	N/A	13.05	TO	17.18	END CRS BEFORE FAIRFAX BOLINAS RD IN TOWN OF WOODVILLE	CASE 1	4.13
R-6	BEGIN CRS AT OLEMA VALLEY TRAIL 500FT AFTER TOWN OF WOODVILLE	N/A	18.27	TO	19.88	END CRS BEFORE PASSING PERMITTED	N/A	1.61
R-7	BEGIN CRS AFTER PASSING PERMITTED	N/A	20.20	TO	25.45	END CRS BEFORE PASSING PERMITTED	N/A	5.25
R-8	BEGIN CRS AFTER TOWN OF OLEMA	N/A	27.07	TO	27.90	END CRS BEFORE TOWN OF POINT REYES	N/A	0.83
R-9	BEGIN CRS AFTER TOWN OF POINT REYES	N/A	30.40	TO	33.26	END CRS BEFORE A CREEK BRIDGE	N/A	2.86
R-10	BEGIN CRS AFTER A CREEK BRIDGE	N/A	33.28	TO	36.17	END CRS BEFORE TOWNS OF MARCONI, RAYNOLDS & MARSHALL	N/A	2.89
R-11	BEGIN CRS AFTER TOWNS OF MARCONI, RAYNOLDS & MARSHALL	N/A	38.42	TO	40.40	END CRS AT CLARK RD BEFORE TOWNS OF MCDONALD, BLAKES LANDING & NICKS COVE	CASE 2	1.98
R-12	BEGIN CRS AFTER TOWN OF NICKS COVE	N/A	41.93	TO	44.40	END CRS BEFORE SNAKE ROAD & HIGHWAY 1 INTERSECTION (BEFORE WALKER CREEK BRIDGE 27-26)	CASE 2	2.47
R-13	BEGIN CRS AFTER WALKER CREEK BRIDGE	N/A	44.50	TO	45.24	END CRS BEFORE BAY ROAD & HIGHWAY 1 INTERSECTION 500 FT BEFORE TOWN OF TOMALES	N/A	0.74
R-14	BEGIN CRS AFTER PASSING PERMITTED	N/A	46.40	TO	47.40	END CRS BEFORE STEMPLE CREEK BRIDGE	N/A	1.00
R-15	BEGIN CRS AFTER STEMPLE CREEK BRIDGE	N/A	47.44	TO	47.60	END CRS BEFORE FALLON CREEK BRIDGE	N/A	0.16
R-16	BEGIN CRS AFTER FALLON CREEK BRIDGE	N/A	47.61	TO	47.82	END CRS BEFORE INTERSECTION OF SHORE LINE HWY 1 & WHITAKER BLUFF ROAD	CASE 1	0.21
R-17	BEGIN CRS AFTER INTERSECTION OF SHORE LINE HWY 1 & WHITAKER BLUFF ROAD	CASE 1	47.85	TO	48.19	END CRS BEFORE PASSING PERMITTED	N/A	0.34
R-18	BEGIN CRS AFTER PASSING PERMITTED	N/A	48.49	TO	49.38	END CRS BEFORE PASSING PERMITTED	N/A	0.89
R-19	BEGIN CRS AFTER PASSING PERMITTED	N/A	49.84	TO	50.18	END CRS BEFORE PASSING PERMITTED	N/A	0.34
R-20	BEGIN CRS AFTER PASSING PERMITTED	N/A	50.40	TO	50.50	END CRS BEFORE SONOMA-MARIN COUNTY LINE AT AMERICANO CREEK (END OF PROJECT LIMIT)	N/A	0.10
NAPA COUNTY, HIGHWAY-29 (PM 48.00 - PM 48.58)								
R-21	BEGIN CRS (BEGINNING OF PROJECT LIMIT)	N/A	48.00	TO	48.58	END RS AT THE END OF THE PROJECT LIMIT (PM 48.58)	N/A	0.58

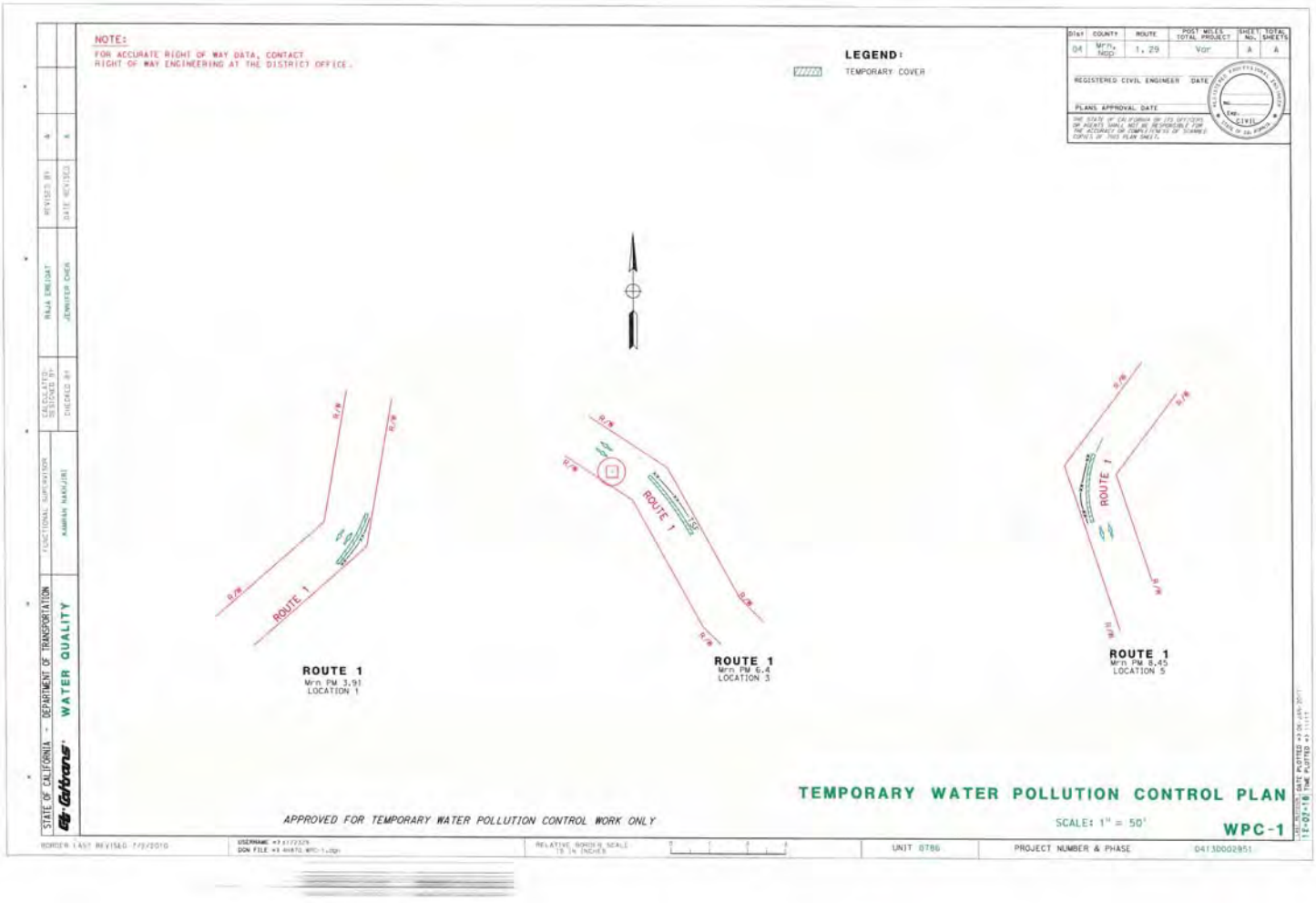
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans DESIGN

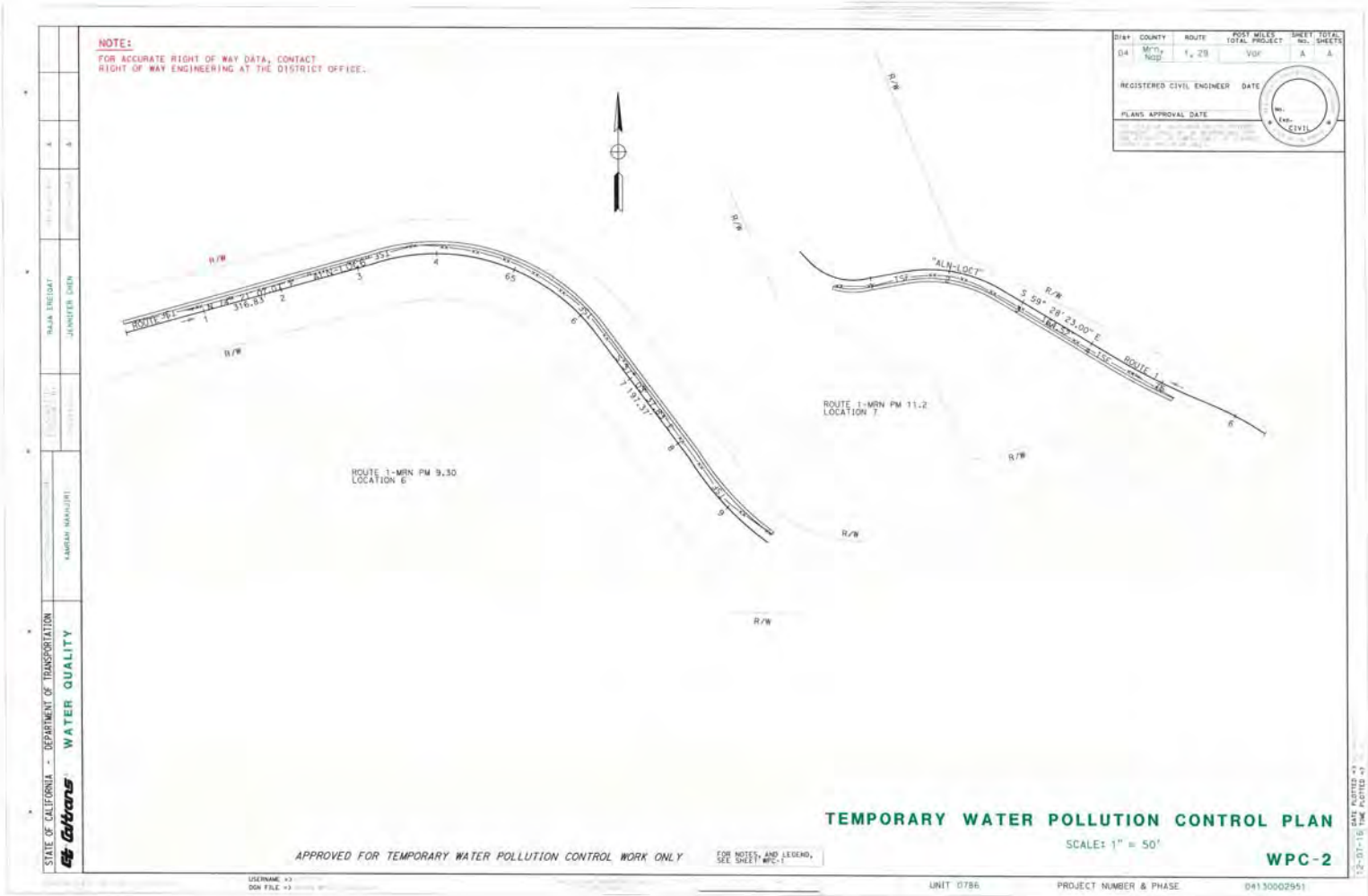
KAN YU PATRICK YIP GEORGE LO

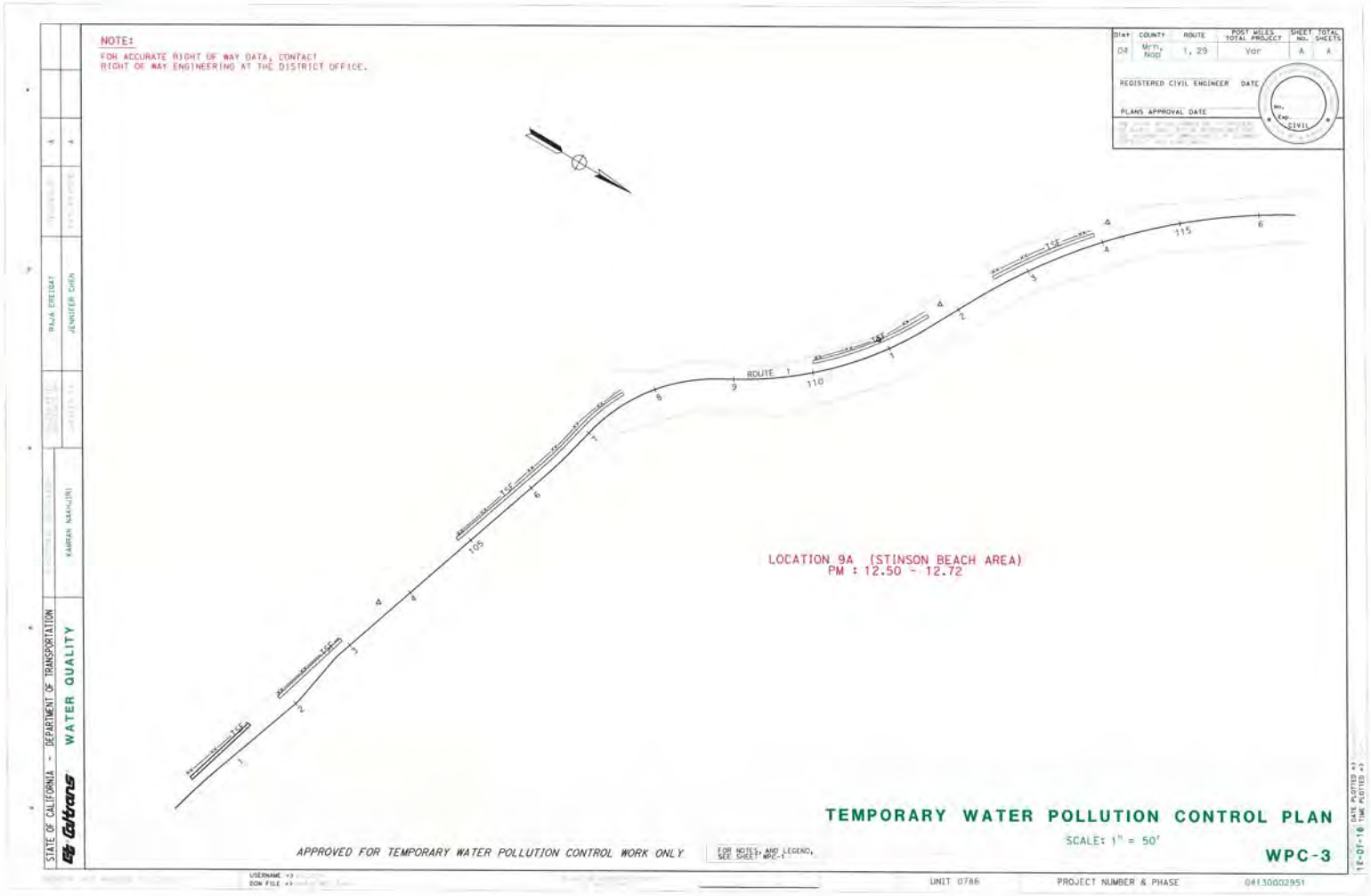
UNIT 0704 PROJECT NUMBER & PHASE 04130002951

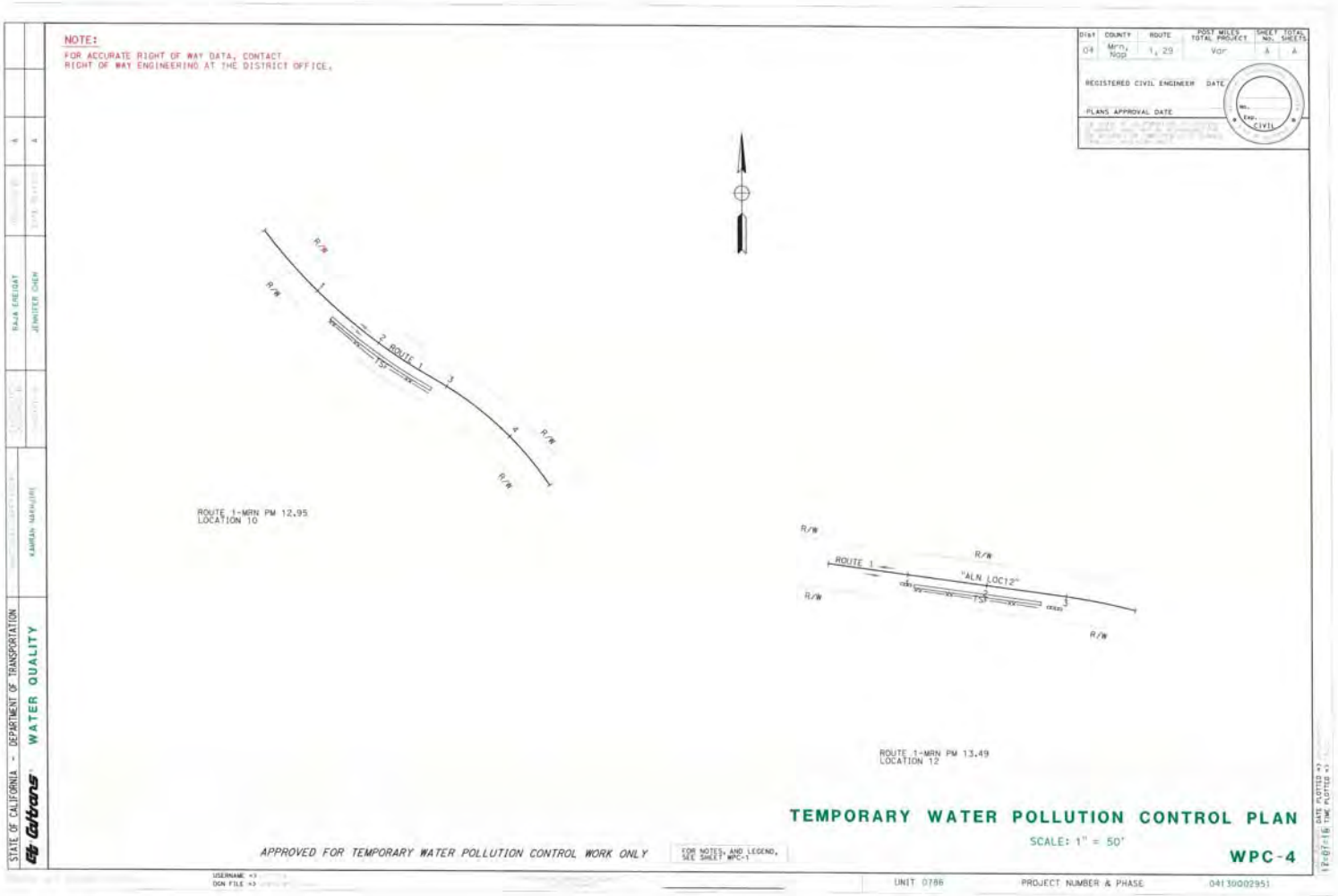
SUMMARY OF QUANTITIES

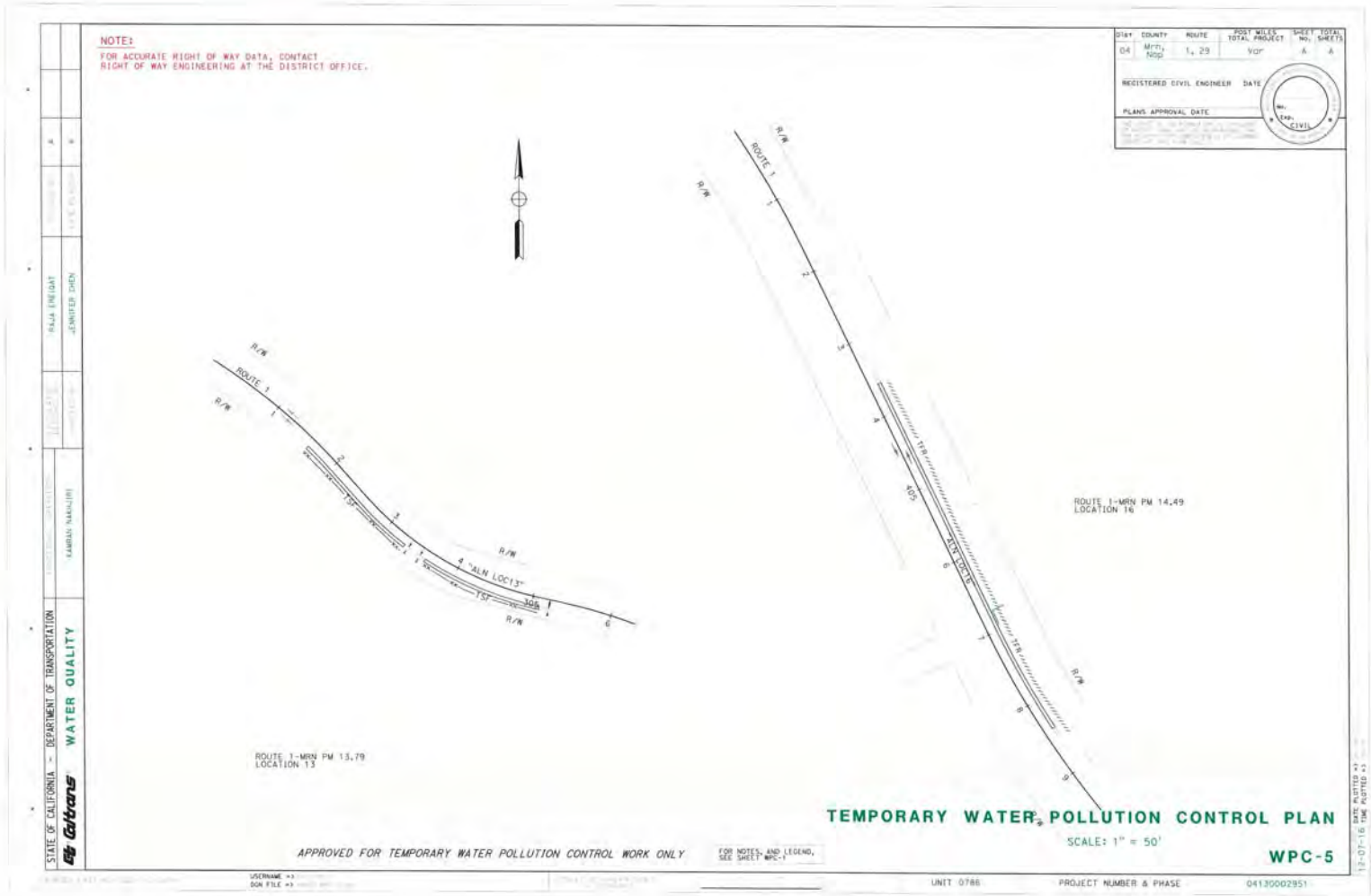
Q-3

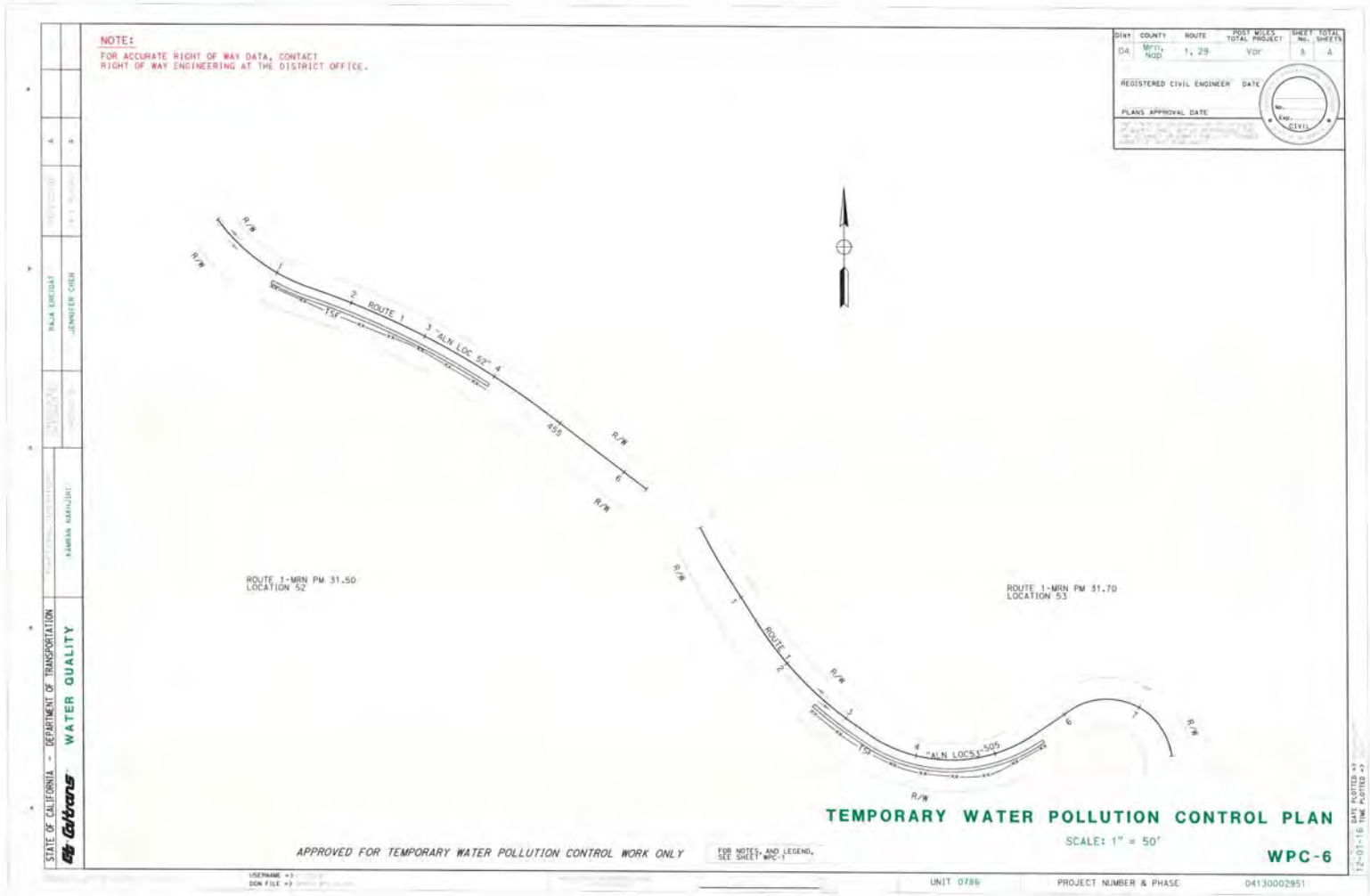

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
LEGEND:
TEMPORARY COVER
ROUTE 1
Mrn PM 3.91
LOCATION 1
ROUTE 1
Mrn PM 6.4
LOCATION 3
ROUTE 1
Mrn PM 8.45
LOCATION 5
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-1
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
WATER QUALITY


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
DIST. COUNTY ROUTE POST MILES TOTAL PROJECT SHEET No. TOTAL SHEETS
04 MRN 1 2.9 YOF A A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
ROUTE 1-MRN PM 9.30
LOCATION 6
ROUTE 1-MRN PM 11.2
LOCATION 7
"ALN-1 OCT"
ROUTE 1
R/W
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans WATER QUALITY
RAJA ERIGIAT
JENNIFER DAEN
KANSAN MAHAJAN
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-2
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
UNIT 0786
PROJECT NUMBER & PHASE 0413000295


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
Dist
COUNTY
ROUTE
POST MILES TOTAL PROJECT
SHEET NO.
TOTAL SHEETS
04
Mrn, Nap
1, 29
Var
A
A
REGISTERED CIVIL ENGINEER
DATE
PLANS APPROVAL DATE
No. Exp. CIVIL
ROUTE 1
LOCATION 9A (STINSON BEACH AREA)
PM : 12.50 - 12.72
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-3
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES, AND LEGEND, SEE SHEET WPC-1
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
WATER QUALITY
RAJA ERTUGAT
JENNIFER CHEN
KAMRAN KAMALIRI
USERNAME =>
DGN FILE =>
UNIT 0786
PROJECT NUMBER & PHASE
0413000295
DATE PLOTTED =>
TIME PLOTTED =>


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET NO. | TOTAL SHEETS
04 | Mrn, Nap | 1, 29 | Var | A | A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
CIVIL
R/W
ROUTE 1
TSP
ROUTE 1-MRN PM 12.95
LOCATION 10
"ALN LOC12"
ROUTE 1-MRN PM 13.49
LOCATION 12
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-4
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
WATER QUALITY
RAJA ERBISAT
JENNIFER CHEW
KAMRAN NAFAJIRI
USERNAME =
DGN FILE =
UNIT 0786
PROJECT NUMBER & PHASE
0413000295


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
DIST 04 COUNTY Mrn, Nap ROUTE 1, 29 POST MILES TOTAL PROJECT Var SHEET NO. A TOTAL SHEETS A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
R/W
ROUTE 1
4 "ALN LOC13"
ROUTE 1-MRN PM 13.79
LOCATION 13
ROUTE 1-MRN PM 14.49
LOCATION 16
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-5
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans WATER QUALITY
RAJA ENGIAT
JENNIFER CHEN
KAMRAN NAKAJIRI
USERNAME =>
DGN FILE =>
UNIT 0766
PROJECT NUMBER & PHASE 04130002951
DATE PLOTTED =>
TIME PLOTTED =>


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
Dist COUNTY ROUTE POST MILES TOTAL PROJECT SHEET No. TOTAL SHEETS
04 Mrn, Nap 1, 29 YOr A A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
EXP. CIVIL
R/W
ROUTE 1
"ALN LOC 53"
455
505
TSF
ROUTE 1-MRN PM 31.50
LOCATION 52
ROUTE 1-MRN PM 31.70
LOCATION 53
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
WATER QUALITY
RAJA ERCIGAT
JENNIFER CHEN
KAMRAN KARIMJEE
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-6
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
UNIT 0786
PROJECT NUMBER & PHASE
04130002951
DATE PLOTTED =>
TIME PLOTTED =>

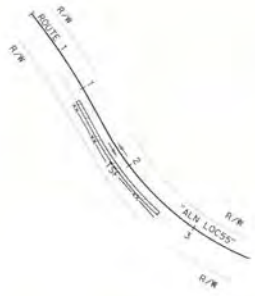
NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	MRN, NAP	1, 29	VAR	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

ROUTE 1-MRN PM 32.06
LOCATION 54



ROUTE 1-MRN PM 32.31
LOCATION 55

TEMPORARY WATER POLLUTION CONTROL PLAN

SCALE: 1" = 50'

WPC-7

APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY

FOR NOTES, AND LEGEND, SEE SHEET WPC-1

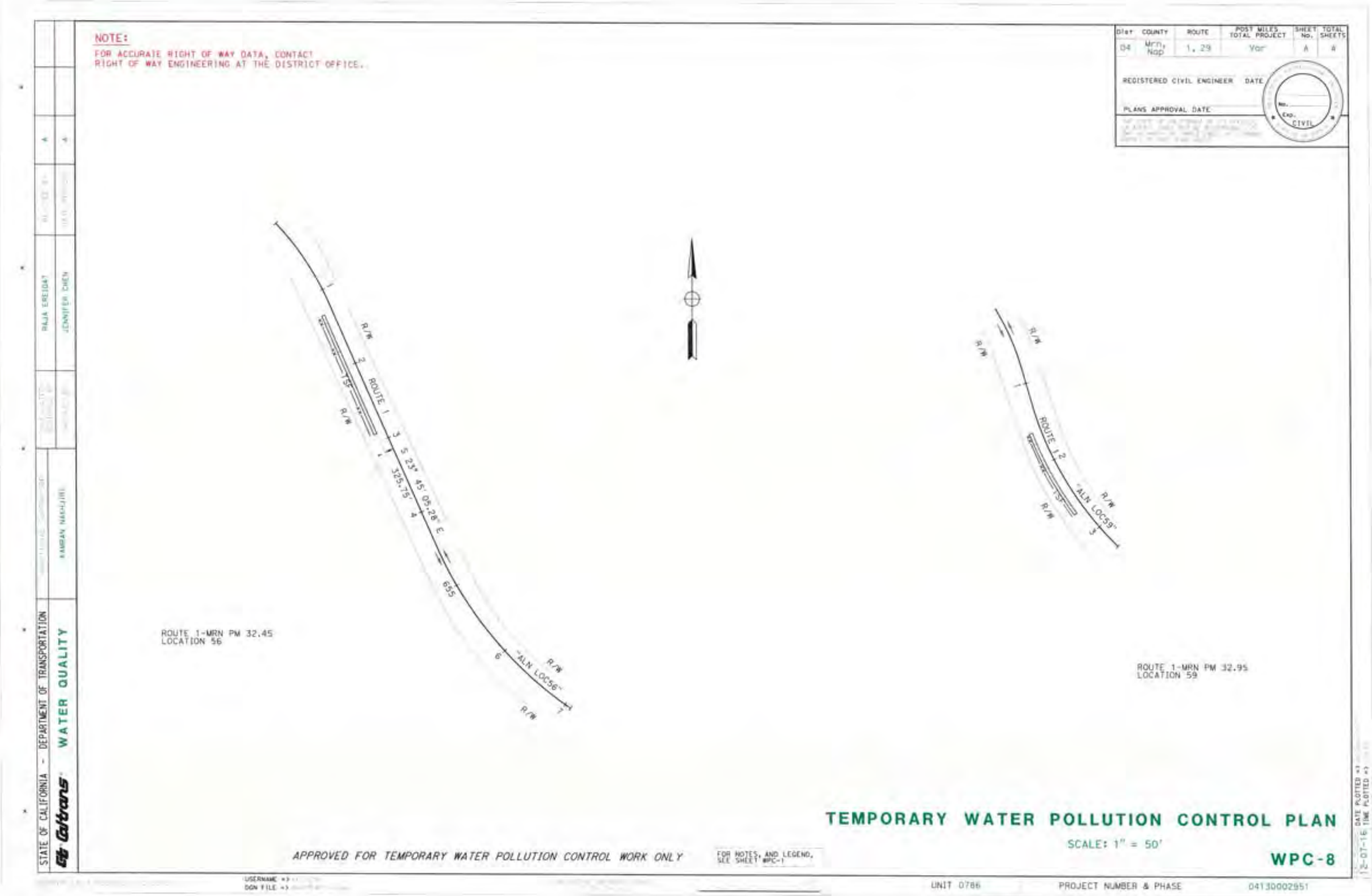
STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION
Caltrans WATER QUALITY

KAMRAN NAWAZISH | RAJA ERETGAT | JENNIFER CHEN

USERNAME =>
DGN FILE =>

UNIT 0786 | PROJECT NUMBER & PHASE 0413000295I

DATE PLOTTED =>
TIME PLOTTED =>
12-07-16

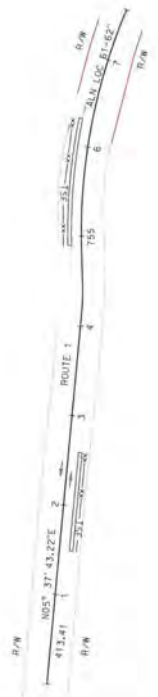

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
WATER QUALITY
ROUTE 1-MRN PM 32.45
LOCATION 56
ROUTE 1
S 23° 45' 05.28" E
325.75'
"ALN LOC56"
R/W
ROUTE 1-MRN PM 32.95
LOCATION 59
ROUTE 1
"ALN LOC59"
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-8
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
UNIT 0786
PROJECT NUMBER & PHASE
0413000295

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

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	MRN; NOO	1; 29	VAR	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE



ROUTE 1-MRN PM 33.13-33.30
LOCATION 61-62

ROUTE 1-MRN PM 35.41
LOCATION 64

TEMPORARY WATER POLLUTION CONTROL PLAN

SCALE: 1" = 50'

WPC-9

APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY

FOR NOTES AND LEGEND, SEE SHEET WPC-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans WATER QUALITY
KAMRAN NAKHJIRI
REJA FREIGAT
JENNIFER CHEN

USERNAME =>
DGN FILE =>

UNIT 0786 PROJECT NUMBER & PHASE 0413000295I

DATE PLOTTED =>
12-07-16 TIME PLOTTED =>

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

Dist.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

ROUTE 1-MRN PM 35.90
LOCATION 66

ROUTE 1-MRN PM 36.00
LOCATION 67

TEMPORARY WATER POLLUTION CONTROL PLAN

SCALE: 1" = 50'

APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY

FOR NOTES AND LEGEND, SEE SHEET WPC-1

WPC-10

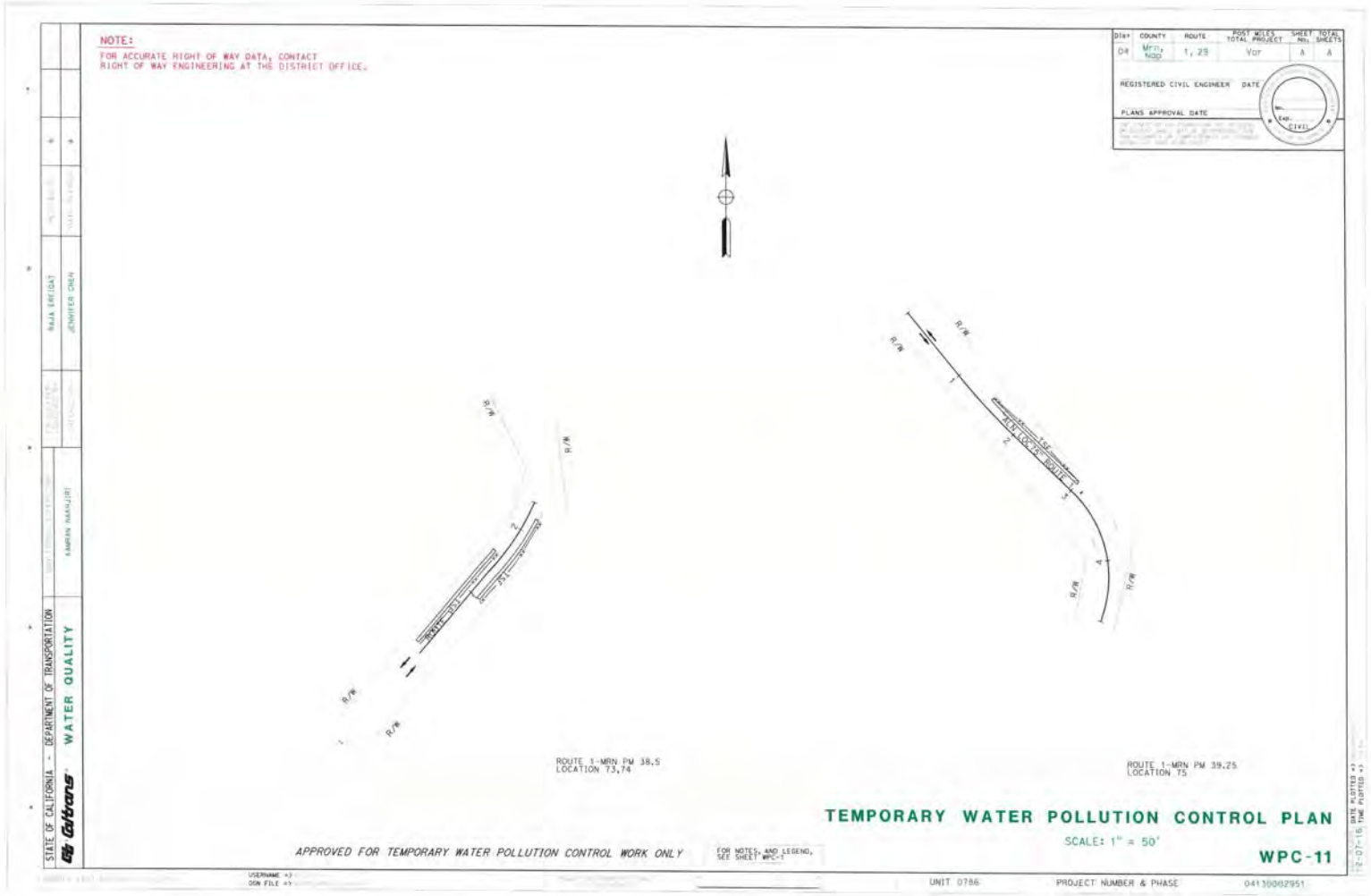
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans WATER QUALITY

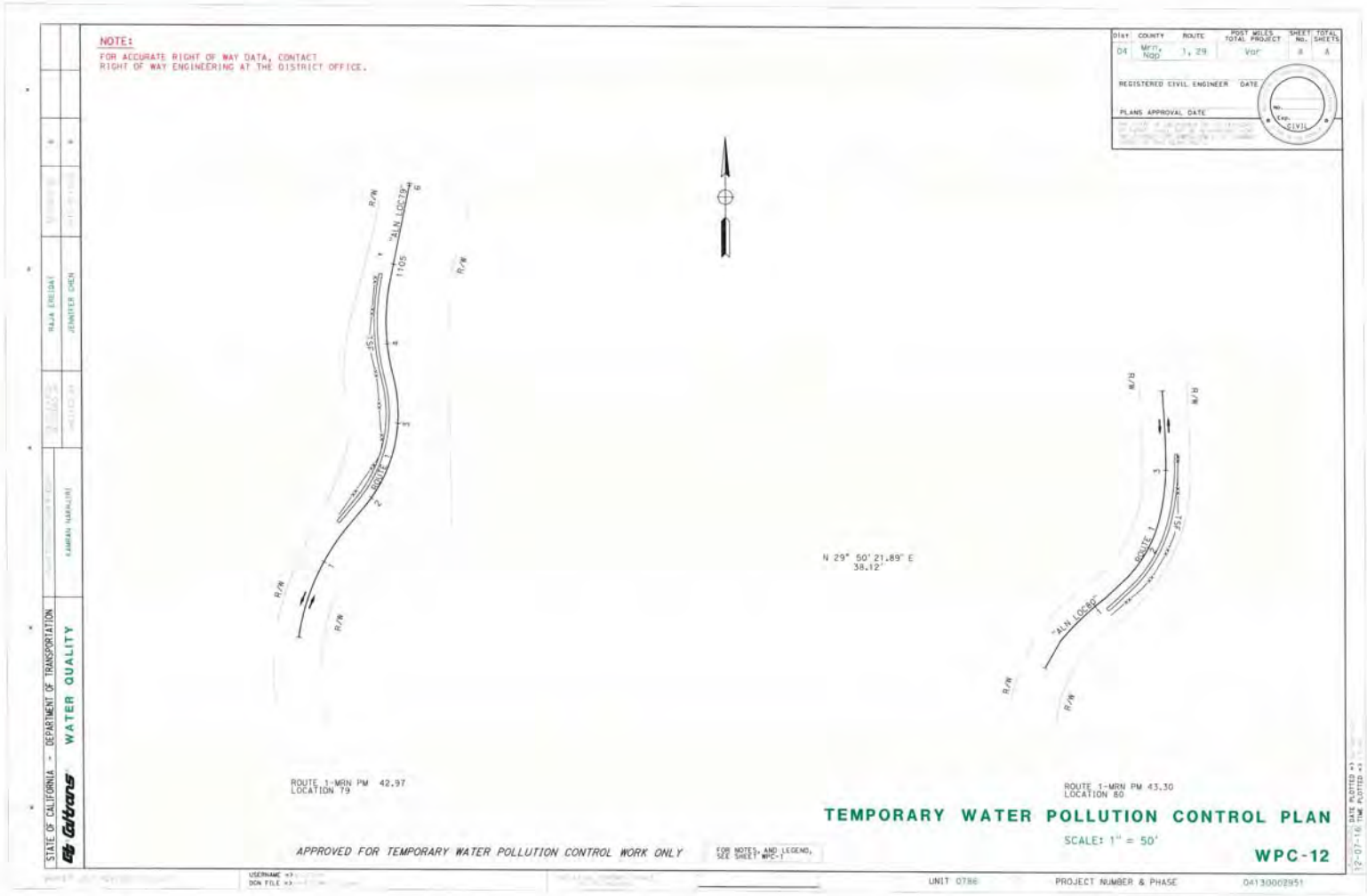
RAJA ERCEGAT | JENNIFER CHEN | KAMRAN NANAJIRI

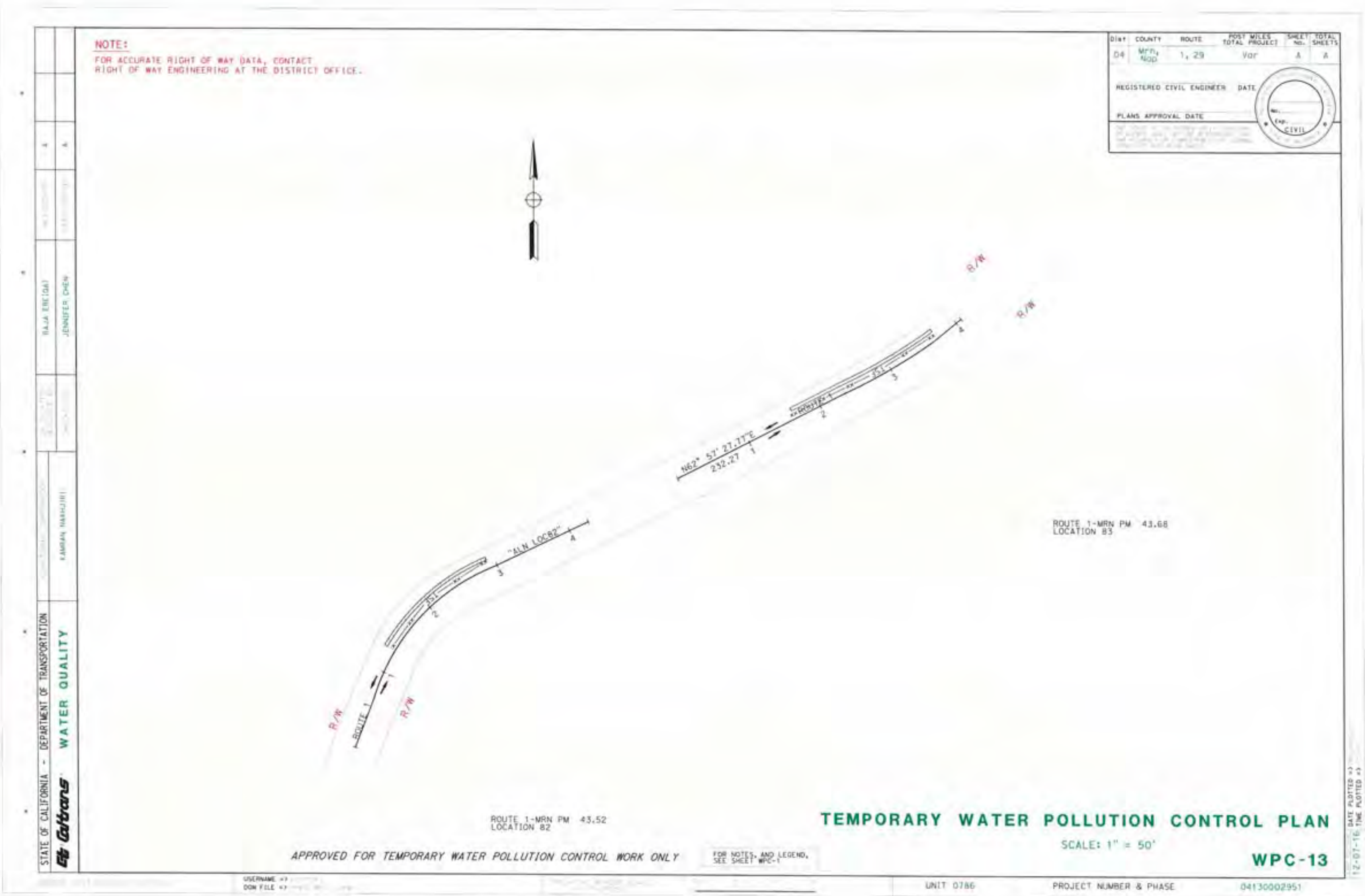
USERNAME =>
DGN FILE =>

UNIT 0786 | PROJECT NUMBER & PHASE 04130002951

DATE PLOTTED =>
12-07-16
TIME PLOTTED =>


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
Dist COUNTY ROUTE POST MILES TOTAL PROJECT SHEET No. TOTAL SHEETS
04 Mrn, Nap 1, 29 Var A A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
CIVIL
R/W
ROUTE 1
ROUTE 1-MRN PM 38.5
LOCATION 73,74
ROUTE 1-MRN PM 39.25
LOCATION 75
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
WATER QUALITY
RAJA ERIGAT
JENNIFER CHEN
KAMRAN NANJIRI
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-11
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
USERNAME =>
DGN FILE =>
UNIT 0786
PROJECT NUMBER & PHASE
0413000279S1
DATE PLOTTED =>
TIME PLOTTED =>


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
Dist
COUNTY
ROUTE
POST MILES TOTAL PROJECT
SHEET NO.
TOTAL SHEETS
04
Mrn, Nap
1, 29
Var
8
REGISTERED CIVIL ENGINEER
DATE
PLANS APPROVAL DATE
CIVIL
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
WATER QUALITY
RAJA ERIDANI
JENNIFER OHEN
"ALN LOC 79"
"ALN LOC 80"
ROUTE 1
R/W
1105
151
N 29° 50' 21.89" E
38.12'
ROUTE 1-MRN PM 42.97
LOCATION 79
ROUTE 1-MRN PM 43.30
LOCATION 80
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-12
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
UNIT 0786
PROJECT NUMBER & PHASE
04130002951


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
WATER QUALITY
Caltrans
N62° 57' 27.77"E
232.27
"ALN LOC82"
R/W
ROUTE 1
ROUTE 1-MRN PM 43.68
LOCATION 83
ROUTE 1-MRN PM 43.52
LOCATION 82
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-13
UNIT 0786
PROJECT NUMBER & PHASE
04130002951

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

CURVE DATA

No. ⊗	R	Δ	T	L
70	1318.14'	011°11'57"	129.23'	257.65'
71	908.50'	011°54'23"	94.74'	188.79'

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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

ROUTE 1-MRN PM 43.88
LOCATION 84

TEMPORARY WATER POLLUTION CONTROL PLAN

SCALE: 1" = 50'

APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY

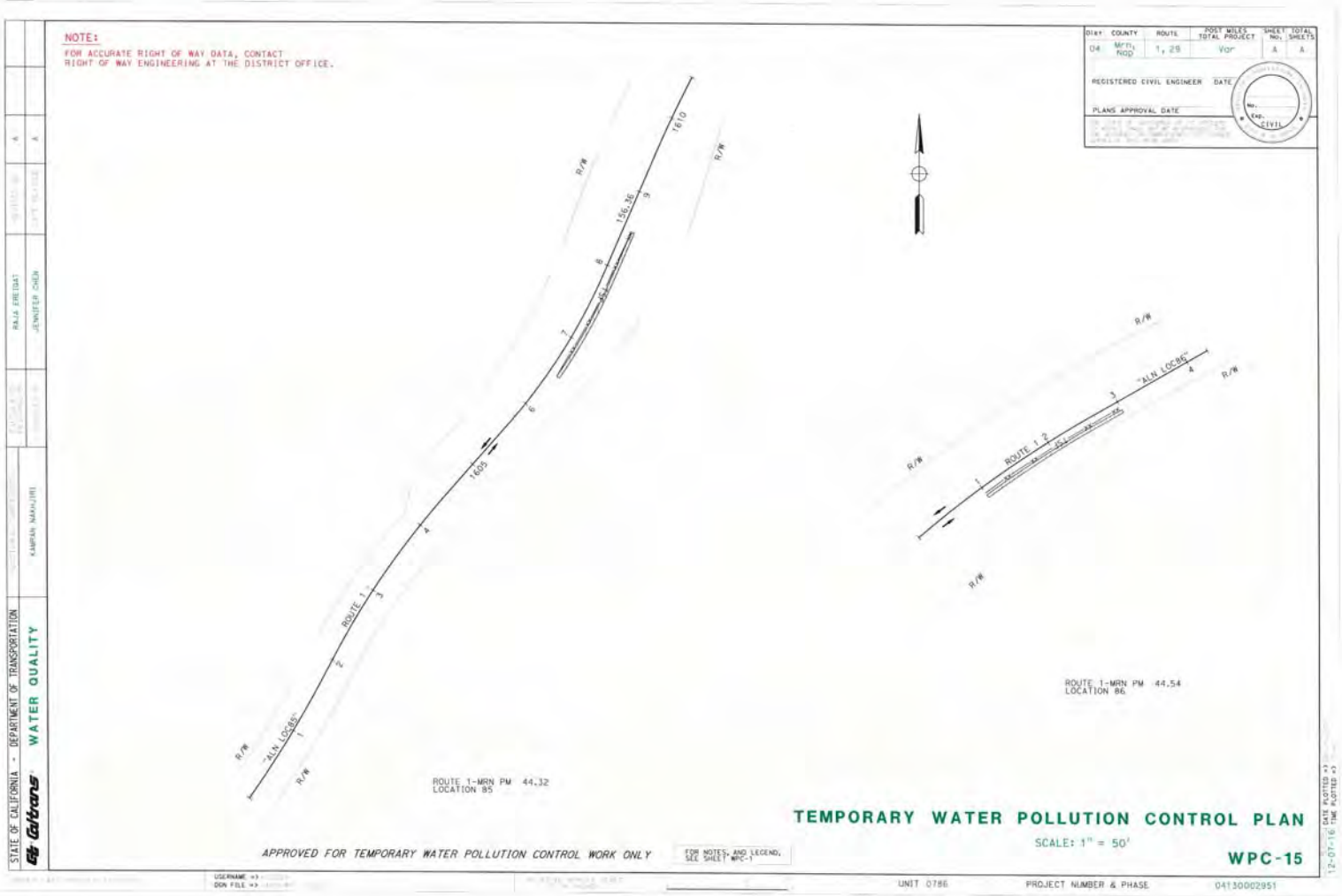
FOR NOTES, AND LEGEND, SEE SHEET WPC-1

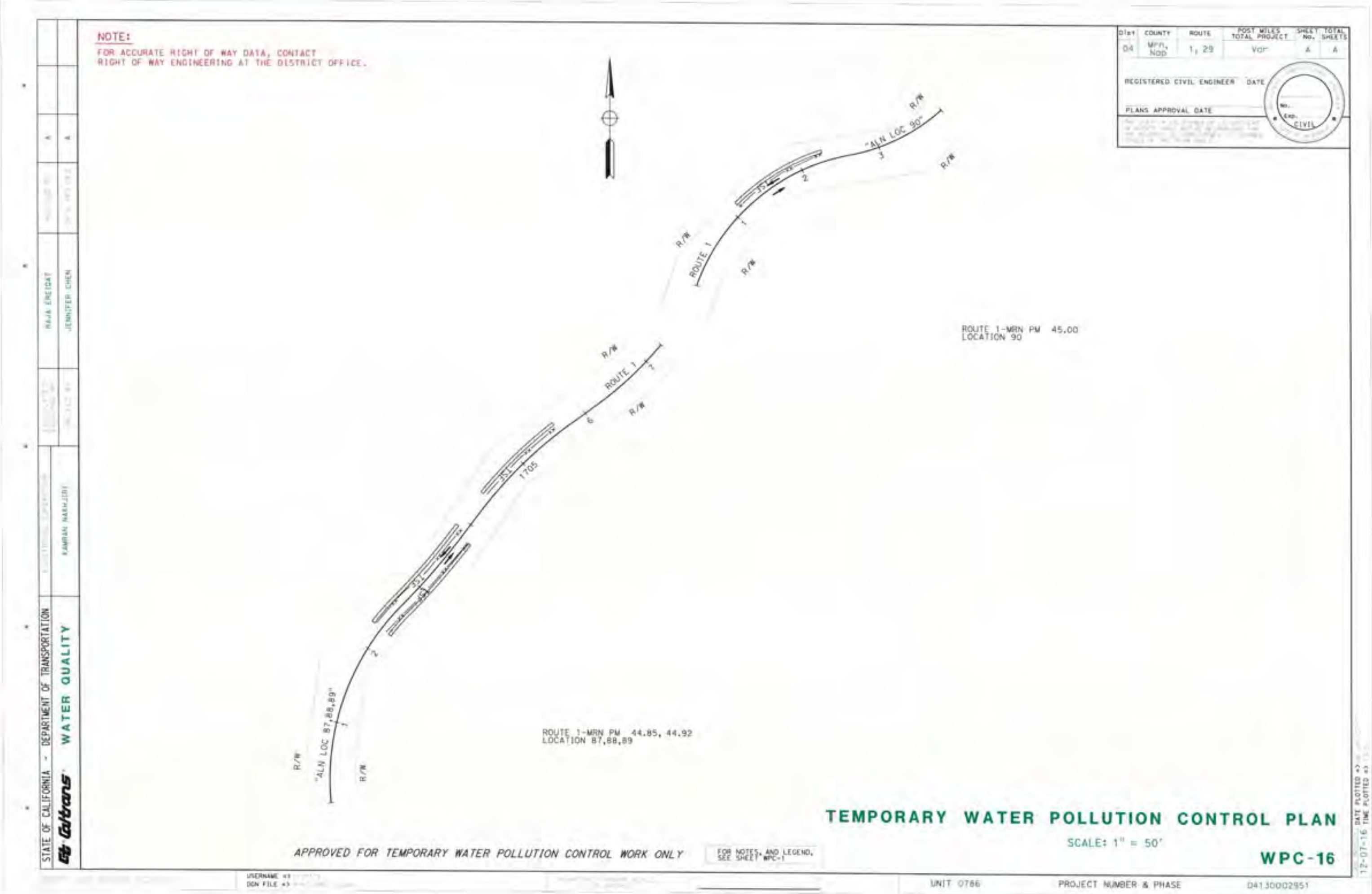
WPC-14

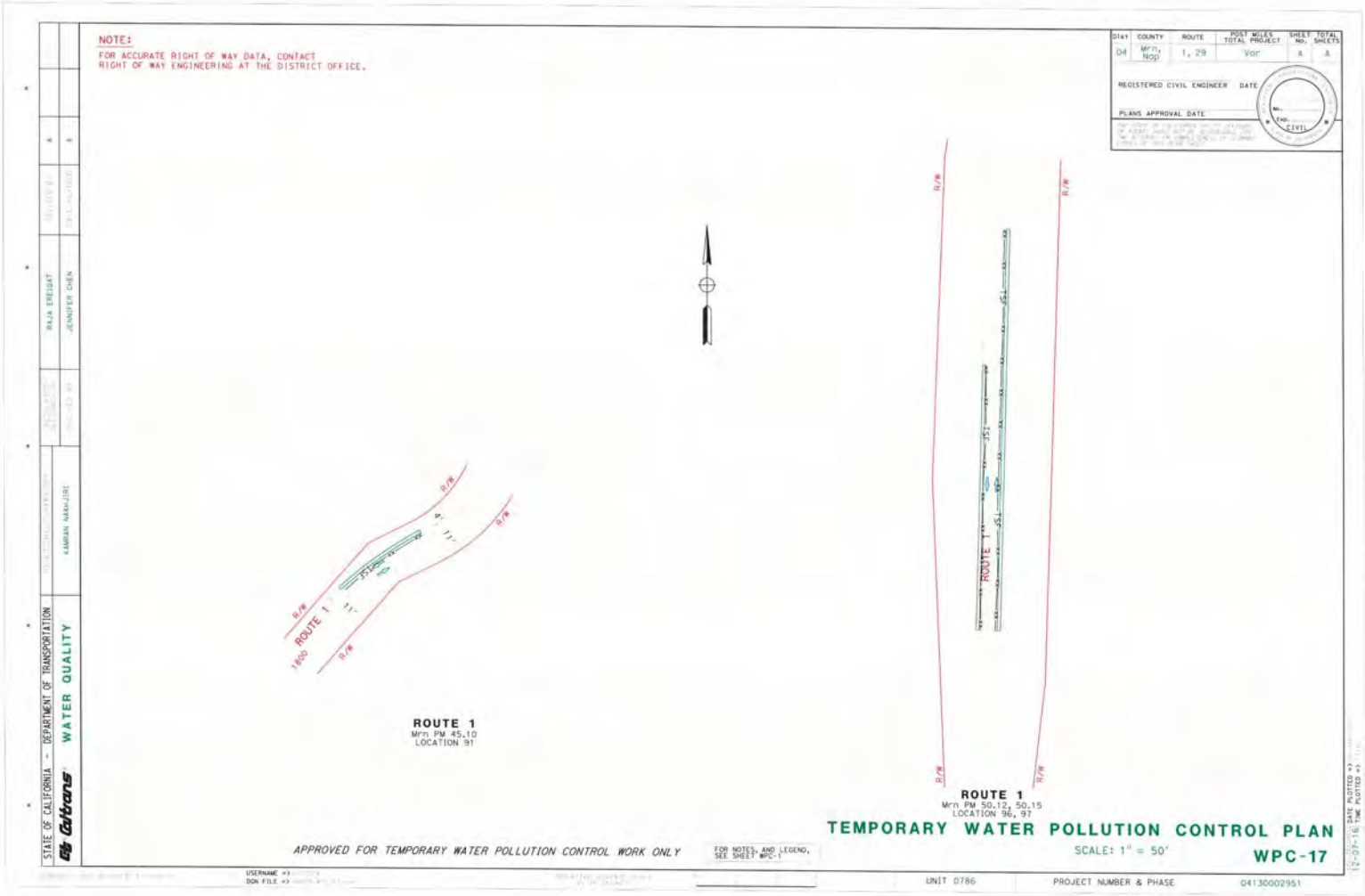
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
WATER QUALITY

FUNCTIONAL SUPERVISOR: KAMRAN NAKHJIRI
CALCULATED-DESIGNED BY: RAJA ERESKAT
CHECKED BY: JENNIFER CHEN
REVISED BY
DATE REVISED

BORDER LAST REVISED 7/2/2010
USERNAME
DGN FILE
RELATIVE BORDER SCALE IS IN INCHES
UNIT 0786
PROJECT NUMBER & PHASE 0413000295


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
DIST COUNTY ROUTE POST MILES TOTAL PROJECT SHEET NO. TOTAL SHEETS
04 Mrn; Nap 1, 29 Var A A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
No. Exp. CIVIL
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans WATER QUALITY
RAJA ERTIGAT
JENNIFER CHEN
KAMRAN NAHAJIRI
"ALN LOC85"
ROUTE 1
1605
1610
156.36
R/W
ROUTE 1-MRN PM 44.32
LOCATION 85
"ALN LOC86"
ROUTE 1
ROUTE 1-MRN PM 44.54
LOCATION 86
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-15
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
USERNAME =>
DGN FILE =>
UNIT 0786
PROJECT NUMBER & PHASE
04130002951
DATE PLOTTED =>
12-07-16 TIME PLOTTED =>


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
WATER QUALITY
ROUTE 1
R/W
"ALN LOC 90"
"ALN LOC 87,88,89"
ROUTE 1-MRN PM 45.00
LOCATION 90
ROUTE 1-MRN PM 44.85, 44.92
LOCATION 87,88,89
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-16
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
UNIT 0786
PROJECT NUMBER & PHASE
0413000295


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
Dist
COUNTY
ROUTE
POST MILES TOTAL PROJECT
SHEET NO.
TOTAL SHEETS
04
Mrn, Nap
1, 29
Var
A
A
REGISTERED CIVIL ENGINEER
DATE
PLANS APPROVAL DATE
EXP.
CIVIL
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
WATER QUALITY
KAMRAN NAKHJIRI
RAJA ERIGAT
JENNIFER CHEN
ROUTE 1
1800
R/W
ROUTE 1
Mrn PM 45.10
LOCATION 91
ROUTE 1
Mrn PM 50.12, 50.15
LOCATION 96, 97
APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY
FOR NOTES AND LEGEND, SEE SHEET WPC-1
TEMPORARY WATER POLLUTION CONTROL PLAN
SCALE: 1" = 50'
WPC-17
USERNAME =>
DGN FILE =>
UNIT 0786
PROJECT NUMBER & PHASE
04130002951
DATE PLOTTED =>
TIME PLOTTED =>

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

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1; 29	Var	4	8

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

No. Exp. CIVIL

TEMPORARY WATER POLLUTION CONTROL QUANTITIES

LOCATION	POST MILE	TEMPORARY COVER (SQYD)	TEMPORARY SILT FENCE (LF)	TEMPORARY DRAINAGE INLET PROTECTIO (EA)	TEMPORARY GRAVEL BERM BAG (LF)	TEMPORARY FIBER ROLL (LF)
1	3.91	35	77	0	0	0
3	6.4	41	98	1	0	0
5	8.45	40	94	0	0	0
6	9.3	412	973	0	0	0
7	11.2	205	464	0	0	0
9A	12.5-12.72	344	791	0	0	0
10	12.95	68	154	0	0	0
12	13.49	71	162	0	36	0
13	13.79	145	328	0	0	0
16	14.46	213	0	0	0	490
52	31.5	133	300	0	0	0
53	31.7	141	328	0	0	0
54	32.06	88	161	0	0	0
55	32.31	68	156	0	0	0
56	32.45	71	161	0	0	0
59	32.95	50	116	0	0	0
61-62	33.13-33.30	101	256	0	0	0
64	35.41	67	152	0	0	0
66	35.9	118	264	0	0	0
37	37	55	250	0	0	0
73,74	38.5	121	277	0	0	0
75	39.25	66	149	0	0	0
79	42.95	74	319	0	0	0
80	43.3	99	231	0	0	0
82	43.52	75	165	0	0	0
83	43.68	90	208	0	0	0
84	43.88	111	250	0	0	0
85	44.32	46	202	0	0	0
86	44.54	88	199	0	0	0
87,88,89	44.85-44.92	192	434	0	0	0
90	45	56	125	0	0	0
91	45.1	55	122	0	0	0
96,97	50.12-50.15	369	831	0	0	0
TOTAL		3908	8797	1	36	490

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans WATER QUALITY
KAMRAN NAKHJIRI
REVISED
DATE REVISED
BRAD EREQAT
JENNIFER DIEN

APPROVED FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY

TEMPORARY WATER POLLUTION CONTROL QUANTITY
SCALE: 1" = 50'
WPCQ-1

USERNAME =>
DGN FILE =>
UNIT 0786
PROJECT NUMBER & PHASE 0413000295I

STATIONARY MOUNTED CONSTRUCTION AREA SIGNS

SIGN No.	SIGN CODE		PANEL SIZE	SIGN MESSAGE	NUMBER OF POSTS AND SIZE	NUMBER OF SIGNS
	FEDERAL	CALIFORNIA				
A	W20-1		48" x 48"	ROAD WORK AHEAD	1 - 4" x 6"	7
B	G20-2		36" x 18"	END ROAD WORK	1 - 4" x 4"	7

NOTES:

1. EXACT LOCATION AND POSITION OF CONSTRUCTION AREA SIGNS TO BE DETERMINED BY THE ENGINEER.
2. SIGN POST LENGTH ARE APPROXIMATE, EXACT SIZE AND LENGTH TO BE DETERMINED BY THE ENGINEER.

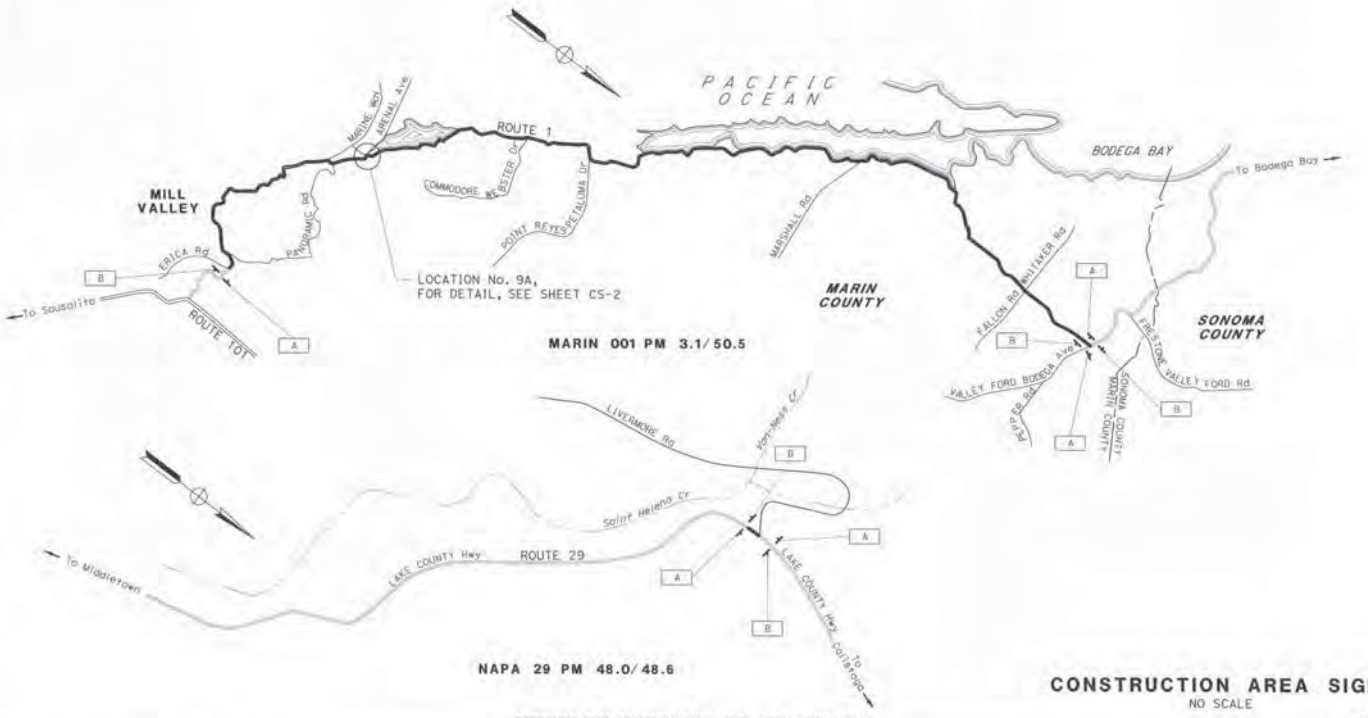
LEGEND:

[L] CONSTRUCTION AREA SIGN LETTER

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE



CONSTRUCTION AREA SIGNS

NO SCALE

CS-1

APPROVED FOR CONSTRUCTION AREA SIGN WORK ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
TRAFFIC
FUNCTIONAL SUPERVISOR: ROLAND Au-YEUNG
CALCULATED/DESIGNED BY: HENRY TAM
CHECKED BY: RAJESH ORDEDI
REVISED BY:
DATE REVISED:

UNIT: 0T04 PROJECT NUMBER & PHASE 0413000295I


ROUTE 1
"ALNST" LINE
R/W
A
B
LOCATION No. 9A
(STINSON BEACH AREA)
PM 12.50 TO 12.72
CONSTRUCTION AREA SIGNS
NO SCALE
CS-2
APPROVED FOR CONSTRUCTION AREA SIGN WORK ONLY
STATE OF CALIFORNIA — DEPARTMENT OF TRANSPORTATION
TRAFFIC
HENRY TAM
RAJESH OBEROI
ROLAND AU-YEUNG
UNIT 0704
04136002951

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

LEGEND:
DIRECTION OF TRAFFIC

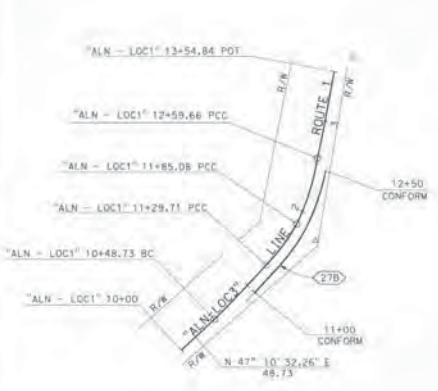
NOTE:
1. COORDINATE VALUES SHOWN ARE CCS 83 ZONE 3.
HORIZONTAL DATUM CCS 83
VERTICAL DATUM NAVD 88

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

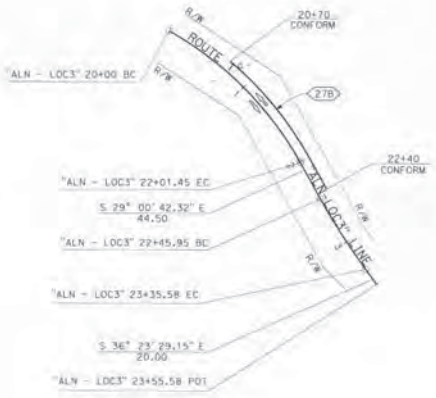
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

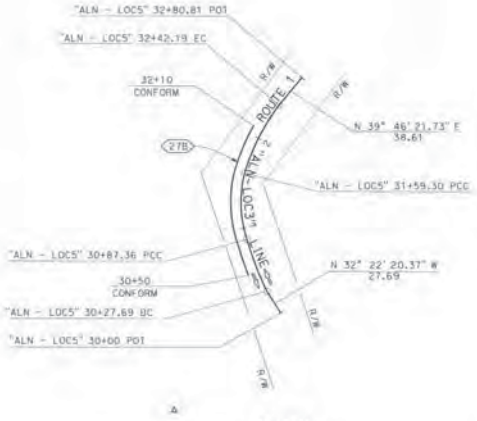
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF COMPUTER DATA SHOWN ON THIS MEDIA SHEET.



PM 3.91
LOCATION No. 1



PM 6.4
LOCATION No. 3



PM 8.45
LOCATION No. 5

ROUTE 1
(MARIN)

PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'

PD-1

APPROVED FOR PAVEMENT DELINEATION WORK ONLY

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO – FUNCTIONAL SUPERVISOR
CALCULATED/DESIGNED BY
CHECKED BY
PATRICK YIP
KAN PU
DATE REVISED
REVISED BY

BORDER LAST REVISED 7/3/2015
USERNAME =
DGN FILE =
RELATIVE BORDER SCALE IS IN INCHES
UNIT 0704
PROJECT NUMBER & PHASE 04130002951
12-20-16 TIME PLOTTED =

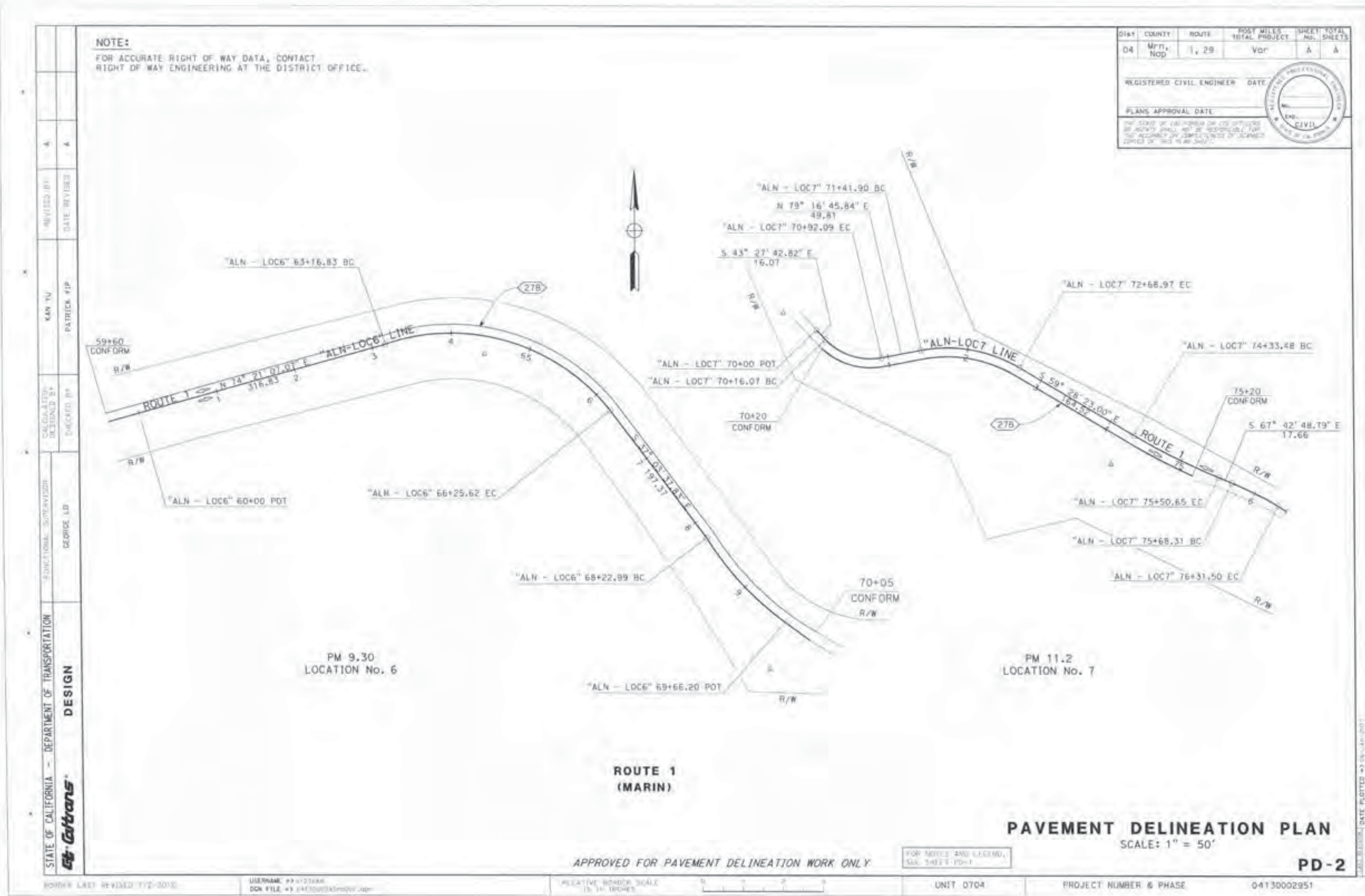
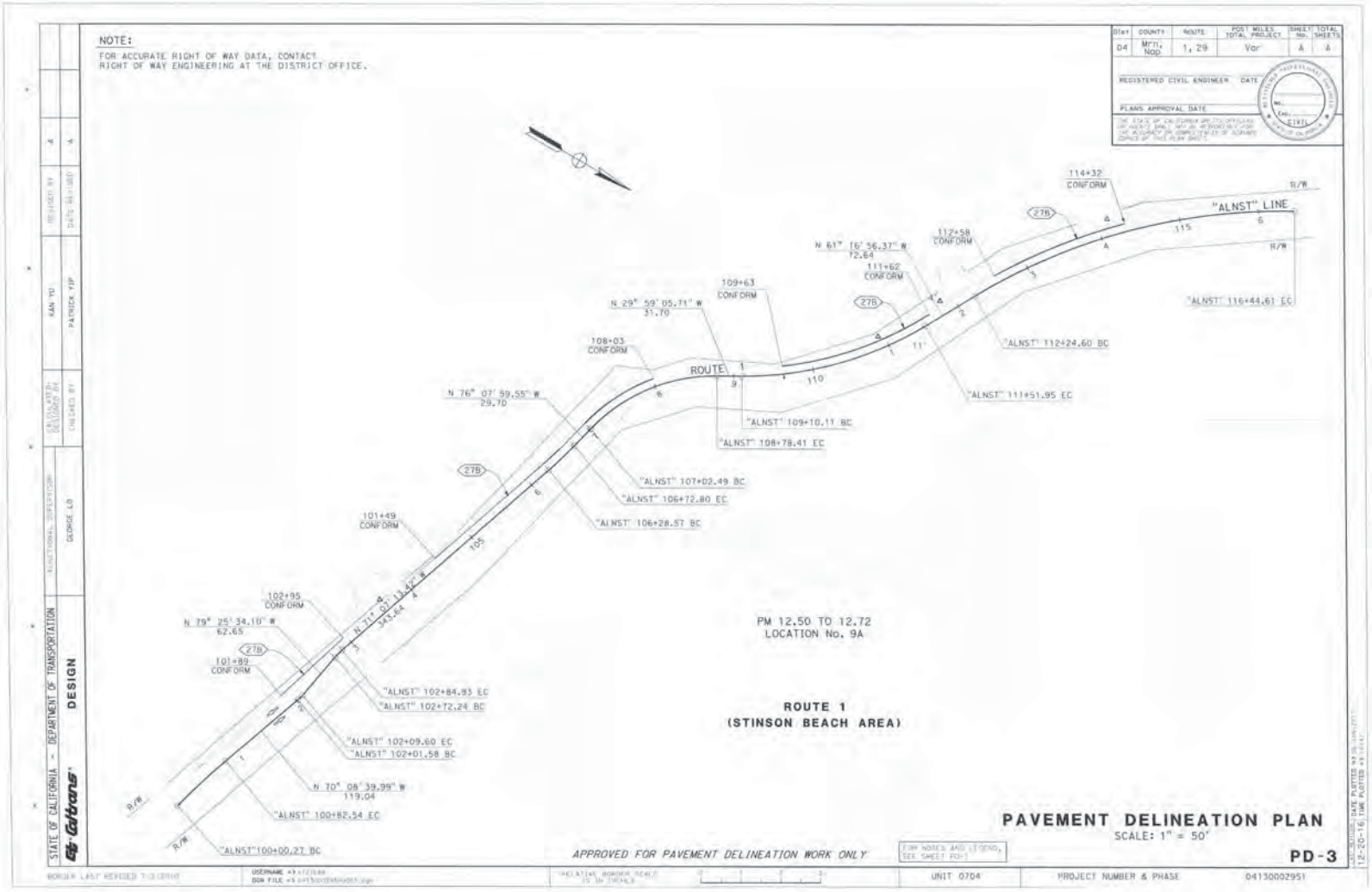


Exhibit 2 (Project Plans)
CDP 2-17-0018 (MRN-1 Rumble Strip)


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
DIST | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS
04 | Mrn, Nap | 1, 29 | Var | A | A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
KAN TO
PATRICK YIP
GEORGE LO
"ALNST" LINE
ROUTE
114+32 CONFORM
112+58 CONFORM
111+62 CONFORM
109+63 CONFORM
108+03 CONFORM
101+49 CONFORM
102+95 CONFORM
101+89 CONFORM
N 61° 16' 56.37" W 72.64
N 29° 59' 05.71" W 31.70
N 76° 07' 59.55" W 29.70
N 79° 25' 34.10" W 62.65
N 71° 07' 13.42" W 343.64
N 70° 08' 39.99" W 119.04
"ALNST" 116+44.61 EC
"ALNST" 112+24.60 BC
"ALNST" 111+51.95 EC
"ALNST" 109+10.11 BC
"ALNST" 108+78.41 EC
"ALNST" 107+02.49 BC
"ALNST" 106+72.80 EC
"ALNST" 106+28.57 BC
"ALNST" 102+84.93 EC
"ALNST" 102+72.24 BC
"ALNST" 102+09.60 EC
"ALNST" 102+01.58 BC
"ALNST" 100+82.54 EC
"ALNST" 100+00.27 BC
R/W
PM 12.50 TO 12.72
LOCATION No. 9A
ROUTE 1
(STINSON BEACH AREA)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
PD-3
UNIT 0704
PROJECT NUMBER & PHASE 04130002951

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

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

PM 12.95
LOCATION No. 10

PM 13.49
LOCATION No. 12

ROUTE 1
(MARIN)

PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'

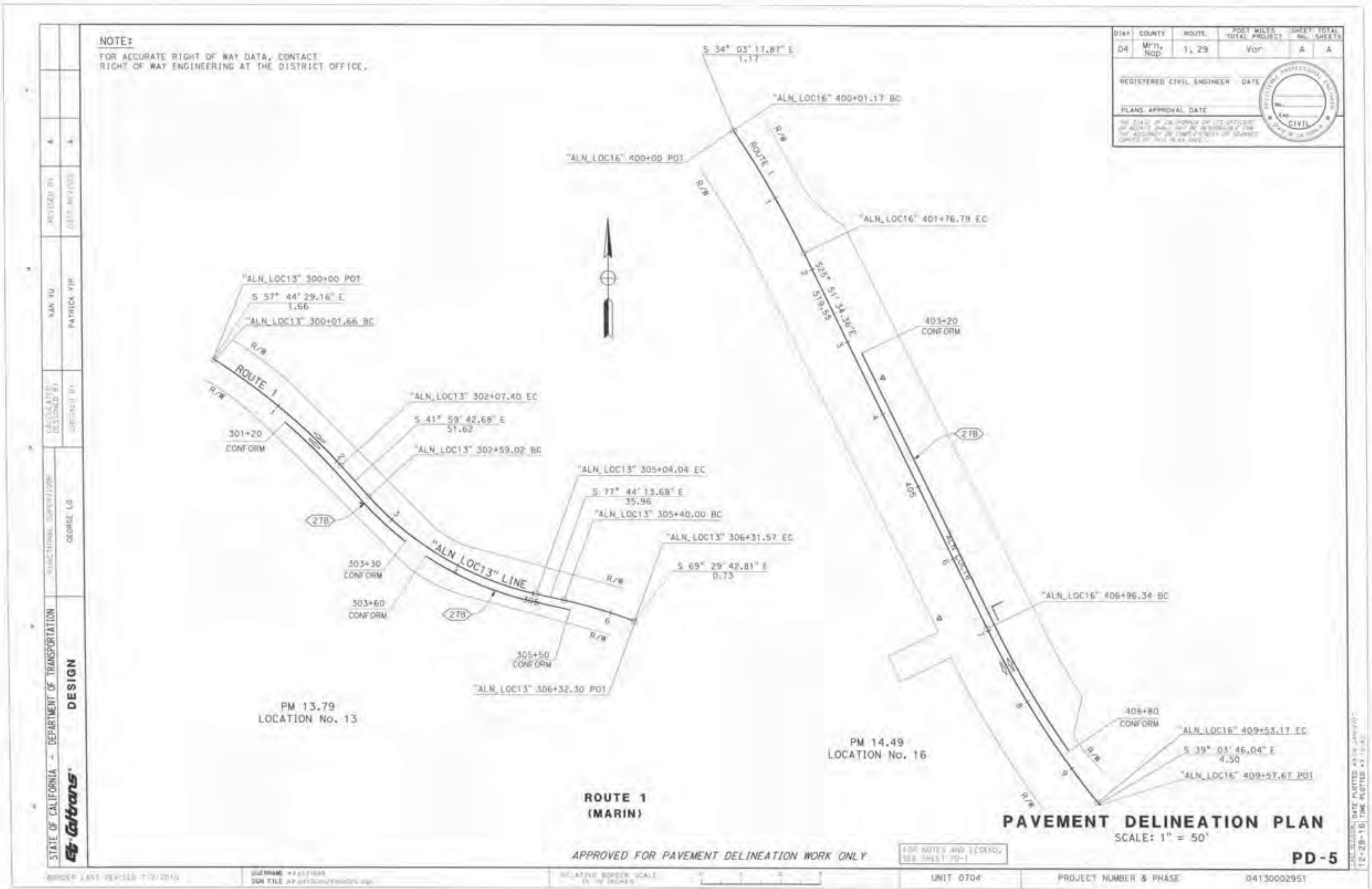
APPROVED FOR PAVEMENT DELINEATION WORK ONLY

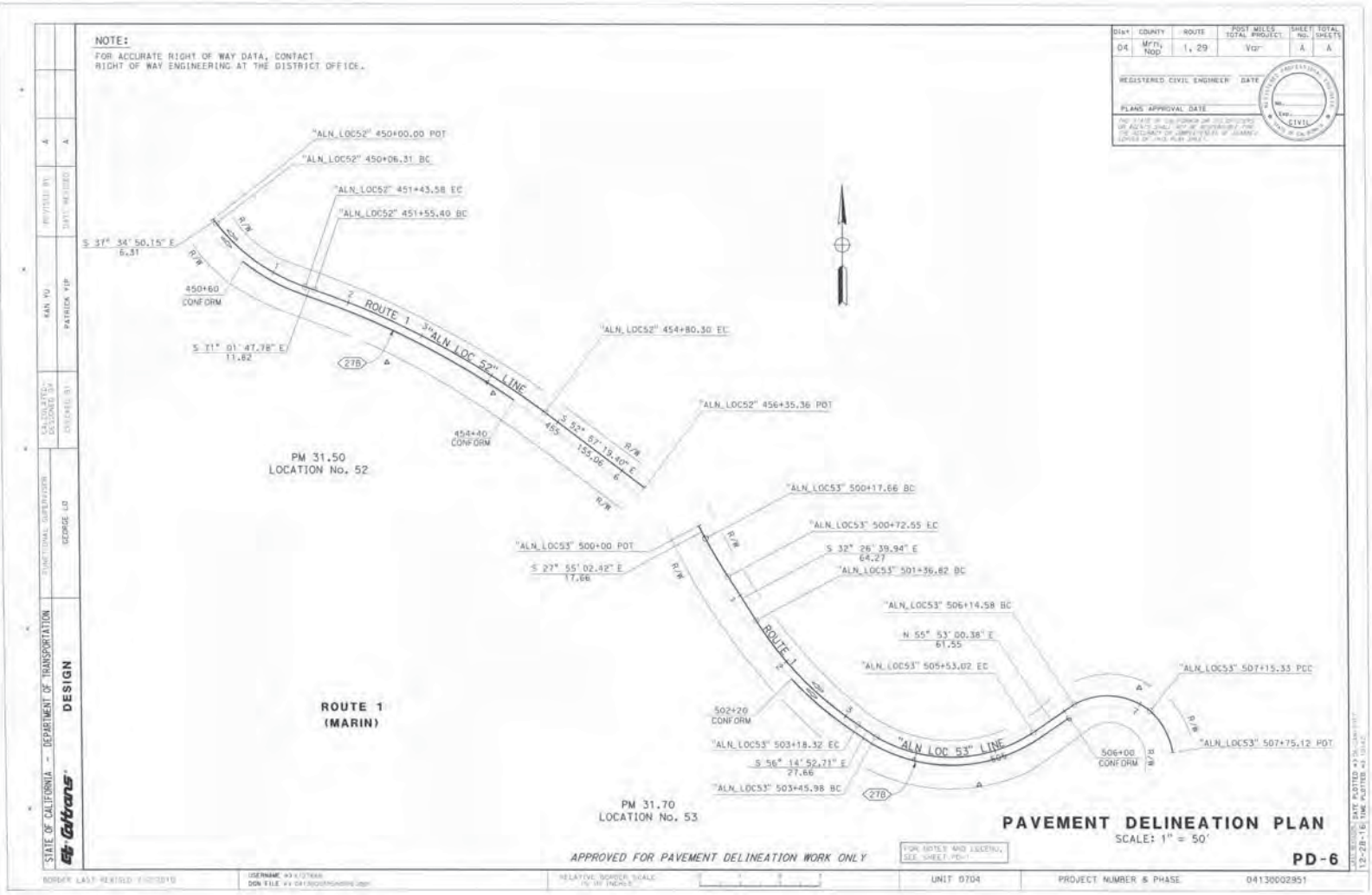
FOR NOTES AND LEGEND, SEE SHEET PD-2

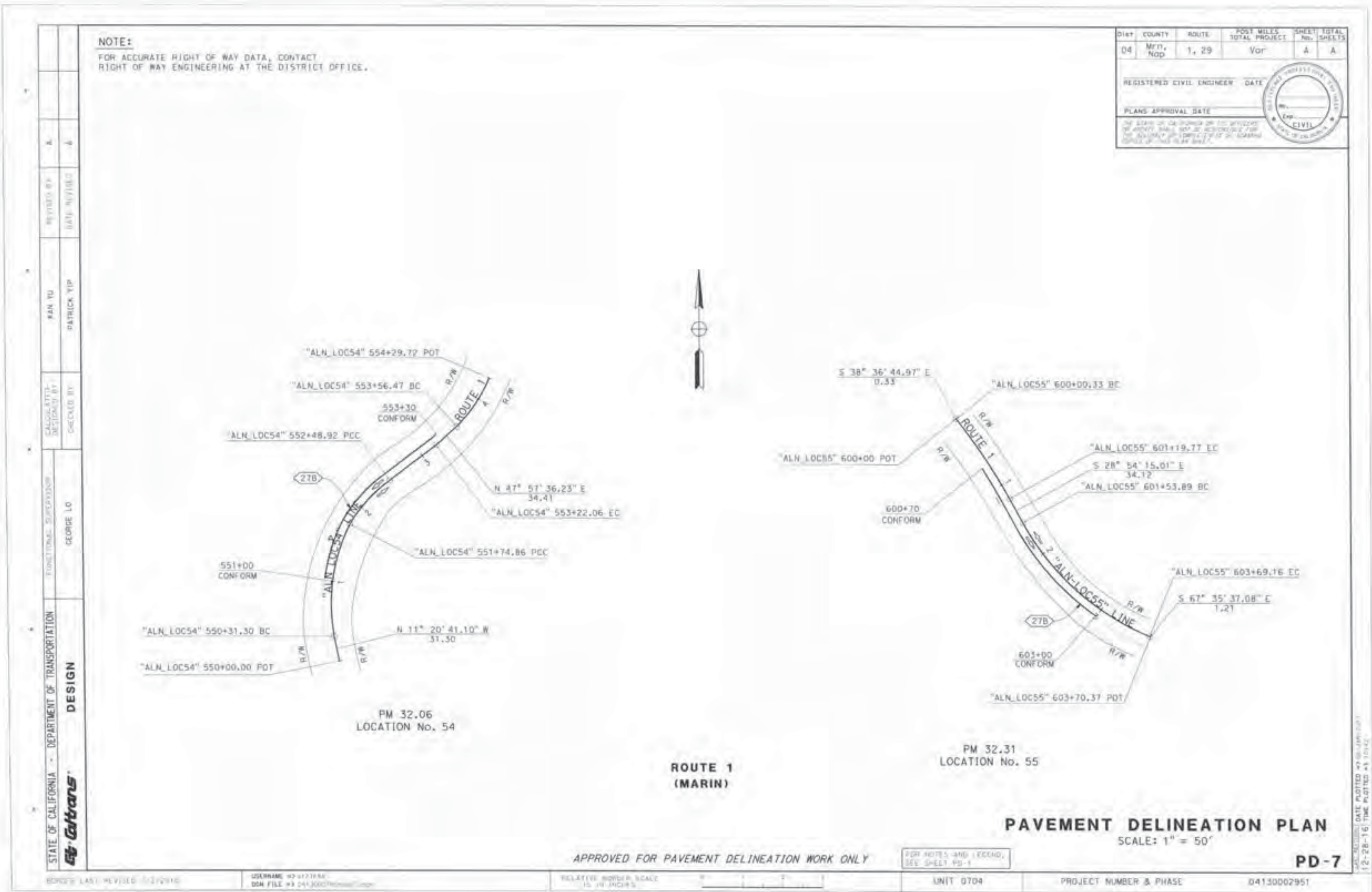
PD-4

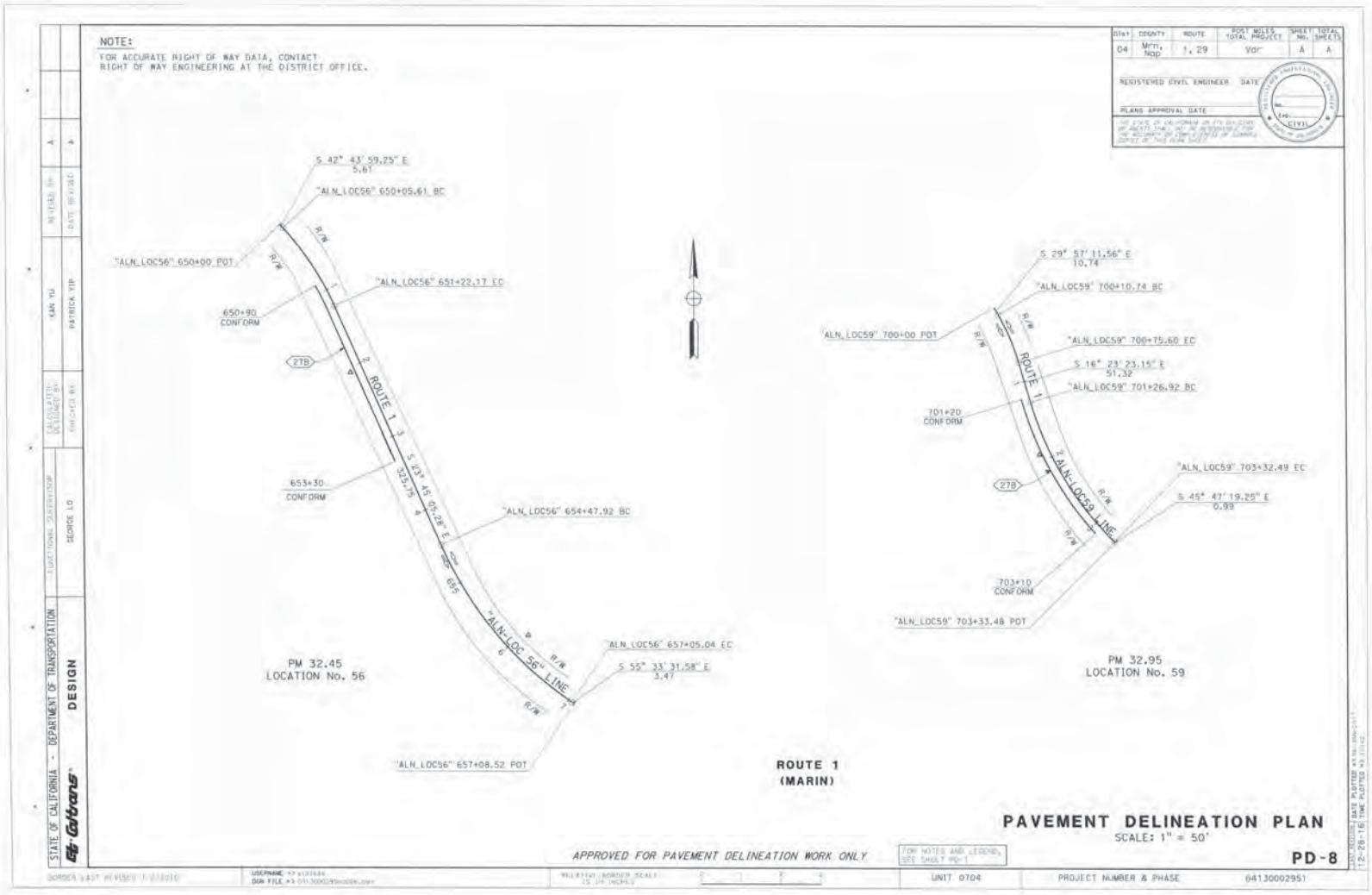
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
FUNCTIONAL SUPERVISOR: GEORGE LO
CALCULATED/DESIGNED BY
CHECKED BY
KAN YU
PATRICK YIP
DATE REVISED
REVISED BY
4
A

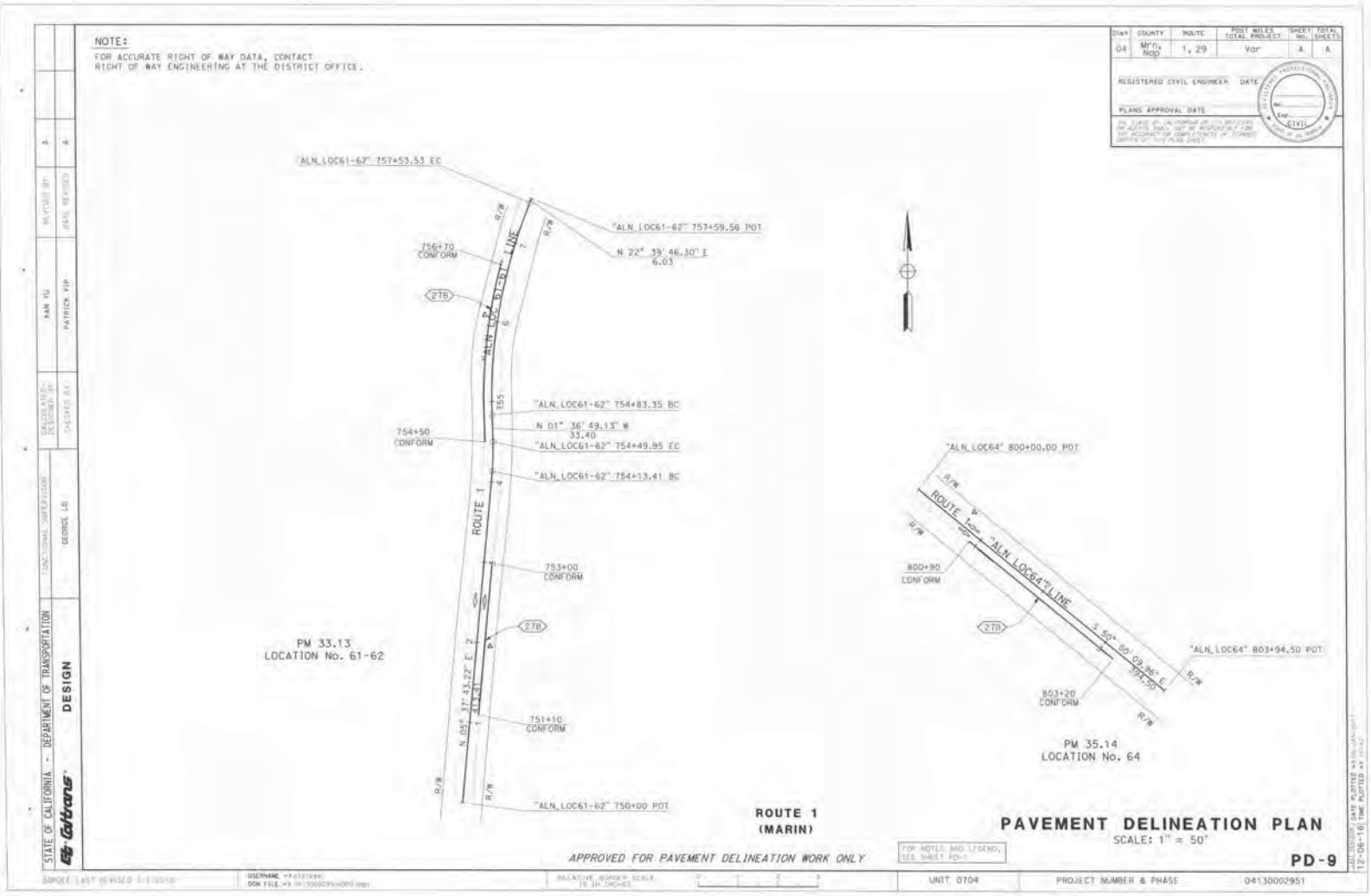
BORDER LAST REVISED 1/22/2019
USERNAME
DGN FILE
RELATIVE BORDER SCALE
UNIT 0704
PROJECT NUMBER & PHASE 04130002951
12-20-16 PLOTTED

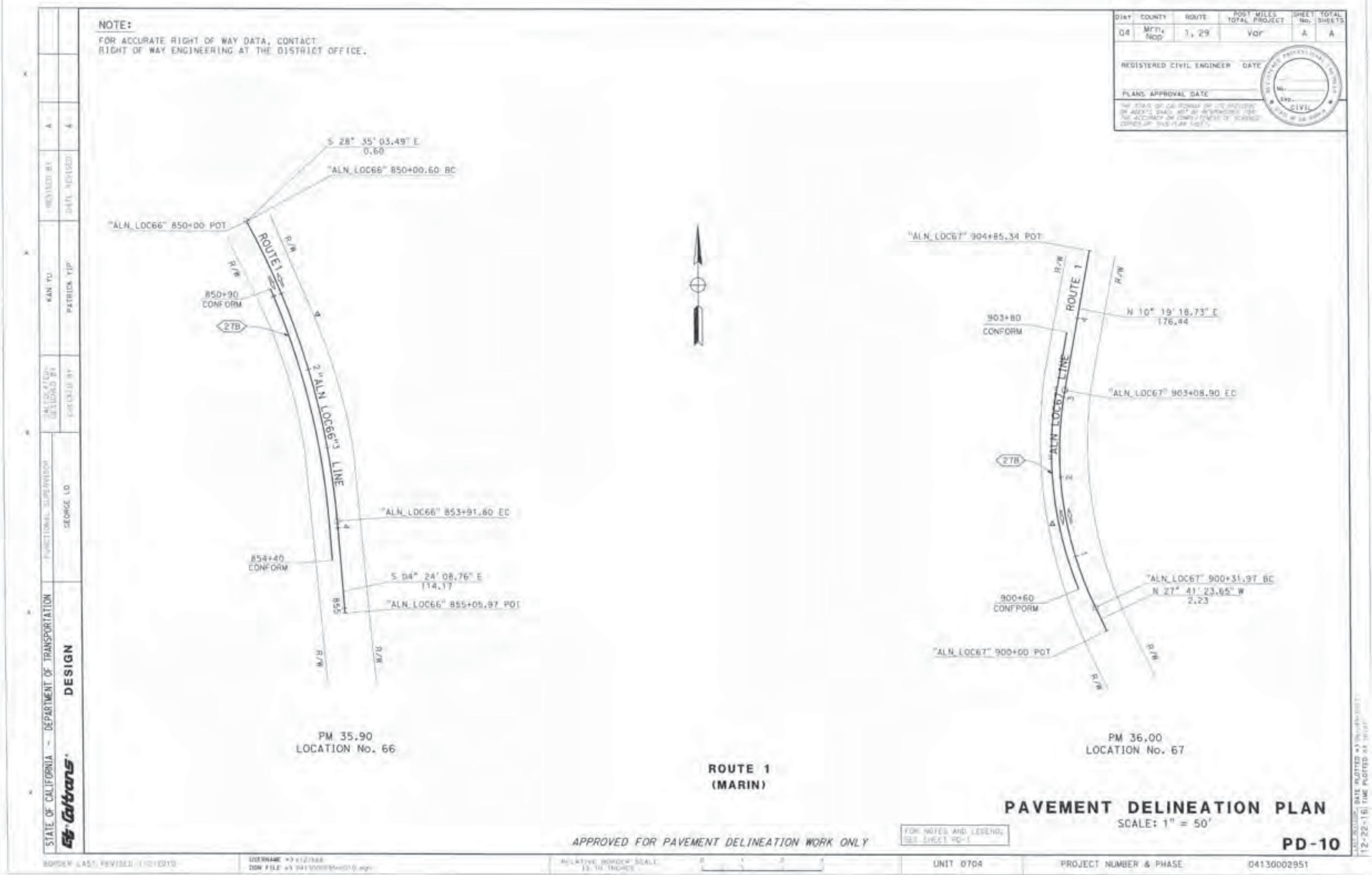

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
"ALN_LOC13" 300+00 POT
S 57° 44' 29.16" E
1.66
"ALN_LOC13" 300+01.66 BC
ROUTE 1
R/W
301+20
CONFORM
"ALN_LOC13" 302+07.40 EC
S 41° 59' 42.68" E
51.62
"ALN_LOC13" 302+59.02 BC
278
303+30
CONFORM
303+60
CONFORM
"ALN_LOC13" LINE
"ALN_LOC13" 305+04.04 EC
S 77° 44' 13.68" E
35.96
"ALN_LOC13" 305+40.00 BC
"ALN_LOC13" 306+31.57 EC
S 69° 29' 42.81" E
0.73
305+50
CONFORM
"ALN_LOC13" 306+32.30 POT
PM 13.79
LOCATION No. 13
S 34° 03' 17.87" E
1.17
"ALN_LOC16" 400+01.17 BC
"ALN_LOC16" 400+00 POT
"ALN_LOC16" 401+76.79 EC
S25° 51' 34.36"E
519.55
403+20
CONFORM
"ALN_LOC16" 406+96.34 BC
408+80
CONFORM
"ALN_LOC16" 409+53.17 EC
S 39° 03' 46.04" E
4.50
"ALN_LOC16" 409+57.67 POT
PM 14.49
LOCATION No. 16
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
PD-5
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
Caltrans
GEORGE LO
KAN YU
PATRICK YIP
Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS
04 | Mrn, Nap | 1, 29 | Var | A | A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
CIVIL
UNIT 0704
PROJECT NUMBER & PHASE
04130002951
12-28-16

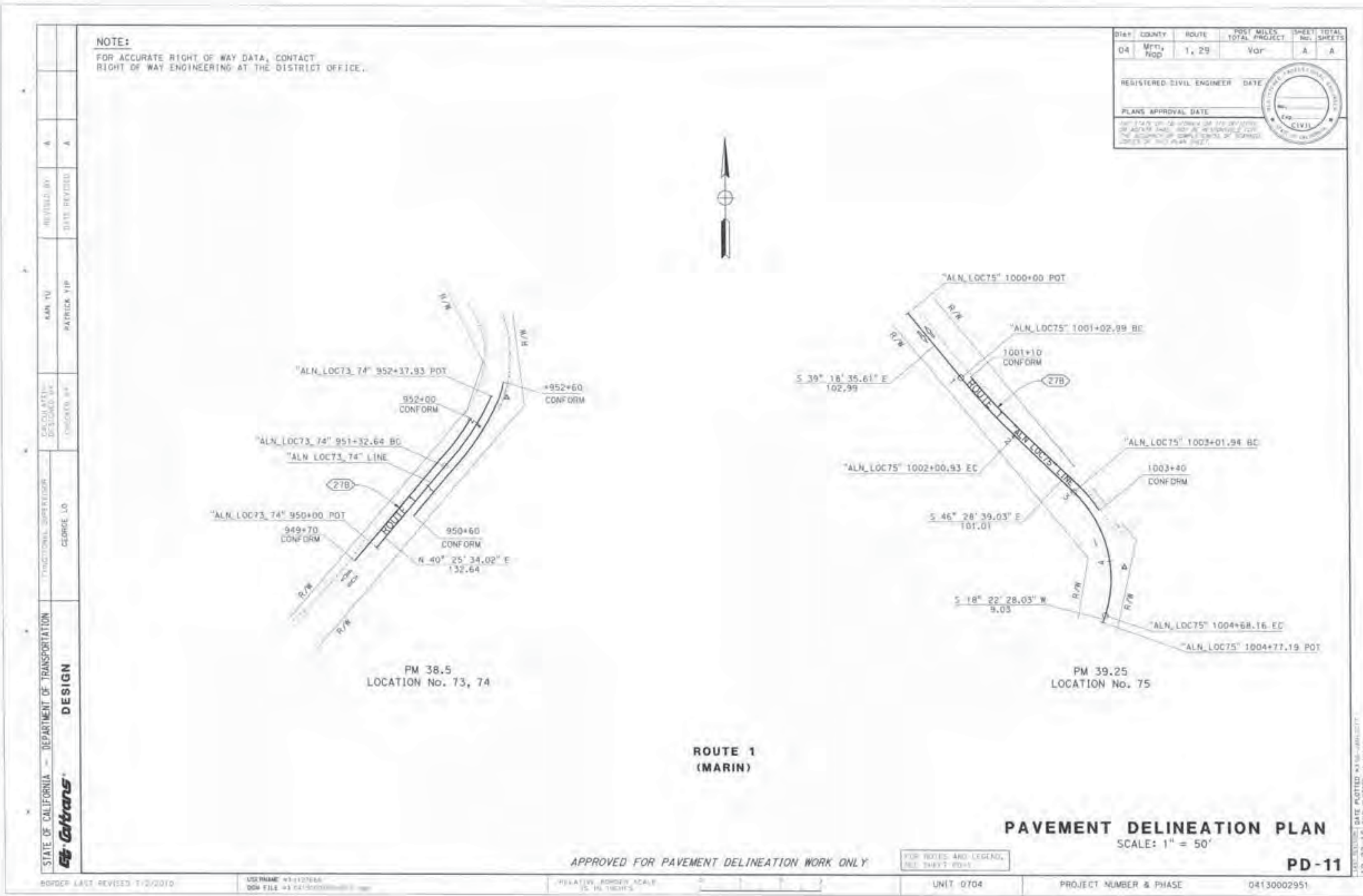

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET NO. | TOTAL SHEETS
04 | Mrn; Nap | 1, 29 | Var | A | A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
CIVIL
"ALN_LOC52" 450+00.00 POT
"ALN_LOC52" 450+06.31 BC
"ALN_LOC52" 451+43.58 EC
"ALN_LOC52" 451+55.40 BC
S 31° 34' 50.15" E
6.31
R/W
450+60
CONFORM
ROUTE 1
"ALN LOC 52" LINE
S 71° 01' 47.78" E
11.82
278
"ALN_LOC52" 454+80.30 EC
"ALN_LOC52" 456+35.36 POT
454+40
CONFORM
S 52° 57' 19.40" E
155.06
PM 31.50
LOCATION No. 52
"ALN_LOC53" 500+17.66 BC
"ALN_LOC53" 500+72.55 EC
"ALN_LOC53" 500+00 POT
S 27° 55' 02.42" E
17.66
S 32° 26' 39.94" E
64.27
"ALN_LOC53" 501+36.82 BC
"ALN_LOC53" 506+14.58 BC
N 55° 53' 00.38" E
61.55
"ALN_LOC53" 505+53.02 EC
"ALN_LOC53" 507+15.33 PCC
ROUTE 1
"ALN LOC 53" LINE
502+20
CONFORM
"ALN_LOC53" 503+18.32 EC
S 56° 14' 52.71" E
27.66
"ALN_LOC53" 503+45.98 BC
506+00
CONFORM
"ALN_LOC53" 507+75.12 POT
PM 31.70
LOCATION No. 53
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
PD-6
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
FUNCTIONAL SUPERVISOR
GEORGE LIU
CALCULATED/DESIGNED BY
CHECKED BY
KAN YU
PATRICK YIP
UNIT 0704
PROJECT NUMBER & PHASE 04130002951

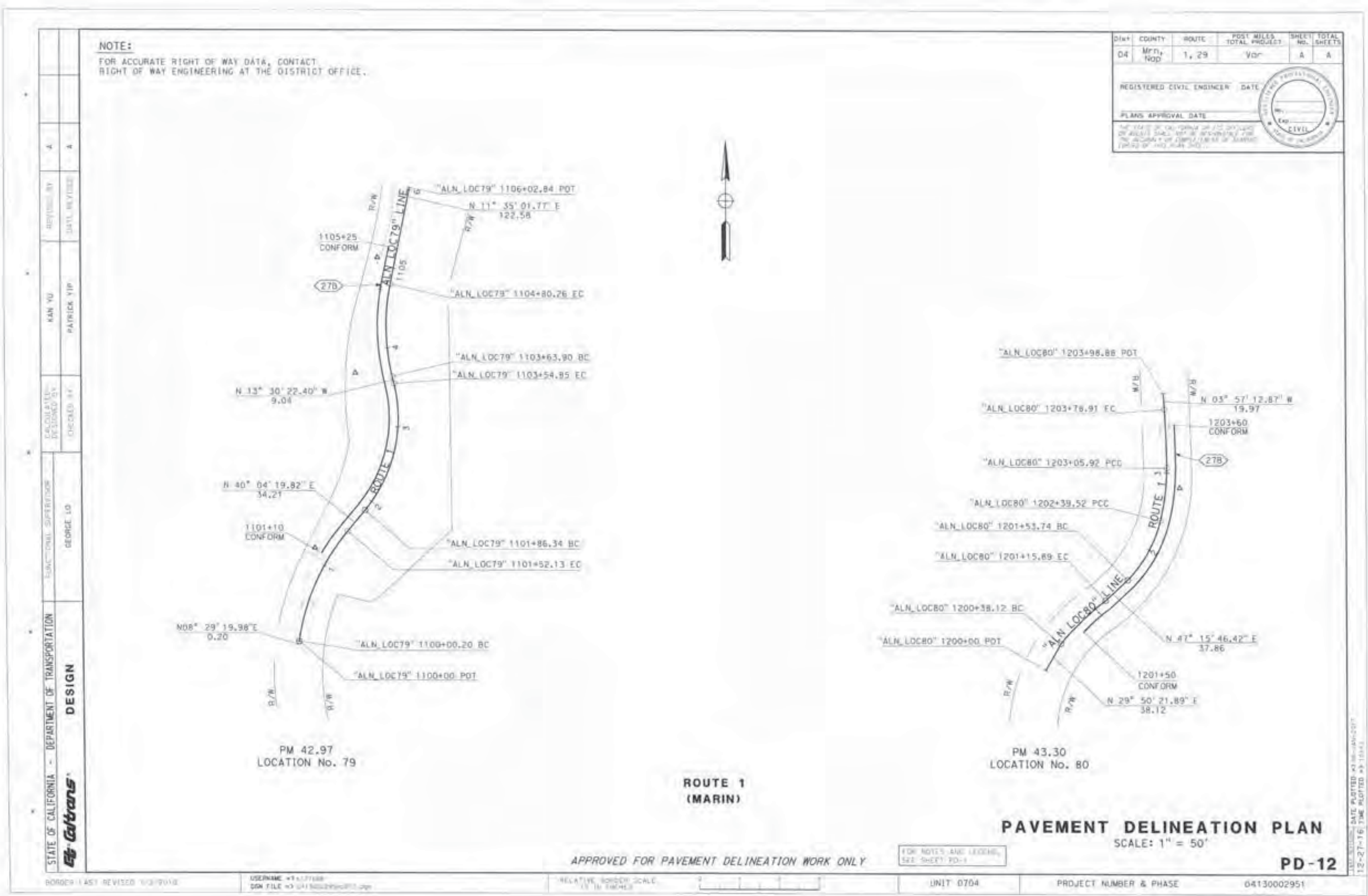

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
"ALN_LOC54" 554+29.72 POT
"ALN_LOC54" 553+56.47 BC
553+30
CONFORM
"ALN_LOC54" 552+48.92 PCC
N 47° 57' 36.23" E
34.41
"ALN_LOC54" 553+22.06 EC
"ALN_LOC54" 551+74.86 PCC
551+00
CONFORM
"ALN_LOC54" 550+31.30 BC
N 11° 20' 41.10" W
31.30
"ALN_LOC54" 550+00.00 POT
PM 32.06
LOCATION No. 54
S 38° 36' 44.97" E
0.33
"ALN_LOC55" 600+00.33 BC
"ALN_LOC55" 600+00 POT
"ALN_LOC55" 601+19.77 EC
S 28° 54' 15.01" E
34.12
"ALN_LOC55" 601+53.89 BC
600+70
CONFORM
"ALN_LOC55" 603+69.76 EC
S 67° 35' 37.08" E
1.21
603+00
CONFORM
"ALN_LOC55" 603+70.37 POT
PM 32.31
LOCATION No. 55
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
PD-7
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
KAN YU
PATRICK YIP
UNIT 0704
PROJECT NUMBER & PHASE
0413000295

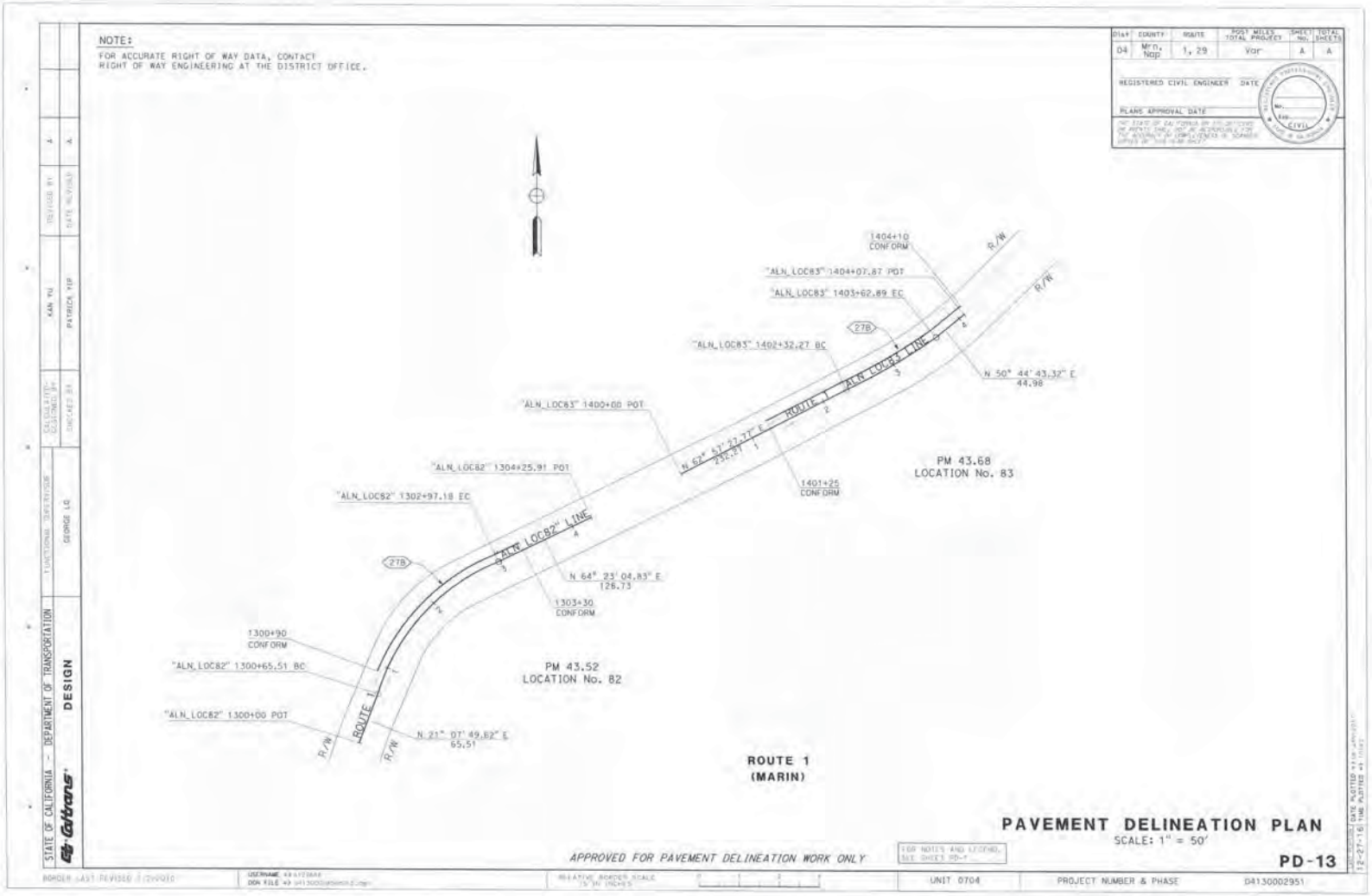

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
S 42° 43' 59.25" E
5.61'
"ALN_LOC56" 650+05.61 BC
"ALN_LOC56" 650+00 POT
"ALN_LOC56" 651+22.17 EC
650+90
CONFORM
278
ROUTE 1
S 23° 46' 05.28" E
323.75'
653+30
CONFORM
"ALN_LOC56" 654+47.92 BC
"ALN-LOC 56" LINE
"ALN_LOC56" 657+05.04 EC
S 55° 33' 31.58" E
3.47'
"ALN_LOC56" 657+08.52 POT
PM 32.45
LOCATION No. 56
S 29° 57' 11.56" E
10.74'
"ALN_LOC59" 700+10.74 BC
"ALN_LOC59" 700+00 POT
"ALN_LOC59" 700+75.60 EC
S 16° 23' 23.15" E
57.32'
"ALN_LOC59" 701+26.92 BC
701+20
CONFORM
"ALN_LOC59" 703+32.49 EC
S 45° 47' 19.25" E
0.99'
"ALN-LOC59 LINE"
703+10
CONFORM
"ALN_LOC59" 703+33.48 POT
PM 32.95
LOCATION No. 59
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
PD-8
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
KAN YU
PATRICK YIP
UNIT 0704
PROJECT NUMBER & PHASE
04130002951


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
"ALN_LOC61-62" 757+53.53 EC
"ALN_LOC61-62" 757+59.56 POT
N 22° 39' 46.30" E
6.03
756+70
CONFORM
27B
"ALN_LOC61-62" P.I.
"ALN_LOC61-62" 755+83.35 BC
N 01° 36' 49.13" W
33.40
754+50
CONFORM
"ALN_LOC61-62" 754+49.95 EC
"ALN_LOC61-62" 754+13.41 BC
ROUTE 1
753+00
CONFORM
27B
N 05° 37' 43.22" E
751+10
CONFORM
"ALN_LOC61-62" 750+00 POT
R/W
PM 33.13
LOCATION No. 61-62
"ALN_LOC64" 800+00.00 POT
ROUTE 1
"ALN_LOC64" P.I.
"ALN_LOC64" LINE
800+90
CONFORM
27B
"ALN_LOC64" 803+94.50 POT
803+20
CONFORM
PM 35.14
LOCATION No. 64
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
PD-9
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
UNIT 0704
PROJECT NUMBER & PHASE
04130002951


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
PM 35.90
LOCATION No. 66
PM 36.00
LOCATION No. 67
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
PD-10
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
UNIT 0704
PROJECT NUMBER & PHASE
04130002951


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
"ALN_LOC73_74" 952+37.93 POT
+952+60 CONFORM
952+00 CONFORM
"ALN_LOC73_74" 951+32.64 BC
"ALN LOC73_74" LINE
"ALN_LOC73_74" 950+00 POT
949+70 CONFORM
950+60 CONFORM
N 40° 25' 34.02" E 132.64
PM 38.5
LOCATION No. 73, 74
"ALN_LOC75" 1000+00 POT
"ALN_LOC75" 1001+02.99 BC
1001+10 CONFORM
S 39° 18' 35.61" E 102.99
"ALN_LOC75" 1003+01.94 BC
1003+40 CONFORM
"ALN_LOC75" 1002+00.93 EC
S 46° 28' 39.03" E 101.01
S 18° 22' 28.03" W 9.03
"ALN_LOC75" 1004+68.16 EC
"ALN_LOC75" 1004+77.19 POT
PM 39.25
LOCATION No. 75
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
PD-11
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
STATE OF CALIFORNIA — DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
KAN YU
PATRICK YIP
UNIT 0704
PROJECT NUMBER & PHASE
04130002951
12-22-16


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
"ALN_LOC79" 1106+02.84 POT
N 11° 35' 01.77" E
122.58
1105+25
CONFORM
"ALN_LOC79" 1104+80.26 EC
"ALN_LOC79" 1103+63.90 BC
"ALN_LOC79" 1103+54.85 EC
N 13° 30' 22.40" W
9.04
N 40° 04' 19.82" E
34.21
1101+10
CONFORM
"ALN_LOC79" 1101+86.34 BC
"ALN_LOC79" 1101+52.13 EC
N08° 29' 19.98"E
0.20
"ALN_LOC79" 1100+00.20 BC
"ALN_LOC79" 1100+00 POT
PM 42.97
LOCATION No. 79
"ALN_LOC80" 1203+98.88 POT
N 03° 57' 12.87" W
19.97
"ALN_LOC80" 1203+78.91 EC
1203+60
CONFORM
"ALN_LOC80" 1203+05.92 PCC
"ALN_LOC80" 1202+39.52 PCC
"ALN_LOC80" 1201+53.74 BC
"ALN_LOC80" 1201+15.89 EC
"ALN_LOC80" 1200+38.12 BC
"ALN_LOC80" 1200+00 POT
N 47° 15' 46.42" E
37.86
1201+50
CONFORM
N 29° 50' 21.89" E
38.12
PM 43.30
LOCATION No. 80
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
PD-12
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
KAN YU
PATRICK YIP
UNIT 0704
PROJECT NUMBER & PHASE
04130002951
12-27-16

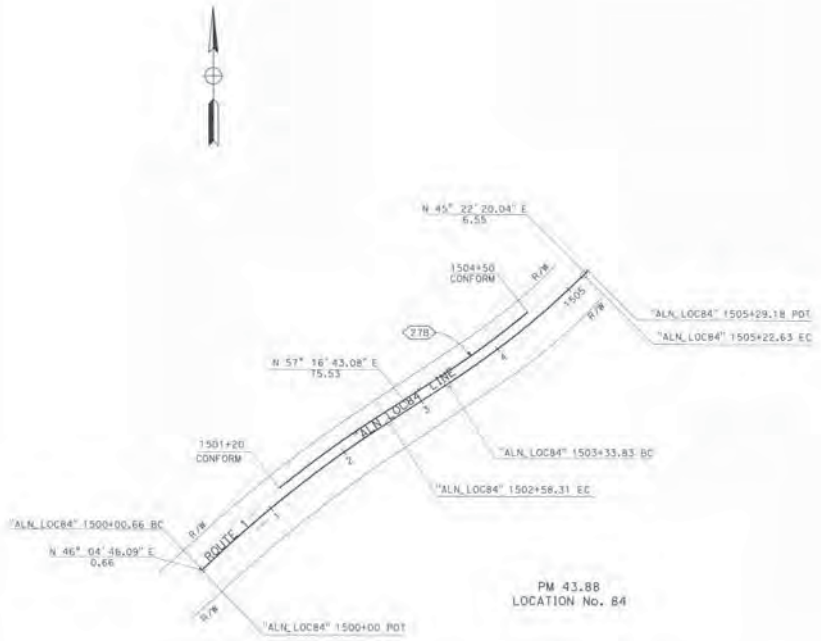

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
DIST | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS
04 | Mrn, Nap | 1, 29 | Var | A | A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
1404+10 CONFORM
"ALN_LOC83" 1404+07.87 POT
"ALN_LOC83" 1403+62.89 EC
"ALN_LOC83" 1402+32.27 BC
"ALN_LOC83" 1400+00 POT
"ALN_LOC82" 1304+25.91 POT
"ALN_LOC82" 1302+97.18 EC
"ALN_LOC82" 1300+65.51 BC
"ALN_LOC82" 1300+00 POT
1300+90 CONFORM
1303+30 CONFORM
1401+25 CONFORM
N 62° 47' 27.77" E 232.27
N 50° 44' 43.32" E 44.98
N 64° 23' 04.83" E 126.73
N 21° 07' 49.62" E 65.51
ROUTE 1 "ALN_LOC83" LINE
"ALN_LOC82" LINE
ROUTE 1
R/W
27B
PM 43.68
LOCATION No. 83
PM 43.52
LOCATION No. 82
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
PD-13
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
KAN YU
PATRICK YIP
GEORGE LO
UNIT 0704
PROJECT NUMBER & PHASE
0413000295I

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

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	6	6

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE



PM 43.88
LOCATION No. 84

ROUTE 1
(MARIN)

PAVEMENT DELINEATION PLAN

SCALE: 1" = 50'

APPROVED FOR PAVEMENT DELINEATION WORK ONLY

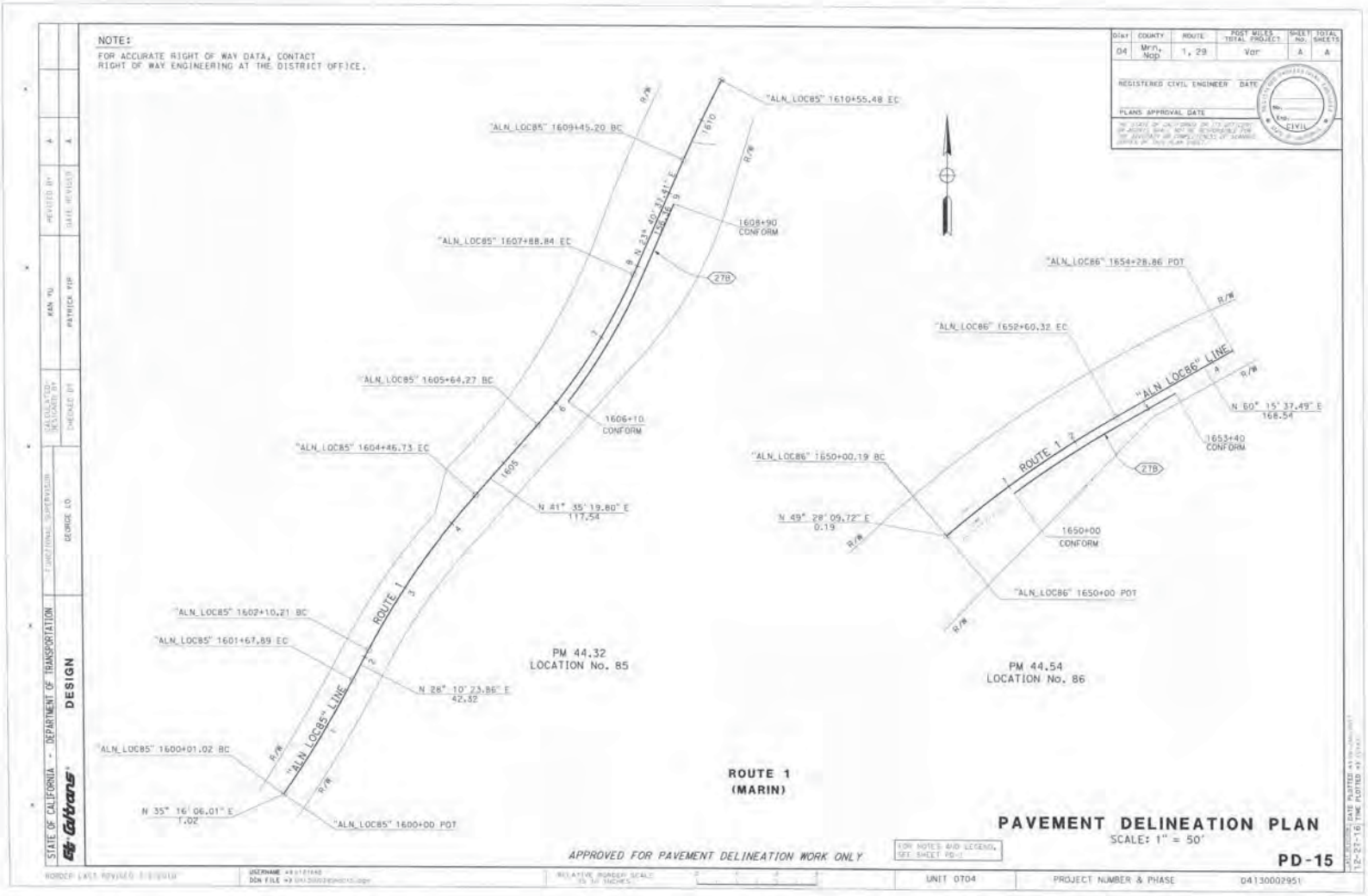
FOR NOTES AND LEGEND, SEE SHEET PD-1

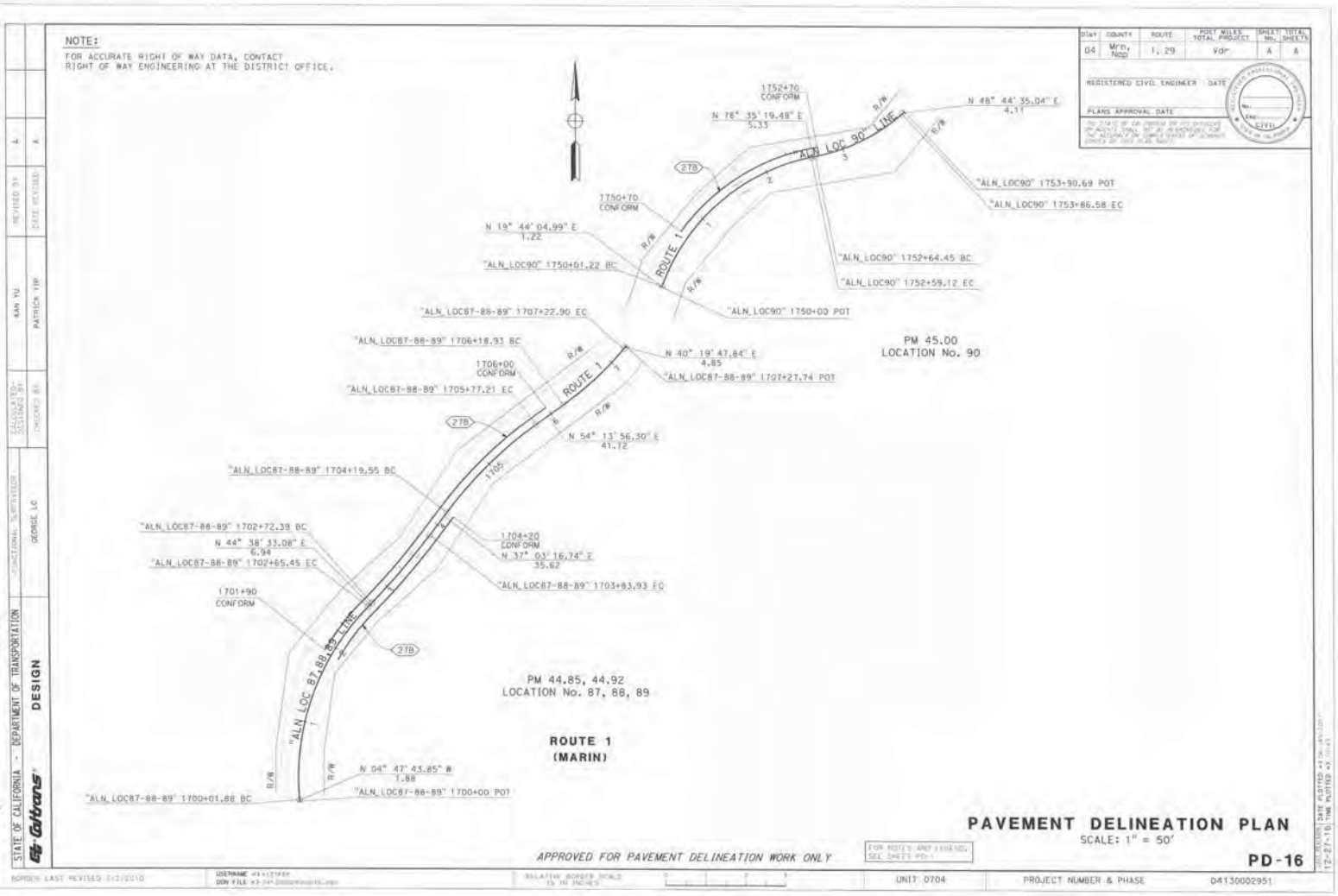
PD-14

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
FUNCTIONAL SUPERVISOR: GEORGE LO
CALCULATED/DESIGNED BY: KAN YU
CHECKED BY: PATRICK YIP
REVISED BY
DATE REVISED

SHEET LAST REVISED 1-7-2015 | USERNAME & DGN FILE | RELATIVE SCALE IS IN INCHES | UNIT 0704 | PROJECT NUMBER & PHASE 0413000295

12-27-16 TIME PLOTTED


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
DIST
04
COUNTY
Mrn, Nap
ROUTE
1, 29
POST MILES TOTAL PROJECT
Var
SHEET NO.
A
TOTAL SHEETS
A
REGISTERED CIVIL ENGINEER
DATE
PLANS APPROVAL DATE
REGISTERED PROFESSIONAL ENGINEER
CIVIL
"ALN_LOC85" 1610+55.48 EC
"ALN_LOC85" 1609+45.20 BC
1610
R/W
1608+90
CONFORM
"ALN_LOC85" 1607+88.84 EC
N 23° 40' 33.41" E
156.19
27B
"ALN_LOC86" 1654+28.86 POT
"ALN_LOC86" 1652+60.32 EC
"ALN_LOC85" 1605+64.27 BC
1606+10
CONFORM
"ALN_LOC86" LINE
N 60° 15' 37.49" E
168.54
1653+40
CONFORM
"ALN_LOC85" 1604+46.73 EC
1605
"ALN_LOC86" 1650+00.19 BC
ROUTE 1
N 41° 35' 19.80" E
117.54
N 49° 28' 09.72" E
0.19
1650+00
CONFORM
"ALN_LOC86" 1650+00 POT
"ALN_LOC85" 1602+10.21 BC
"ALN_LOC85" 1601+67.89 EC
ROUTE 1
N 28° 10' 23.86" E
42.32
PM 44.32
LOCATION No. 85
PM 44.54
LOCATION No. 86
"ALN_LOC85" LINE
"ALN_LOC85" 1600+01.02 BC
N 35° 16' 06.01" E
7.02
"ALN_LOC85" 1600+00 POT
ROUTE 1
(MARIN)
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
PD-15
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
KEN YU
PATRICK YIP
UNIT 0704
PROJECT NUMBER & PHASE
0413000295I


NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.
DIST 04 | COUNTY Mrn, Nap | ROUTE 1, 29 | POST MILES TOTAL PROJECT Var | SHEET NO. A | TOTAL SHEETS A
REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
1752+70 CONFORM
N 78° 35' 19.48" E 5.33
N 48° 44' 35.04" E 4.11
"ALN_LOC 90" LINE
"ALN_LOC90" 1753+90.69 POT
"ALN_LOC90" 1753+86.58 EC
1750+70 CONFORM
N 19° 44' 04.99" E 1.22
"ALN_LOC90" 1750+91.22 BC
"ALN_LOC90" 1752+64.45 BC
"ALN_LOC90" 1752+59.12 EC
"ALN_LOC90" 1750+00 POT
"ALN_LOC87-88-89" 1707+22.90 EC
"ALN_LOC87-88-89" 1706+18.93 BC
N 40° 19' 47.84" E 4.85
1706+00 CONFORM
"ALN_LOC87-88-89" 1707+27.74 POT
"ALN_LOC87-88-89" 1705+77.21 EC
ROUTE 1
27B
N 54° 13' 56.30" E 41.12
PM 45.00
LOCATION No. 90
"ALN_LOC87-88-89" 1704+19.55 BC
"ALN_LOC87-88-89" 1702+72.39 BC
N 44° 38' 33.08" E 6.94
"ALN_LOC87-88-89" 1702+65.45 EC
1704+20 CONFORM
N 37° 03' 16.74" E 35.62
"ALN_LOC87-88-89" 1703+83.93 EC
1701+90 CONFORM
"ALN_LOC 87-88-89 LINE"
PM 44.85, 44.92
LOCATION No. 87, 88, 89
ROUTE 1
(MARIN)
N 04° 47' 43.85" W 1.88
"ALN_LOC87-88-89" 1700+01.88 BC
"ALN_LOC87-88-89" 1700+00 POT
PAVEMENT DELINEATION PLAN
SCALE: 1" = 50'
APPROVED FOR PAVEMENT DELINEATION WORK ONLY
PD-16
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
GEORGE LO
PATRICK YIP
SAN YU
UNIT 0704
PROJECT NUMBER & PHASE 04130002951

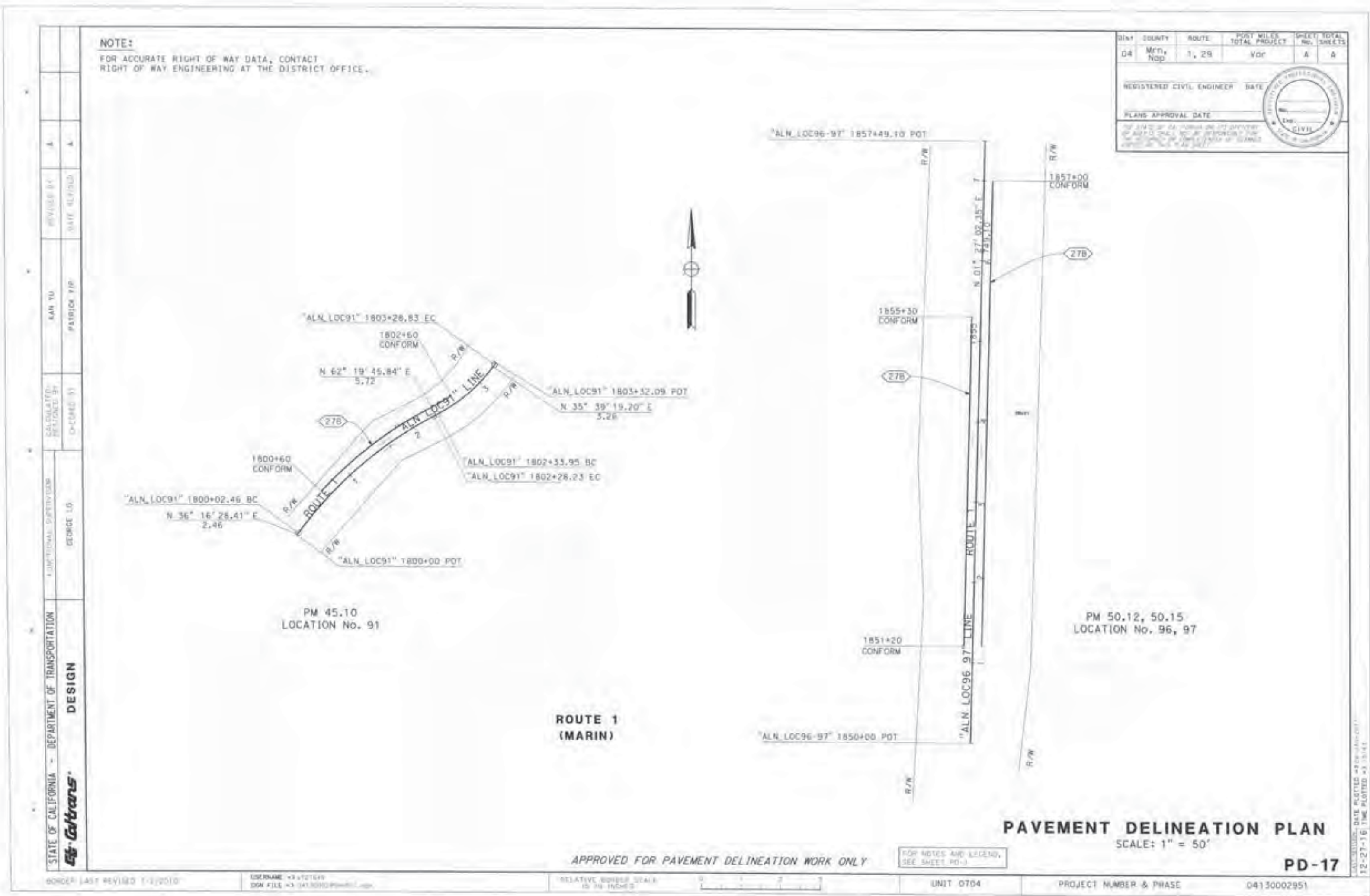


Exhibit 2 (Project Plans)
CDP 2-17-0018 (MRN-1 Rumble Strip)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	4

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

TRAFFIC STRIPES, PAVEMENT MARKINGS AND PAVEMENT MARKERS

SHEET No.	STATION LIMITS	DETAIL No.	REMOVE PAVEMENT MARKERS	THERMOPLASTIC TRAFFIC STRIPE (HAZARDOUS WASTE)	THERMOPLASTIC TRAFFIC STRIPE	PAVEMENT MARKER
					4" YELLOW	TYPE D
			EA	LF	LF	EA
HIGHWAY-1 (MARIN COUNTY)						
R-1	3.08 TO 3.35	22	127	1496.9	2993.8	127
R-2	3.34 TO 5.06	22	797	9535.7	19071.4	797
R-3	5.05 TO 5.60	22	256	3049.2	6098.4	256
R-4	7.10 TO 12.10	22	2312	27720.0	55440.0	2312
R-5	13.05 TO 17.20	22	1919	23007.6	46015.2	1919
R-6	18.27 TO 19.88	22	746	8925.8	17851.7	746
R-7	20.20 TO 25.45	22	2428	29106.0	58212.0	2428
R-8	27.07 TO 27.90	22	385	4601.5	9203.0	385
R-9	30.40 TO 33.76	22	1323	15855.8	31711.7	1323
R-10	33.28 TO 36.17	22	1337	16022.2	32044.3	1337
R-11	38.42 TO 40.42	22	926	11088.0	22176.0	926
R-12	41.93 TO 44.42	22	1152	13804.6	27609.1	1152
R-13	44.50 TO 45.24	22	344	4102.6	8205.1	344
R-14	46.40 TO 47.40	22	464	5544.0	11088.0	464
R-15	47.44 TO 47.60	22	76	887.0	1774.1	76
R-16	47.61 TO 47.84	22	108	1275.1	2550.2	108
R-17	47.83 TO 48.19	22	168	1995.8	3991.7	168
R-18	48.49 TO 49.38	22	413	4934.2	9868.3	413
R-19	49.84 TO 50.18	22	159	1885.0	3769.9	159
R-20	50.40 TO 50.50	22	48	544.4	1106.8	48
HIGHWAY-29 (NAPA COUNTY)						
R-21	48.00 TO 48.58	22	270	3215.5	6431.0	270
	SHEET TOTAL		15719	188606.9	377213.8	15719

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
FUNCTIONAL SUPERVISOR: GEORGE LO
CALCULATED/DESIGNED BY: PATRICK TIP
DRAWN BY: KAN TO
CHECKED BY:
DATE REVISED:

PAVEMENT DELINEATION QUANTITIES

PDQ-1

BORDER LAST REVISED 1/1/2010 | USERNAME: | DGN FILE: | RELATIVE BORDER SCALE TO BE INCHES | UNIT 0704 | PROJECT NUMBER & PHASE 0413000295I

DATE PLOTTED: 12-06-16 TIME PLOTTED:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

PAVEMENT DELINEATION QUANTITIES

STATION LIMITS	DETAIL No. OR PAVEMENT MARKER	LENGTH	THERMOPLASTIC TRAFFIC STRIPE 4" WHITE
		LF	LF
"ALN-LOC1" 11+00 TO 12+50	27B	150	150
"ALN-LOC3" 20+70 TO 22+40	27B	170	170
"ALN-LOC5" 30+50 TO 32+10	27B	160	160
"ALN-LOC6" 59+60 TO 70+05	27B	1045	1045
"ALN-LOC7" 70+20 TO 75+20	27B	500	500
"ALNST-LOC1B" 102+95 TO 101+89	27B	106	106
"ALNST-LOC2" 101+49 TO 108+03	27B	654	654
"ALNST-LOC3" 109+63 TO 111+62	27B	199	199
"ALNST-LOC4" 112+58 TO 114+32	27B	174	174
"ALN-LOC10" 201+15 TO 203+25	27B	210	210
"ALN-LOC12" 231+10 TO 233+10	27B	200	200
"ALN-LOC13A" 301+ 20 TO 303+30	27B	210	210
"ALN-LOC13B" 303+60 TO 305+50	27B	190	190
"ALN-LOC16" 403+20 TO 408+80	27B	560	560
"ALN-LOC52" 450+60 TO 454+40	27B	380	380
"ALN-LOC53" 502+20 TO 506+00	27B	380	380
"ALN-LOC54" 551+00 TO 553+30	27B	230	230
"ALN-LOC55" 600+70 TO 603+00	27B	230	230
"ALN-LOC56" 650+90 TO 653+30	27B	240	240
"ALN-LOC59" 701+20 TO 703+10	27B	190	190
"ALN-LOC61" 751+10 TO 753+00	27B	190	190
"ALN-LOC62" 754+50 TO 756+70	27B	220	220
"ALN-LOC64" 800+90 TO 803 +20	27B	230	230
"ALN-LOC66" 850+90 TO 854+40	27B	350	350
"ALN-LOC67" 900+60 TO 903+80	27B	320	320
"ALN-LOC73" 950+60 TO 952+60	27B	200	200
"ALN-LOC74" 949+70 TO 952+00	27B	230	230
"ALN-LOC75" 1001+10 TO 1003+40	27B	230	230
"ALN-LOC79" 1100+10 TO 1105+25	27B	515	515
"ALN-LOC80" 1201+50 TO 1203+60	27B	210	210
"ALN-LOC82" 1300+90 TO 1303+30	27B	240	240
"ALN-LOC83" 1401+25 TO 1404+10	27B	285	285
"ALN-LOC84" 1501+20 TO 1504+50	27B	330	330
"ALN-LOC85" 1606+10 TO 1608+90	27B	280	280
"ALN-LOC86" 1650+00 TO 1653+40	27B	340	340
"ALN-LOC88" 1701+90 TO 1704+20	27B	230	230
"ALN-LOC89" 1701+90 TO 1760+00	27B	410	410
"ALN-LOC90" 1750+70 TO 1752+70	27B	200	200
"ALN-LOC91" 1800+60 TO 1802+60	27B	200	200
"ALN-LOC96" 1851+20 TO 1857+00	27B	580	580
"ALN-LOC97" 1851+20 TO 1855+30	27B	410	410
SUBTOTAL		12378	12378

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: GEORGE LO

CALCULATED-DESIGNED BY: KAN YU

CHECKED BY: PATRICK YIP

PAVEMENT DELINEATION QUANTITIES

PDQ-2

UNIT 0704 PROJECT NUMBER & PHASE 04130002951

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

EARTHWORK

LOCATION No.	ROADWAY EXCAVATION	(N) EMBANKMENT	IMPORTED BORROW
	CY		
1	14.278	0.28	0.28
3	17.325	4.48	4.48
5	15.378	1.86	1.86
6	188.595	13.67	13.67
7	90.013	21.42	21.42
9A	142.857	14.51	14.51
10	26.488	0.43	0.43
12	31.207	1.00	1.00
13A	32.868	2.45	2.45
13B	29.238	0.81	0.81
16	92.653	21.01	21.01
52	57.959	9.56	9.56
53	77.495	12.34	12.34
54	28.82	15.31	15.31
55	28.963	3.44	3.44
56	30.921	4.36	4.36
59	21.153	3.38	3.38
61	21.142	5.89	5.89
62	27.093	3.42	3.42
64	28.908	2.94	2.94
66	51.931	6.67	6.67
67	46.09	12.58	12.58
73	23.034	5.91	5.91
74	29.326	3.61	3.61
75	29.018	1.34	1.34
79	65.835	1.87	1.87
80	40.81	5.34	5.34
82	30.69	4.40	4.40
83	39.38	4.87	4.87
84	48.29	4.60	4.60
85	38.687	1.14	1.14
86	38.83	1.43	1.43
87	37.631	7.08	7.08
88			0.00
89	23.474	1.29	1.29
90	23.111	1.88	1.88
91	23.32	1.47	1.47
96	98.637	5.70	5.70
97	64.009	4.19	4.19
SHEET TOTAL	1767.53	231.11	231.11

ROADWORK

LOCATION No.	HMS (TYPE A)	RHMS (TYPE G)	CLASS 4 AS
	TON		CY
1	12.87	3.96	3.23
3	19.31	5.94	4.84
5	17.16	5.28	4.30
6	205.92	63.36	51.63
7	98.67	30.36	24.74
9A	144.57	44.48	36.25
10	28.96	8.91	7.26
12	34.32	10.56	8.60
13A	36.47	11.22	9.14
13B	32.18	9.90	8.07
16	102.96	31.68	25.81
52	64.35	19.80	16.13
53	64.35	19.80	16.13
54	32.18	9.90	8.07
55	32.18	9.90	8.07
56	34.32	10.56	8.60
59	23.60	7.26	5.92
61	23.60	7.26	5.92
62	30.03	9.24	7.53
64	32.18	9.90	8.07
66	57.92	17.82	14.52
67	51.48	15.84	12.91
73	25.74	7.92	6.45
74	32.18	9.90	8.07
75	32.18	9.90	8.07
79	71.86	22.11	18.02
80	45.05	13.86	11.29
82	34.32	10.56	8.60
83	43.97	13.53	11.02
84	53.63	16.50	13.44
85	42.90	13.20	10.76
86	42.90	13.20	10.76
87	34.32	10.56	8.60
88	34.32	10.56	10.76
89	25.74	7.92	6.45
90	25.74	7.92	6.45
91	25.74	7.92	6.45
96	107.25	33.00	26.89
97	70.79	21.78	17.75
SHEET TOTAL	2005	670	502

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
FUNCTIONAL SUPERVISOR GEORGE LO
KAN YU
PATRICK YIP

SUMMARY OF QUANTITIES

Q-1

UNIT 0704 | PROJECT NUMBER & PHASE 04130002951

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Mrn, Nap	1, 29	Var	A	A

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

CENTERLINE RUMBLE STRIP (CRS)

CSR STATION No.	POST MILE	PLAN DETAIL	CRS	
			(LF)	STATION
HIGHWAY-1 (MARIN COUNTY)				
R-1	3.08 TO 3.33	A	1386	14
R-2	3.36 TO 5.04	A	9314	93
R-3	5.07 TO 5.60	A	2938	29
R-4	7.10 TO 12.10	A	27720	277
R-5	13.05 TO 17.18	A	22897	229
R-6	18.27 TO 19.88	A	8926	89
R-7	20.20 TO 25.45	A	29106	291
R-8	27.07 TO 27.90	A	4602	46
R-9	30.40 TO 33.26	A	15856	159
R-10	33.28 TO 36.17	A	16022	160
R-11	38.42 TO 40.40	A	10977	110
R-12	41.93 TO 44.40	A	13694	137
R-13	44.50 TO 45.24	A	4103	41
R-14	46.40 TO 47.40	A	5544	55
R-15	47.44 TO 47.60	A	887	9
R-16	47.61 TO 47.82	A	1164	12
R-17	47.85 TO 48.19	A	1885	19
R-18	48.49 TO 49.38	A	4934	49
R-19	49.84 TO 50.18	A	1885	19
R-20	50.40 TO 50.50	A	554	6
HIGHWAY-29 (NAPA COUNTY)				
R-21	48.00 TO 48.58	A	3216	32
	SHEET TOTAL		187609	1876

STATE OF CALIFORNIA — DEPARTMENT OF TRANSPORTATION
Caltrans DESIGN
DESIGNED BY: KAN YU
CHECKED BY: PATRICK YIP
DRAWN BY: GEORGE LO
CALCULATED/DESIGNED BY:
CHECKED BY:
REVISED BY: A
DATE REVISED: A

SUMMARY OF QUANTITIES

Q-2

UNIT 0704 PROJECT NUMBER & PHASE 04130002951

Photo 1. Typical pull-out location along Marin 1; September 1, 2015.

Photo 2. Typical pull-out location along Marin 1; September 1, 2015.

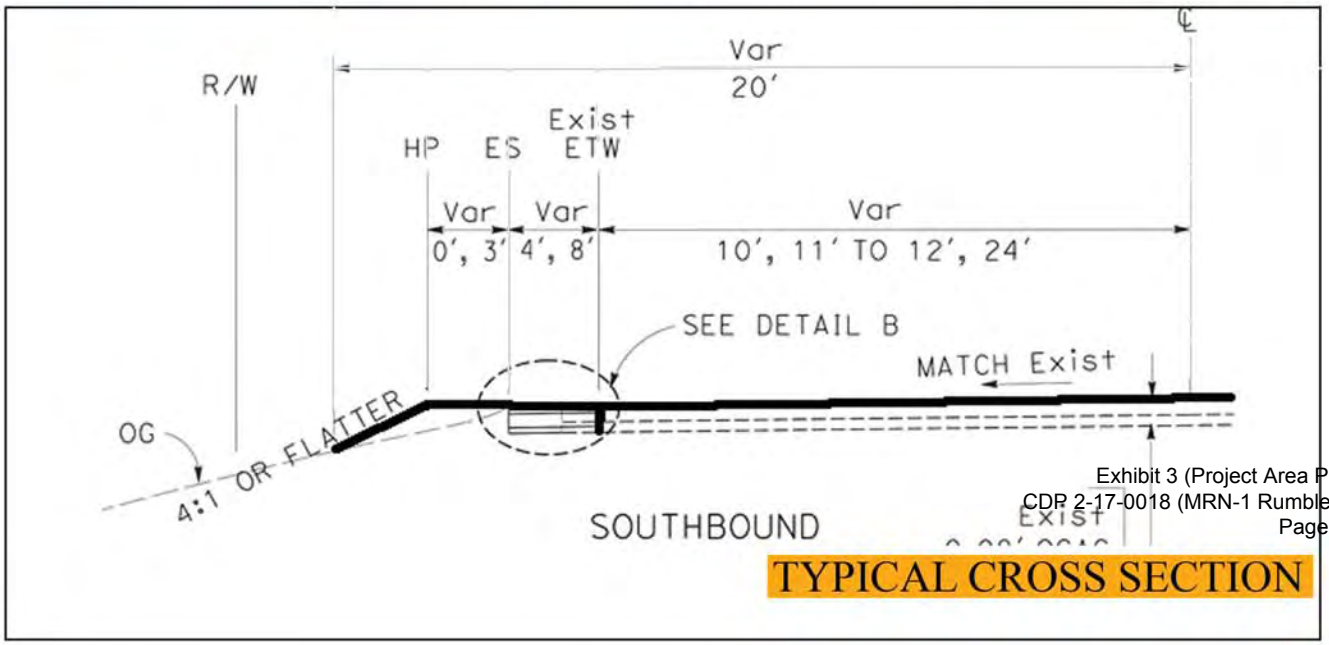
Photo 3. Typical pull-out location along Marin 1; September 1, 2015.

Photo 4: View of Stinson Beach Location 7, looking northbound. Potential wetland identified in this area. November 25, 2015.

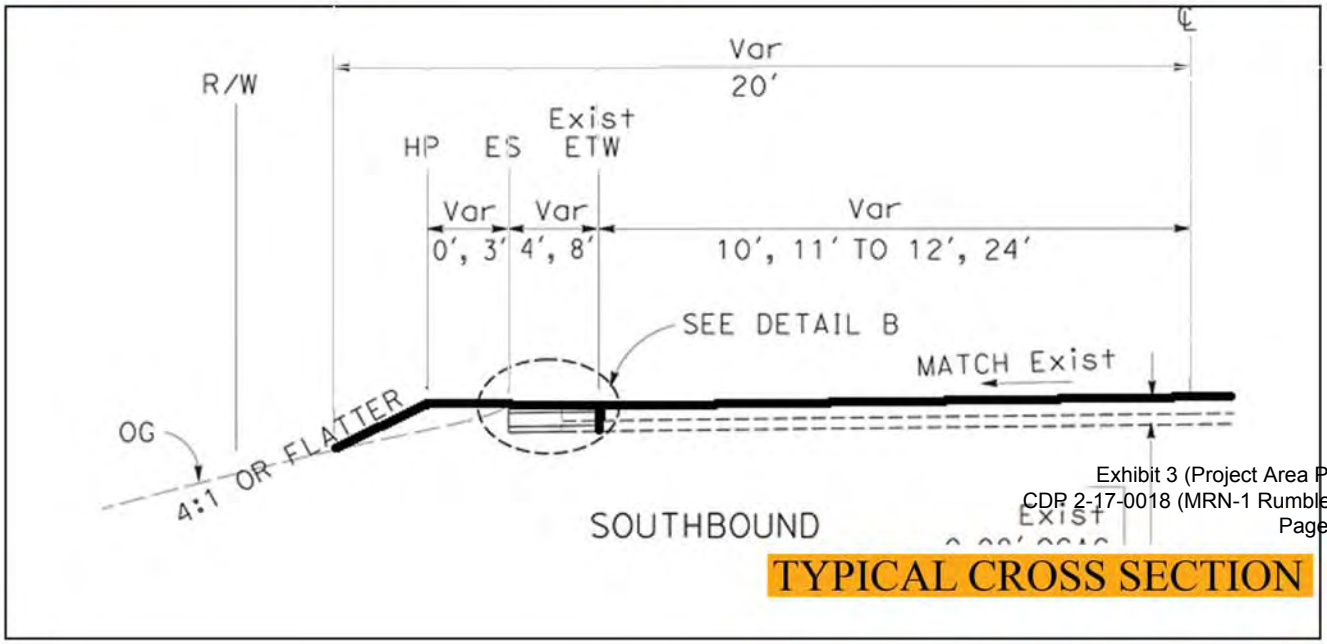
Photo 5: View of Stinson Beach Location 7, Easkoot Creek riparian vegetation, looking northbound. December 8, 2015.

Shoulder Widening At Stinson Beach

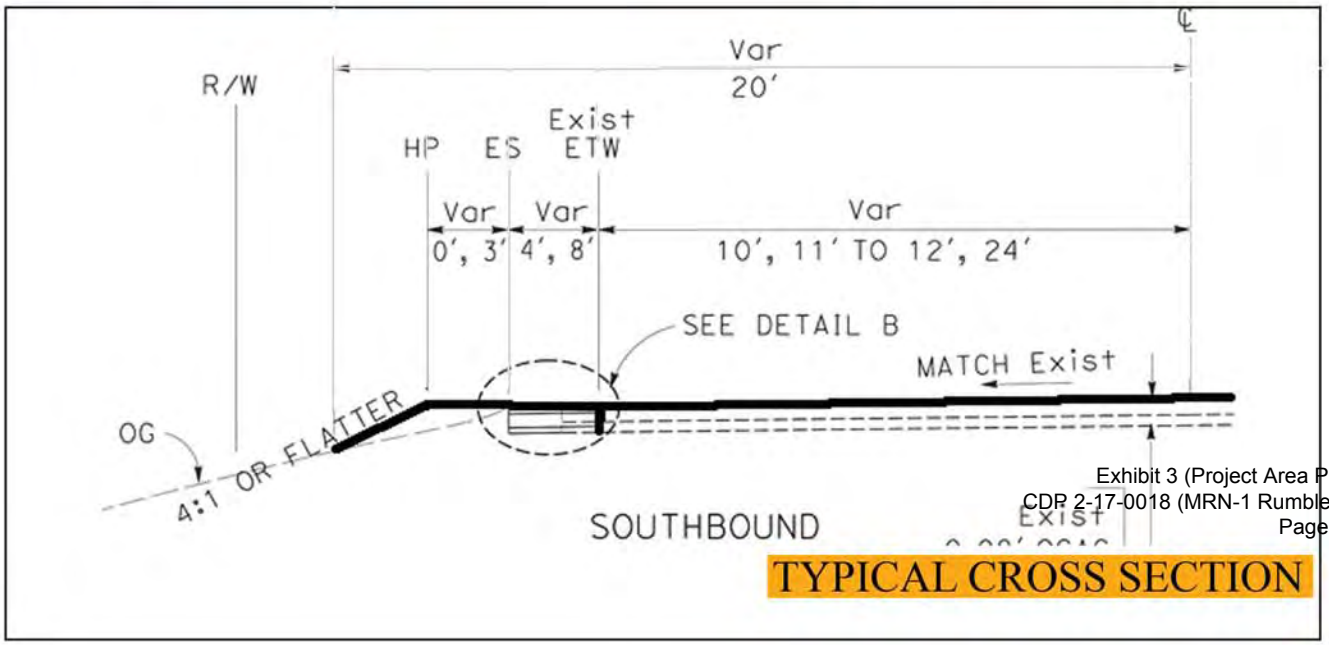
Shoulder Widening At Stinson Beach



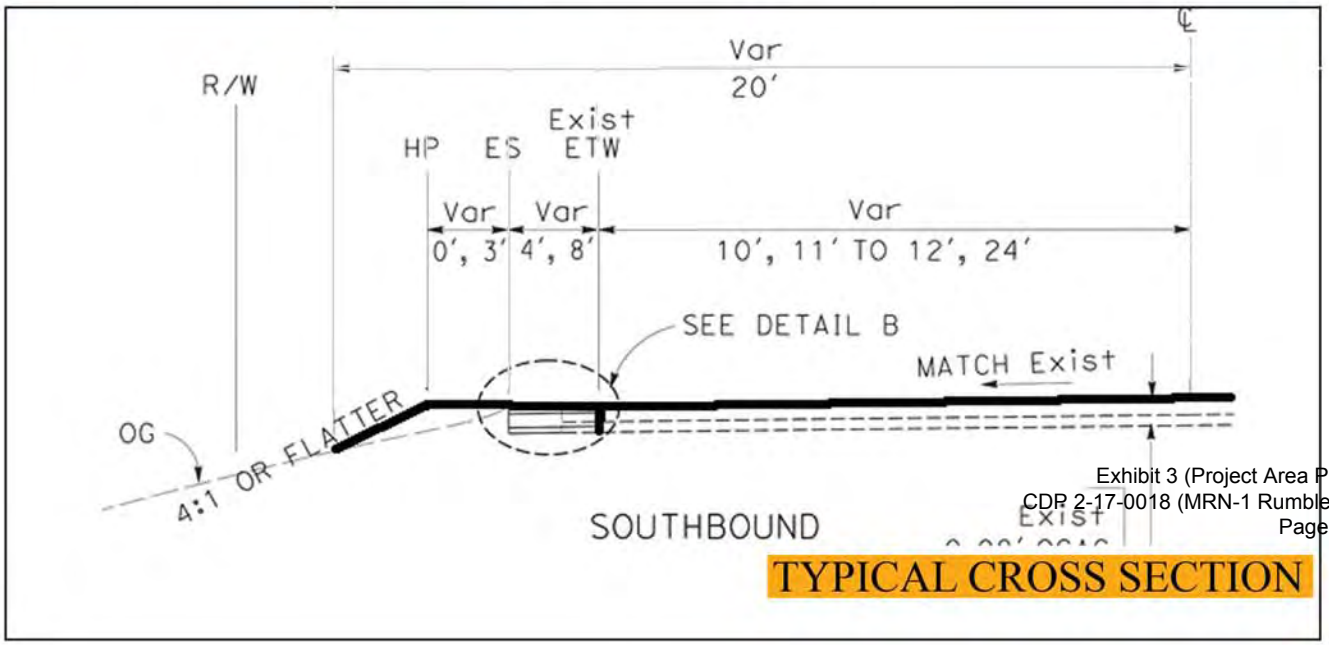
Shoulder Widening At Stinson Beach



Shoulder Widening At Stinson Beach



Shoulder Widening At Stinson Beach



State Route 1 and 29 Rumble Strip Project: Delineation of Waters of the U.S.

PREPARED FOR:	Frances Malamud-Roam, Caltrans
COPY TO:	Lindsay Vivian, Caltrans and Rachel Cotroneo, CH2M HILL
PREPARED BY:	Russell Huddleston and Holly Barbare, CH2M HILL
DATE:	December 14, 2015
PROJECT NUMBER:	EA 4H870

For the Rumble Strip and Shoulder Widening on State Route 1 and State Route 29 Project (the project), the California Department of Transportation (Caltrans) proposes to construct a rumble strip in the roadway centerline along State Route (SR) 1 for approximately 50 miles in Marin County from Post Miles (PMs) 3.08 to 50.5, as well as a small approximately 0.6-mile portion of SR 29 in Napa County from PMs 48 to 48.58. In addition, Caltrans proposes to widen the shoulder and construct pullouts at 40 locations within Caltrans right-of-way along this segment of SR 1 to provide safety areas for cyclists and emergency vehicles.

This technical memorandum summarizes the results of a wetland delineation conducted on an approximately 0.2-mile section of the project located along SR 1 in the community of Stinson Beach in Marin County. The results of this delineation are preliminary pending verification by the U.S. Army Corps of Engineers (USACE). A general description of the project location, project purpose, environmental setting, study methods, and the survey results are provided in the following sections. All figures and attachments follow the References section.

Project Location

The wetland delineation survey area is located in Section 28 and 29, Township 01 north, Range 07 west in the Bolinas U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle from 37°53'55" north latitude/ 122°38'26" west longitude to 37°54'00" north latitude/122°38'39" west longitude, North American Datum 1983. The Biological Study Area (BSA) (Figure 1) follows the Caltrans right-of-way along SR 1 and SR 29 and totals 174 acres. Thirty-nine of the forty proposed pull-out locations are in unvegetated dirt or gravel areas adjacent to the roadway and contain no wetland or water features. These thirty-nine locations were not surveyed by CH2M HILL staff and are not described in this memorandum. The wetland delineation was conducted on the southbound side of SR 1 in the community of Stinson Beach, an unincorporated area of Marin County, California from approximately PM 12.55 to approximately PM 12.78; this portion of the BSA is referred to as the wetland delineation survey area. The wetland delineation survey area encompasses one of the forty proposed pull-out locations, and has been subdivided into four sections: A, B, C, and D (Figure 2).

The purpose of the project is to construct a rumble strip in the roadway centerline along SR 1 in Marin County from PM 3.08 to 50.5, and shoulder widening in approximately 40 locations to provide safety areas for cyclists and emergency vehicles. Centerline rumble strips will not be placed in areas where existing travel lanes are less than 11 feet wide, where public streets and commercial driveways with approximately 500 or more vehicles per day intersect with SR 1, where there are two-way left turn lanes, in high volume turning areas, on bridge decks, on approach slabs, and on concrete weigh-in motion slabs. Construction is scheduled to begin in October 2017.

Environmental Setting

The wetland delineation survey area is located in the Marin Hills and Valley Ecological Subsection of the Northern California Coast Section (Miles and Goudey, 1998). This subsection includes the mountains and hills along the Pacific Ocean north of the San Francisco Bay. Geology along the coastline consists of the Franciscan Formation, which includes greywacke sandstone, shale (siltstone), conglomerate, limestone, and chert as well as areas of volcanic and metamorphic rock units. Generally, rock of this formation is considered weak and weathers quickly to clayey soil. The Franciscan Formation is known for extensive deep-seated earth flows and landslides and is considered highly susceptible to erosion due to heavy rainfall and wave action generated from winter storms (Miles and Goudey, 1998).

Vegetation

The southbound side of the roadway supports bare gravel and ruderal, wetland, and riparian vegetation. The dominant ruderal species include Italian ryegrass (*Lolium perenne*), common velvet grass (*Holcus lanatus*), and Bermuda buttercup (*Oxalis pes-carpe*). Pacific water-dropwort (*Oenanthe sarmentosa*), seep monkey-flower (*Mimulus guttatus*), and swamp smartweed (*Persicaria hydropiperoides*) are dominate in the wetland areas. Riparian vegetation is characterized by arroyo willows (*Salix lasiolepis*), Himalayan blackberry (*Rubus armeniacus*), and cape ivy (*Delairea odorata*) grows along the banks of Easkoot Creek.

Climate and Hydrology

The local climate is characterized by cool, wet winters and foggy summers. Average temperatures range from a low of 40 degrees Fahrenheit (°F) during the winter to a high of 70°F during the summer. Based on data from the Muir Woods coastal meteorological station, the average annual precipitation is 37.44 inches, with the majority occurring between November and March (Western Regional Climate Center, 2015). The total annual precipitation data for the 2015 water year (available for December 1, 2014 through November 30, 2015) at the Muir Woods coastal meteorological station was 23.85 inches, which is 64 percent of the average precipitation for this period (Natural Resources Conservation Service [NRCS], 2015a).

The wetland delineation survey area is located in the Bolinas Lagoon watershed (Hydrologic Unit Code 180500050505), which has a drainage area of 12,124 acres.

Soils

Mapped soils in the vicinity of the survey area consist mostly of Blucher-Cole complex and Cronkhite-Barnabe complex with small areas of Rock outcrop-Xerorthents complex and Dune land on the west side (NRCS, 2015b; see Attachment A). Descriptions of soils below are from the *Official Soil Series Descriptions* (NRCS, 2015c) and all colors are for moist soils.

Cronkhite soils and Barnabe soils are found on steep hillsides and upland mountainous areas where they formed in material derived from sandstone and shale. A typical profile of Cronkhite soils has very dark gray (10YR 3/1) loam to a depth of 9 inches underlain by a very dark grayish brown (10YR 3/2) loam to a depth of 15 inches. Between 15 and 26 inches the soil is a very dark grayish brown (10YR 3/2) clay loam. Cronkhite soils are moderately well drained with medium to very rapid runoff and slow permeability. Barnabe soils are shallow with a very dark grayish brown (10YR 3/2), very gravelly loam surface layer in the upper 2 inches. Between 2 and 8 inches the soil is a very dark gray (10YR 3/1), very gravelly loam underlain by a black (10YR 2/1) very gravelly loam. Fractured sandstone and shale is typically present at a depth of 16 inches. Barnabe soils are well drained with medium to very rapid runoff and moderate permeability.

Blucher soils are found in basins and on alluvial fans where they formed in alluvium from mixed sources. In a typical profile of Blucher soils the upper 16 inches is a very dark grayish brown (10YR 3/2) loam. Between 16 and 23 inches the soil is a dark brown and dark grayish brown (10YR 3/3, 4/2) silt loam. Blucher soils are somewhat poorly drained with slow runoff and moderately slow permeability. Cole soils are found on river terraces, basins, flood plains, or on alluvial fans where they formed in alluvium from mixed sources. In a

typical profile of Cole soils the soil is a very dark grayish brown (10YR 3/2) clay loam to a depth of 35 inches. Between 35 and 71 inches the soil is a yellowish brown (10YR 5/4) clay loam. Cole soils are somewhat poorly drained with slow runoff and slow permeability. Many areas have been artificially drained or have drainage altered by gullying.

Methods

CH2M wetland ecologist Russell Huddleston andCH2M biologists Rachel Cotroneo and Holly Barbare completed the wetland delineation on November 25, 2015 and December 1, 2015. The wetland delineation survey area is shown on Figure 2.

Prior to conducting the field survey the following resources were reviewed:

- Soil map and descriptions (Attachment A)
- National Wetlands Inventory Map (Attachment B)
- USGS Bolinas 7.5 minute topographic quadrangle (Attachment C)

The survey methodology followed the USACE's 1987 *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACE, 2010).

The wetland delineation survey area covered approximately 1.64 acres along SR 1 in the vicinity of PM 12.6-12.7 (Figure 2). Eight sample points were established to characterize the two wetlands and the adjacent upland areas. At each sample point, information on vegetation, soils, and hydrology was recorded on wetland determination data sheets (Attachment D). Representative site photographs are provided in Attachment E. The following sections provide additional details on the field methods.

At each sample point, plant species were identified and the percent cover was visually estimated and recorded. Herbaceous and shrubby vegetation was sampled in an approximately 5-foot radius around each sample point. Taxonomic designations follow *The Jepson Manual: Vascular Plants of California* (Baldwin et al., 2012). The wetland indicator status was determined using the *National Wetland Plant List* (Lichvar et al, 2014). Dominant species included the most abundant species whose cumulative cover accounted for at least 50 percent of the relative cover, as well as any single species that accounted for at least 20 percent of the relative vegetative cover. Strata with less than 5 percent absolute cover were not included in the dominance test.

Descriptions of soils were made by examining soil pits excavated to a depth of 12 inches using a tile-spade shovel. The soil surface was difficult to dig due to gravelly roadside fill. At each sample point, soil morphological features such as texture, color, and redoximorphic features (if present) were noted. Soil texture was estimated in the field by feel (Thien, 1979), and moist soil colors were determined using Munsell® color charts.

The wetland boundary was mapped based on obvious changes in vegetation and soil moisture. The boundary was then mapped in the field using a Trimble® GEO-XH Global Positioning System (GPS) unit.

Results

Site Conditions

The great majority of the 50-mile-long BSA is within the unvegetated dirt or gravel areas adjacent to the roadway and contains no wetland or water features. Wetland features were found at two locations within the wetland study area as described below.

The day prior to the November 25, 2015 field visit it rained over 0.5 inch, but overall, the survey was conducted under drought conditions. Cumulative rainfall recorded between December 2014 and November

2015 was just short of 24 inches, which when compared to a long-term average of slightly more than 37 inches annually, corresponds to drought conditions.

Determination of wetland hydrology was problematic given the below-average rainfall condition recorded for the region. However, the precipitation the day prior to the field survey resulted in the presence of surface water and soil saturation in wetland areas.

Seasonal Wetlands

The wetland features observed within the wetland delineation survey area included two wetlands totaling 0.12 acre. One is located in Pullout Location A towards the eastern end of the survey area and in Pullout Location B (Figure 2).

Wetland W-1
Wetland W-1 totaled 0.104 acre and was located on the southbound side of SR 1, east of Stinson Beach Federal Park Road at Pullout, Location A. Dominant vegetation in the wetland was swamp smartweed with scattered Pacific water-dropwort, watercress (*Nasturtium officinale*), curly dock (*Rumex crispus*), seep monkey-flower, cape ivy, and California dewberry (*Rubus ursinus*). Surface soils were 10YR 3/1 silty clay loam in the upper 2 inches, 10YR 3/2 fine gravel and sand from 2 to 3 inches, and 10YR 2/1 very gravelly sandy clay loam from 3 to 12 inches. No redoximorphic features were observed; however, hydric conditions were considered present based on the presence of saturated soils, a high water table at a depth of 6 inches, and wetland vegetation.

Wetland Ditch W-2
Wetland Ditch W-2 was located west of Stinson Beach Federal Park Road and east of Calle Del Pinos road at Pullout Location B. Riparian vegetation characterized by alder (*Alnussp.*) and arroyo willow overstory and blackberry understory extended from Easkoot Creek to a wetland ditch that was parallel to the SR 1 southbound lane.

The wetland ditch (W-2) totaled 0.016 acre and was characterized by Pacific water-dropwort and seep monkey-flower, and also included lamp rush (*Juncus effusus*), curly dock, and a willowherb species (*Epilobium* sp.). Surface soils were a black (10YR 2/1) gravelly clay loam in the upper 5 inches. The underlying soil color was 2.57 3/1 very gravelly sandy loam to a depth of 12 inches. No redoximorphic features were observed; however, hydric conditions were considered present based on the presence of saturated soil conditions and facultative wet vegetation. At the time of the survey, there was standing surface water present.

Pullout Location C
A shallow swale was located on the southbound side of SR 1, west of Calle Del Pradero road and east of Calle Del Sierra road at Pullout Location C. A flat unvegetated dirt walkway 5 feet wide was located immediately next to the roadway. A fence 20 feet from the roadway separated arroyo willow riparian vegetation from a low swale. The shallow swale primarily supported cape ivy with scattered black mustard (*Brassica nigra*) and wild radish (*Raphanus sativus*). Some wetland plants, such as nutsedge, poison hemlock (*Conium maculatum*), rabbit's-foot grass (*Polypogon interruptus*), Pacific water-dropwort, and swamp smartweed were present; however, the area did not have saturated soils or other hydrology indicators. No wetlands or waters of the U.S. were identified in Pullout LocationC.

Pullout Location D
Pullout Location D was located on the southbound side of SR 1, west of Calle Del Sierra road and east of Calle Del Onda road. Roadside vegetation, including Bermuda buttercup, wild radish, Italian ryegrass, nasturtium (*Tropaeolum majus*), golden crown grass (*Paspalum dilatatum*), black mustard, giant horsetail (*Equisetum telmateia*), and rescuegrass (*Bromus catharticus*), was 10 feet from the edge of pavement. Approximately 10 feet from the roadway was an approximately 3-foot elevation drop-off and arroyo willow,

Himalayan blackberry, and cape ivy were growing in the riparian terrace along Easkoot Creek. No wetlands or waters of the U.S. were identified in Pullout Location D.

Discussion and Conclusion

The 0.12 acre of wetlands (W-1 and W-2) on the south side of SR 1 is potential waters of the U.S. as it could be considered an adjacent (neighboring) feature of Easkoot Creek, which flows to the Pacific Ocean (a traditional navigable water) via the Bolinas Lagoon, and the wetlands are therefore potential waters of the U.S.

References

Baldwin, Bruce G., Douglas H. Goldman, David J. Keil, and Robert Patterson (eds.). 2012. *The Jepson Manual: Vascular Plants of California*. Berkeley: University of California Press.

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Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. *The National Wetland Plant List: 2014 Update of Wetland Ratings*. Phytoneuron 2014-41: 1–42. Online: http://rsgisias.crrel.usace.army.mil/NWPL/.

Miles, S. and C. Goudey (eds.). 1998. *Ecological Subregions of California*. United States Department of Agriculture, Forest Service. Pacific Southwest Division. R5-EM-TP-005. San Francisco.

Natural Resources Conservation Service (NRCS). 2015a. USDA Field Office Climate Data for Muir Woods weather Station (046027). Online: http://efotg.sc.egov.usda.gov/treemenuFS.aspx. Accessed December 1, 2015.

_____. 2015b. Web Soil Survey. Online: http://websoilsurvey.nrcs.usda.gov/. Accessed December 2, 2015.

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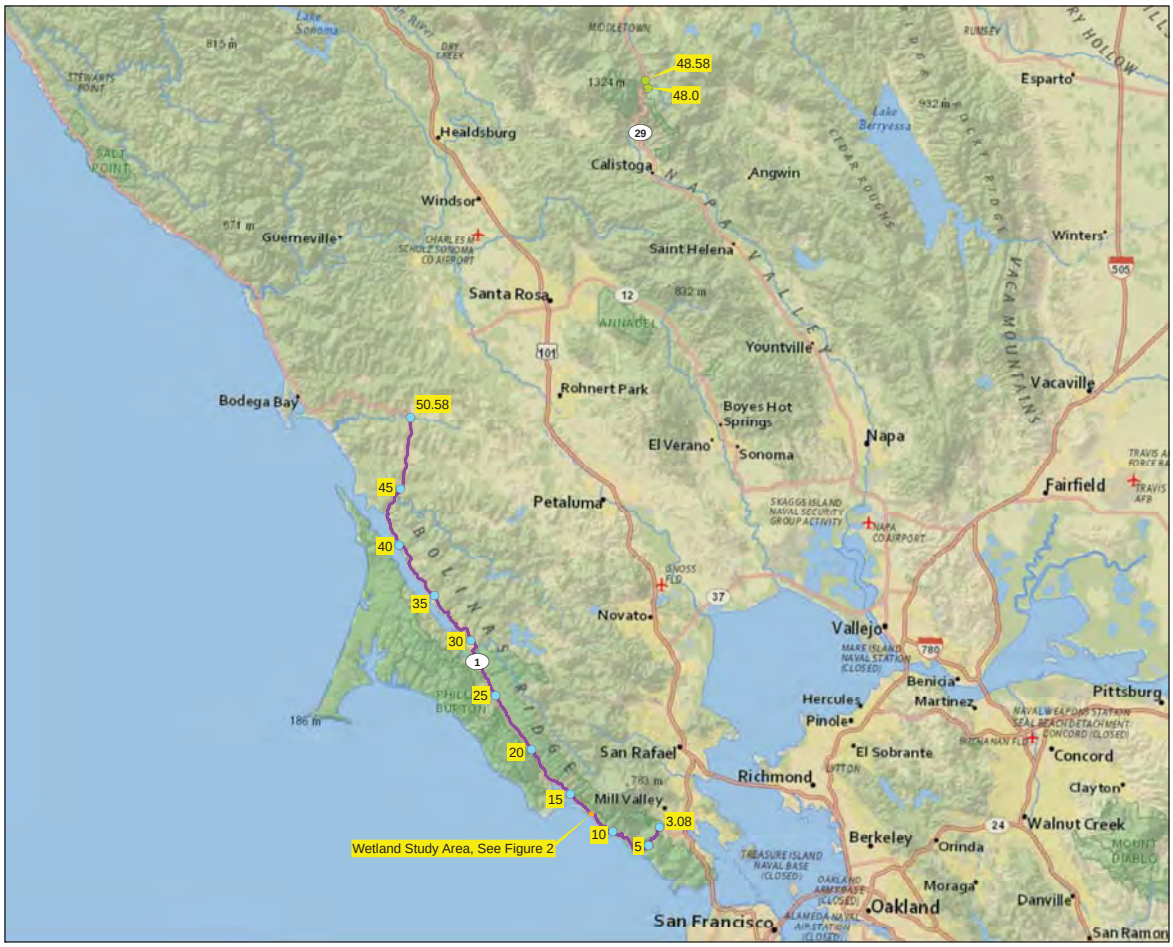
Thien, S. 1979. "A Flow Diagram for Teaching Texture-by-Feel Analysis." *Journal of Agronomic Education* 8:54-55.

United States Army Corps of Engineers (USACE). 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0). U.S. Army Corps of Engineers Engineer Research and Development Center, Environmental Laboratory. Vicksburg, Miss. Online: http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/reg_supp.aspx.

Western Regional Climate Center (WRCC). 2015. Period of Record Monthly Climate Summary at Muir Woods, California (046027). Online: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6027. Accessed in September 2015.

Attachments

Figures



LEGEND

- Post Mile State Route 1
- Post Mile State Route 29
- Biological Study Area / USACE Verification Boundary (173.8 Acres)
- Wetland Study Area (1.64 Acres)

N

0 6 12
Miles

FIGURE 1
Project Location
State Route 1, 29
Rumble Strip Project
EA 04-4H870 MRN-1 Post Mile 3.08 - 50.5,
NAP-29 Post mile 48.0 - 48.58
Marin and Napa County, California

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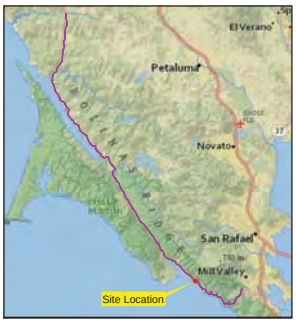

LEGEND

- Post Mile State Route 1
- Biological Study Area / USACE Verification Boundary (173.8 Acres)
- Wetland Study Area (1.64 Acres)
- Creek
- 2 Foot Elevation Contours
- County Parcels

Delineation:
November 25 and December 1, 2015
Russell Huddleston, Rachel Cotroneo and Holly Barbare

N

0 50 100
Feet

FIGURE 2
Map 1 of 2
Waters of the U.S.
State Route 1, 29
Rumble Strip Project
EA 04-4H870 MRN-1 Post Mile 3.08 - 50.5,
NAP-29 Post mile 48.0 - 48.58
Marin and Napa County, California

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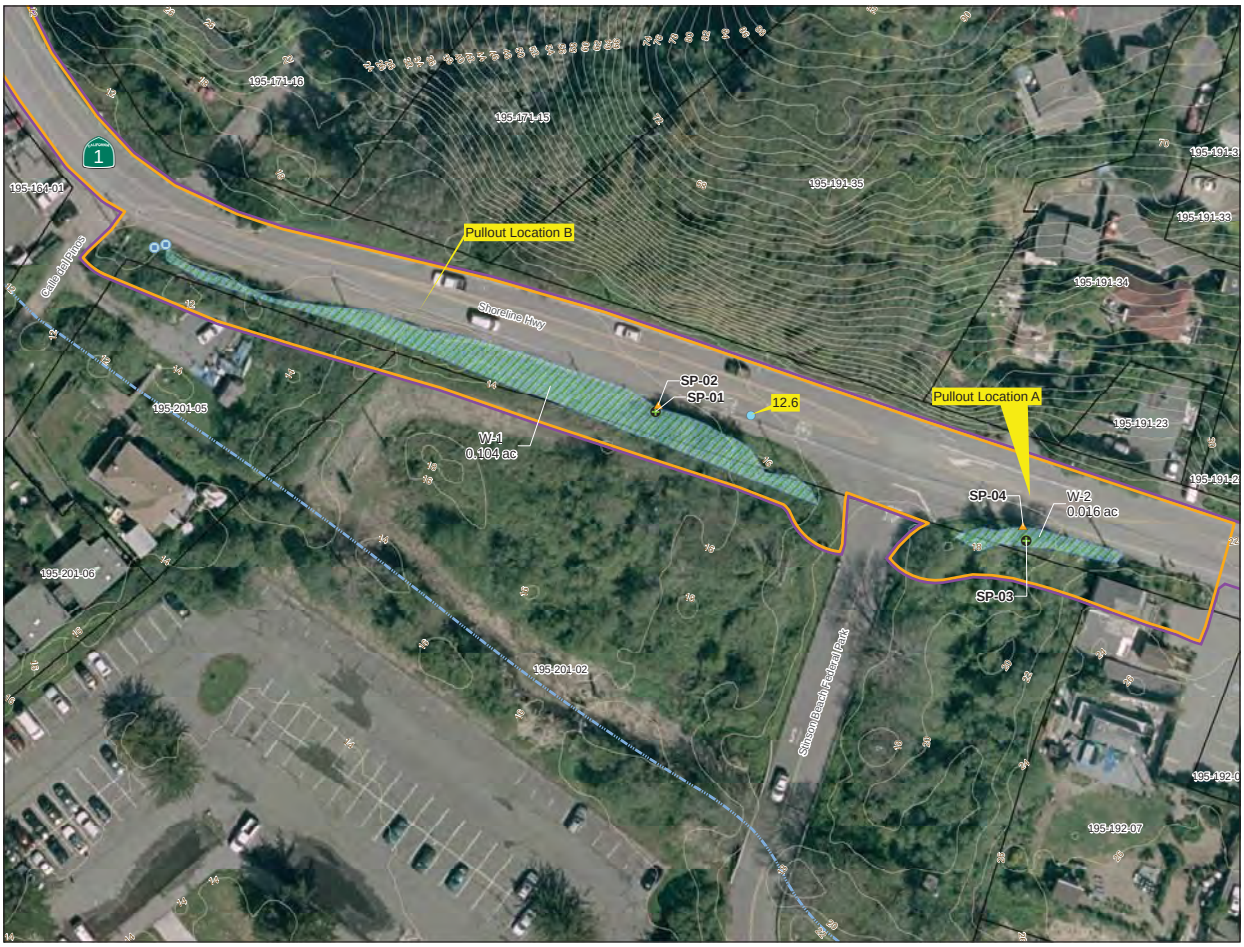

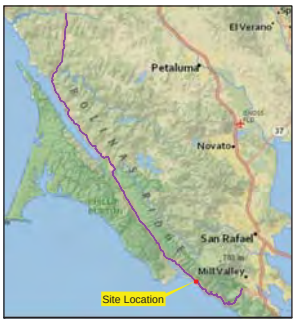

LEGEND

- Post Mile State Route 1
- Biological Study Area / USACE Verification Boundary (173.8 Acres)
- Wetland Study Area (1.64 Acres)
- Creek
- Culvert
- Upland Sample Point
- Wetland Sample Point
- Wetland (0.121 acre)
- 2 Foot Elevation Contours
- County Parcels

Delineation:
November 25 and December 1, 2015
Russell Huddleston, Rachel Cotroneo and Holly Barbare

N

0 50 100
Feet

FIGURE 2
Map 2 of 2
Waters of the U.S.
State Route 1, 29
Rumble Strip Project
EA 04-4H870 MRN-1 Post Mile 3.08 - 50.5,
NAP-29 Post mile 48.0 - 48.58
Marin and Napa County, California

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1 inch = 33 feet

0 15 30 60 Feet

N

Legend

Proposed Widening
Eskoot Creek
Coastal Wetlands
Biological Study Area

Map 1 of 2. Coastal Wetlands R1 and R2 - No Impacts

State Route 1, Stinson Beach
Marin County, California
EA 04-4H870, MRN 1: PM 12.7

Caltrans

Easkoot Creek shapfile provided by Bay Area Aquatic Resource Inventory, 2016.All other data and shapefiles provided by CH2M Hill, 2015. Map created by Caltrans, 2016.

1:441

1 inch = 37 feet

N

0 20 40 80 Feet

Legend

- Permanent Impacts to Coastal Wetlands (0.016 acre)
- Temporary Impacts to Coastal Wetlands (0.017 acre)
- Culverts
- Easkoot Creek
- Wetlands
- Proposed Widening
- Biological Study Area

Map 2 of 2. Impacts to Coastal Wetlands W1 and W2.

State Route 1, Stinson Beach
Marin County, California
EA 04-4H870, MRN 1: PM 12.6

Caltrans

Attachment A
Soil map and descriptions

Soil Map—Marin County, California

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Marin County, California
Survey Area Data: Version 9, Sep 25, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 14, 2011—Aug 15, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Marin County, California (CA041)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
105	Blucher-Cole complex, 2 to 5 percent slopes	0.7	41.9%
116	Cronkhite-Barnabe complex, 15 to 30 percent slopes	0.8	49.8%
122	Dune land	0.0	3.1%
159	Rock outcrop-Xerorthents complex, 50 to 75 percent slopes	0.1	5.2%
Totals for Area of Interest		**1.6**	**100.0%**

LOCATION BARNABE CA

Established Series
Rev. TAC/JHK/JMK/TDC
01/2003

BARNABE SERIES

The Barnabe series consists of shallow, well drained soils that formed in material from sandstone and shale. Barnabe soils are on uplands and have slopes of 9 to 75 percent. The mean annual precipitation is about 30 inches and the mean annual temperature is about 54 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, active, isomesic Lithic Haplustolls

TYPICAL PEDON: Barnabe very gravelly loam, on a N facing convex slope 22 percent slopes under coyotebrush, lupine, annual grasses and forbs at 720 feet elevation. (Colors are for dry soil unless otherwise stated. When described (8/9/76) the soil was dry throughout.)

A11--0 to 2 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure parting to weak fine granular; hard, firm, slightly sticky and slightly plastic; many very fine and fine, few medium roots; common very fine and fine, few medium interstitial and tubular pores; 45 percent pebbles; moderately acid (pH 6.0); clear smooth boundary. (1 to 2 inches thick)

A12--2 to 8 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark gray (10YR 3/1) moist; strong fine and medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; many very fine and fine, few medium roots; many very fine and fine interstitial and tubular pores; 45 percent pebbles; slightly acid (pH 6.3); clear smooth boundary. (4 to 8 inches thick)

B2t--8 to 16 inches; very dark grayish brown (10YR 3/2) very gravelly heavy loam, black (10YR 2/1) moist; strong fine and medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine roots; many very fine and fine interstitial and tubular pores; few thin clay films on faces of peds and in interstitial pores; 35 percent pebbles; slightly acid (pH 6.3); abrupt irregular boundary. (5 to 10 inches thick)

R--16 inches; fractured sandstone and shale. Does not slake in water.

TYPE LOCATION: Marin County, California; about 2 miles (airline) southeast from Mill Valley, 1,800 feet southwest from intersection of Hwy 1 and Panoramic Hwy, 200 feet east of fir road; latitude 122 degrees 33 feet 25 inches W. longitude 37 degrees 52 feet 50 inches N.

RANGE IN CHARACTERISTICS: Depth to a lithic contact is 11 to 20 inches. The mean annual soil temperature is 50 degrees to 56 degrees F. and the soil temperature is not below 47 degrees F. at any time. The soil is moist in some part from October until some time in August. Moist in the summer is due, in part, from heavy fog and low evapo-transpiration rates. It is dry in all parts less than 45 consecutive days in August and September. Gravel averages 35 to 50 percent and base saturation is 50 to 75 percent throughout the soil. Reaction is slightly acid or medium acid.

The A horizon has dry color of 10YR 5/2, 5/3, 4/2; 7.5YR 5/4 or 5/2 and moist color of 10YR 2/1, 2/2, 3/1, 3/2; 7.5YR 2/2 or 3/2. It is very gravelly sandy loam or very gravelly loam and has 1 to 3 percent organic matter.

The B horizon has dry color of 10YR 3/2, 4/3, 4/2, 5/2, 5/3; 7.5YR 4/2 or 4/4 and moist color of 10YR 2/1, 2/2, 3/1, 3/2, 3/3; 7.5YR 2/2 or 3/2.

COMPETING SERIES: This is the Bayview series in the same family and the McMullin and Tyson series. Bayview soils have siliceous shale rock fragments. McMullin soils have less than 35 percent rock fragments in the particle-size control section. Tyson soils have a lithic contact at a depth of 20 to 40 inches.

GEOGRAPHIC SETTING: Barnabe soils are on hills and mountainous uplands. Slopes are 9 to 75 percent. The soils formed on sandstone and shale. Elevations are 50 to 1,700 feet. The climate is subhumid mesothermal with cool foggy summers and cool moist winters. The mean annual precipitation is 30 to 50 inches. Mean January temperature is about 50 degrees F.; mean July temperature is about 56 degrees F., mean annual temperature is about 53 degrees F. Frost-free season is 275 to 360 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Centissima, Cronkhite, Dipsea and Henneke soils. Centissima, Cronkhite and Dipsea soils are more than 20 inches deep to a paralithic contact. Henneke soils have serpentinitic mineralogy and have an argillic horizon.

DRAINAGE AND PERMEABILITY: Well drained; medium to very rapid runoff; moderate permeability.

USE AND VEGETATION: Used for grassland, recreation and watershed. Native vegetation is annual grasses and forbs, lupine, plantain, thistle and brush.

DISTRIBUTION AND EXTENT: Central and northern coastal California. The soil is moderately extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Marin County, California, 1979.

REMARKS: The activity class was added to the classification in January of 2003. Competing series were not checked at that time. - ET

National Cooperative Soil Survey
U.S.A.

LOCATION BLUCHER CA

Established Series
Rev. JHK/TDC
01/2003

BLUCHER SERIES

The Blucher series consists of deep, somewhat poorly drained soils that formed in alluvium from mixed sources. Blucher soils are in basins and on alluvial fans and have slopes of 2 to 5 percent. The mean annual precipitation is about 40 inches. The mean annual temperature is about 60 degrees F.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, thermic Fluvaquentic Haploxerolls

TYPICAL PEDON: Blucher silt loam, on a smooth east facing slope of 2 percent under soft chess, burclover, birdsfoot trefoil, and annual rye at 5 feet elevation. (Colors are for dry soil unless otherwise stated. When described (6/12/78) the soil was moist below 7 inches.)

Ap--0 to 7 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; many fine faint strong brown (7.5YR 5/6) mottles, strong brown (7.5YR 4/6) moist; moderate medium and coarse prismatic, moderate coarse and very coarse subangular blocky structure; hard, friable, sticky and plastic; many very fine, common fine and medium roots; common very fine tubular and interstitial pores; compaction from animal traffic apparent; moderately acid (pH 6.0); clear smooth boundary. (5 to 9 inches thick)

A12--7 to 16 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; few fine faint yellowish brown (10YR 5/4) mottles, dark yellowish brown (10YR 4/4) moist; weak coarse and very coarse prismatic structure parting to moderate coarse and very coarse subangular blocky; very coarse structure less than 1/2 of horizon; hard, friable, sticky and plastic; common very fine and medium roots; many very fine, common fine and medium tubular pores; filled krotovina apparent; slightly acid (pH 6.5); abrupt smooth boundary. (7 to 11 inches thick)

IIC1--16 to 23 inches; brown and pale brown (10YR 5/3, 6/3) silt loam, dark brown and dark grayish brown (10YR 3/3, 4/2) moist; moderate thin through very thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, few fine roots; common fine and medium, few coarse tubular pores; many thin strata of very fine sand and silt occur in this horizon; moderately alkaline (pH 8.0); clear smooth boundary. (5 to 10 inches thick)

IIIC2g--23 to 39 inches; gray and grayish brown (10YR 5/1, 5/2) silty clay loam, very dark gray and very dark grayish brown (10YR 3/1, 3/2) moist; many medium distinct yellowish brown (10YR 5/6) mottles, dark yellowish brown (10YR 4/6) moist; moderate medium through very coarse angular blocky structure; very hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; very fine sand strata; moderately alkaline (pH 8.0); gradual smooth boundary. (12 to 19 inches thick)

IIIC3g--39 to 60 inches; gray (10YR 6/1) clay loam, dark gray (10YR 4/1) moist; many medium distinct brown (7.5YR 5/4) mottles, brown and dark brown (7.5YR 4/4) moist; moderate medium through very coarse angular blocky structure; very hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; roots tend to follow vertical cracks; charcoal present; water table observed at 47 inches; slightly alkaline (pH 7.8).

TYPE LOCATION: Marin County, California; 3/4 mile east of Hwy 101 on paved road along south side of San Antonio Creek heading toward Neils Island, on Lester Corda property, 75 feet east of animal waste pond, 30 feet south of road to Neils Island, 122 degrees 35 feet 14 inches W. longitude, 38 degrees 11 feet 11 inches N. latitude.

RANGE IN CHARACTERISTICS: The mean annual soil temperature is about 59 degrees to 63 degrees F. The soil moisture control section (4 to 12 inches) is moist in all parts from mid-December to April. It is dry in all parts from mid July to October. There are no carbonates in any part of the profile. The particle-size control section averages 18 to 35 percent clay. The soils are strongly stratified.

The A horizon has dry color of 10YR 3/1, 3/2, 4/1, 4/2, 5/1, 5/2, or 5/3 with mottles of 10YR 5/4, 5/6, 4/4; or 7.5YR 5/6. It has moist color of 10YR 2/1, 2/2, 3/1, 3/2, or 3/3. It is sandy loam, fine sandy loam, loam, silt loam, or clay loam. The upper part of this horizon is moderately acid to slightly acid; the lower part is slightly acid or neutral.

The IIC horizon has dry color of 10YR 5/1, 5/2, 5/3, 6/2, 6/3; 2.5Y 5/2; or 5Y 7/2. Some pedons have l0YR 5/6, 5/8, 6/4, 6/8; 7.5YR 5/6, or 5/8 mottles. This horizon is fine sandy loam, silt loam, or loam. It is slightly alkaline or moderately alkaline.

The IIIC horizon has dry color of 10YR 4/1, 5/1, 5/2, 6/1 or 6/2 with mottles of 10YR 4/4, 4/6, 5/6, 5/8, or 7.5YR 5/4. It has moist color of 10YR 2/1, 3/1, 3/2, 4/1, or 4/2. It is silty clay loam or clay loam. It is slightly alkaline or moderately alkaline.

COMPETING SERIES: These are the Lakeside and Pacheco series in the same family. Lakeside soils are calcareous through the series control section and have an sa horizon. Pacheco soils are calcareous within depths of 20 inches and are only weakly stratified.

GEOGRAPHIC SETTING: Blucher soils are in basins and on alluvial fans. Slopes are from 2 to 5 percent. The soils formed in alluvium from mixed sources. Elevations are 0 to 500 feet. The climate is subhumid mesothermal with warm dry summers and cool moist winters. The mean annual precipitation is 25 to 50 inches. Mean January temperature is about 55 degrees F.; mean July temperature is about 65 degrees F.; mean annual temperature is about 60 degrees F. Frost-free season is 210 to 290 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Clear Lake, Cole, Cortina, Goldridge, and Steinbeck soils. Clear Lake and Cole soils have a fine particle-size control section. Cortina soils have a loamy-skeletal particle-size control section. Goldridge soils have an argillic horizon and have less than 35 percent base saturation in the lower part of the C horizon. Steinbeck soils have mean annual soil temperature of less than 59 degrees F. and an ustic moisture regime.

DRAINAGE AND PERMEABILITY: Somewhat poorly drained; slow runoff; moderate over slow permeability. A water table occurs at a depth of 3.5 to 5 feet from December to April.

USE AND VEGETATION: Used for rangeland, hay and pasture, and some row crops. Native vegetation is soft chess, burclover, annual fescue, ryegrass, wiregrass and dock.

DISTRIBUTION AND EXTENT: North coastal valleys of California. The series is of small extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Marin County, California, 1979.

REMARKS: The activity class was added to the classification in January of 2003. Competing series were not checked at that time. - ET

LOCATION COLE CA

Established Series
Rev. DWS-JMK-DJE-ET
02/2003

COLE SERIES

The Cole series consists of very deep, somewhat poorly drained soils that formed in alluvium from mixed sources. Cole soils are on river tarraces, basins, flood plains, or on alluvial fans with slopes of 0 to 5 percent. The mean annual precipitation is about 40 inches and the mean annual air temperature is about 60 degrees F.

TAXONOMIC CLASS: Fine, mixed, superactive, thermic Pachic Argixerolls

TYPICAL PEDON: Cole clay loam - on a 1 percent slope in an irrigated walnut orchard at 1,360 feet. (Colors are for dry soil unless otherwise noted. When described on April 28, 1976, the soil was slightly moist throughout).

Ap--0 to 6 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure parting to strong fine and medium granular; hard, firm, sticky and plastic; common very fine, fine and medium roots; common fine and medium tubular pores; few worm casts; slightly acid (pH 6.5); abrupt smooth boundary. (6 to 15 inches thick)

BAt--6 to 13 inches; grayish brown (10YR 5/2) clay loam, very dark gray (10YR 3/1) moist; moderate fine and medium subangular blocky structure parting to strong fine and medium granular; hard, firm, sticky and plastic; common very fine, fine and medium roots; many fine and medium tubular pores; common thin clay films on peds and in pores; few worm casts; slightly acid (pH 6.3); clear smooth boundary. (0 to 8 inches thick)

Bt1--13 to 35 inches; gray (10YR 5/1) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse angular blocky structure; very hard, firm, sticky and plastic; common very fine, fine and medium roots; common very fine and fine and few medium tubular pores; many thin and common moderately thick clay films on peds and in pores; 2 percent pebbles 5 to 15 mm in diameter; moderately alkaline (pH 8.0); clear wavy boundary. (10 to 22 inches thick)

Bt2--35 to 51 inches; brownish yellow (10YR 6/6) clay loam, yellowish brown (10YR 5/4) moist; grayish brown (10YR 5/2) clay films on peds and in pores; dark grayish brown (10YR 4/2) moist; weak medium prismatic structure; hard, firm, sticky and plastic; common medium coarse and few fine roots; common very fine, fine and few medium tubular pores; many thin clay films bridging mineral grains and common moderately thick clay films on peds and in pores; moderately alkaline (pH 8.0); clear wavy boundary. (6 to 17 inches thick).

BCt--51 to 62 inches; variegated brown (10YR 5/3) and pale brown (10YR 6/3) clay loam, yellowish brown (10YR 5/4) moist; grayish brown (10YR 5/2) clay films; weak medium prismatic structure; hard, firm, sticky and plastic; common medium, coarse and few fine roots; many very fine, fine and common medium tubular pores; few thin and moderately thick clay films bridging mineral grains, on peds, and in pores; moderately alkaline (pH 8.0); clear smooth boundary. (0 to 15 inches thick)

C--62 to 71 inches; variegated brown (10YR 5/3) and pale brown (10YR 6/3) clay loam, yellowish brown (10YR 5/4) moist; grayish brown (10YR 5/2) clay films; weak medium prismatic structure; hard, firm, sticky

and plastic; few fine and medium roots; common very fine, fine and few medium tubular pores; common thin clay films on peds, bridging mineral grains and in pores; 4 percent pebbles 2 to 20 mm in diameter; moderately alkaline (pH 8.0).

TYPE LOCATION: Lake County, California; about 5 miles southeast of Lakeport, 75 feet northwest of the junction of Argonaut Road and Thomas Drive; NE1/4 NE1/4, section 8, T.13 N., R.9 W.

RANGE IN CHARACTERISTICS: The mean annual soil temperature is 59 to 65 degrees F, and the soil temperature usually is not below 47 degrees at any time. The soil between depths of 4 and 12 inches is usually dry from July 1 to October 1 and is moist in all parts from December 1 to April 30. The soils usually increase in alkalinity with increasing depth but are noncalcareous. The particle-size control section has 35 to 45 percent clay. Organic carbon is 1 to 2 percent to a depth of 20 to 35 inches. Gravel content ranges from 0 to 15 percent throughout.

The A horizon dry color is 10YR 3/2, 4/1, 4/2, 4/3, 5/1, 5/2, 5/3; 2.5Y 4/1, 4/2, 5/1 or 5/2. Moist colors are 10YR 2/1, 2/2, 3/1, 3/2, 3/3; or 2.5Y 3/2. It is loam, silt loam, clay loam, or silty clay loam and has granular or subangular blocky structure. It is slightly hard to very hard and is neutral to moderately acid. Some pedons have A3 horizons, B1 horizons or Blt horizons.

The Bt horizon dry color is 10YR 2/1, 2/2, 3/1, 3/2, 4/1, 4/2, 4/3, 5/1, 5/2, 5/3, 5/4, 6/3; 2.5Y 3/2, 4/2, 5/2 N 3/0, or N 4/0. Moist colors are 10YR 2/1, 2/2, 3/1, 3/2, 3/3, 4/1, 4/2, 4/3 4/4; 2.5Y 3/2, 4/2 or 5/2. In some pedons the lower part has dry colors of 10YR 6/2, 6/3, 6/4 or 6/6. Moist colors are 4/4, 5/3 or 5/4 and some also have mottles. It is silty clay loam, clay loam, silty clay or clay and averages 35 to 50 percent clay in the upper 20 inches. It is slightly acid to moderately alkaline.

The C horizon dry color has hues of 10YR, 2.5Y or 5Y and values 3 through 6 dry and 2 through 6 moist. Chroma is 1 through 3 dry and 2 through 4 moist. It is clay loam, clay loam, silty clay loam or clay and is mildly or moderately alkaline. Some pedons are underlain by gravel.

COMPETING SERIES: There are no other series in this family.

GEOGRAPHIC SETTING: Cole soils are on flood plains and fans and in basins at elevations of 50 to 1,500 feet. Slopes are 0 to 5 percent. The soils formed in alluvium from mixed sources. The climate is subhumid with warm or hot dry summers and cool moist winters. Mean annual precipitation is 25 to 50 inches. Average January temperature is 55 to 61 degrees F. The frost-free period is 150 to 290 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Bale, Botella, Soquel, Clear Lake, Cortina, Pajaro, and Yolo soils. Clear Lake soils are clayey throughout and have intersecting slickensides. Cortina soils have an ochric epipedon and have a loamy-skeletal control section. Pajaro soils lack an argillic horizon, have a fine-loamy control section, and have an aquic moisture regime. Yolo soils have an ochric epipedon, lack an argillic horizon, and have a fine-silty control section.

DRAINAGE AND PERMEABILITY: Somewhat poorly drained; slow runoff; slow permeability. Many areas have been artificially drained or have drainage altered by gullying.

USE AND VEGETATION: Used mostly for production of orchards, vineyards, truck crops, and irrigated pasture. Uncultivated areas have oak-grass vegetation with some shrubs and forbs.

DISTRIBUTION AND EXTENT: North coastal counties, California. The soils are moderately extensive. MLRA is 14.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Lake County, California. Clear Lake Area 1927.

REMARKS: The activity class was added to the classification in February of 2003. Competing series were not checked at that time. - ET

Diagnostic horizons and features recognized in this pedon are:

Mollic Pachic epipedon -- the zone from 0 to 35 inches (Ap, BAt, Bt1)

Argillic horizon -- the zone from 6 to 62 inches (BAt, Bt1, Bt2, Bct)

National Cooperative Soil Survey
U.S.A.

LOCATION CRONKHITE CA

Established Series
Rev. CAB/JK/JMK/TDC
02/97

CRONKHITE SERIES

The Cronkhite series consists of deep, moderately well drained soils that formed in material weathered from sandstone and shale. Cronkhite soils are on hills and have slopes of 9 to 75 percent. The mean annual precipitation is about 30 inches and the mean annual temperature is about 54 degrees F.

TAXONOMIC CLASS: Fine, smectitic, isomesic Pachic Argiustolls

TYPICAL PEDON: Cronkhite heavy loam, on a west facing convex slope of 45 percent under coyotebrush, sage, lupine, brackenfern, poison-oak, blackberry, ryegrass, and toyon at 200 feet elevation. (Colors are for dry soil unless otherwise stated. When described (9/21/76) the soil was moist below 26 inches.)

A11--0 to 9 inches; brown (10YR 5/3) loam, very dark gray (10YR 3/1) moist; strong very fine, fine, and medium subangular blocky structure; extremely hard, friable, slightly sticky and slightly plastic; common very fine and few medium roots; common very fine tubular and interstitial, common fine tubular and vesicular pores; cracks 5mm wide, 6 to 12 inches apart; slightly acid (pH 6.3); clear smooth boundary. (8 to 11 inches thick)

A12--9 to 15 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate very fine, fine, and medium subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular and vesicular pores; cracks 5mm wide, 6 to 12 inches apart; slightly acid (pH 6.3); gradual smooth boundary. (5 to 8 inches thick)

A3--15 to 26 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate very fine and fine subangular blocky structure; extremely hard, friable, sticky and plastic; common very fine roots; common very fine interstitial and tubular, common fine and medium tubular and vesicular pores; common moderately thick clay films in pores; many pressure faces; cracks 0.5cm wide, about 6 to 12 inches apart; slightly acid (pH 6.3); abrupt smooth boundary. (10 to 13 inches thick)

B2t--26 to 37 inches; mixed colors of yellowish brown and strong brown (10YR 5/8 and 7.5YR 5/8) clay, dark grayish brown and very dark grayish brown (10YR 4/2, 3/2) moist; moderate coarse and very coarse angular blocky structure; extremely hard, firm, sticky and plastic; common very fine and few fine roots; common very fine tubular, vesicular, and interstitial pores; many moderately thick clay films in pores; many pressure faces; cracks 5mm wide and about 4 to 8 inches apart; slightly acid (pH 6.3); gradual wavy boundary. (10 to 16 inches thick)

B3t--37 to 45 inches; yellowish brown (10YR 5/8) clay loam, dark yellowish brown (10YR 4/4) moist; strong medium and coarse angular blocky structure; very hard, friable, sticky and plastic; common very fine and few fine roots; common very fine tubular, vesicular, and interstitial pores; many moderately thick clay films in pores; many pressure faces; cracks 10mm apart, about 4 to 8 inches apart; neutral (pH 6.8); gradual irregular boundary. (7 to 12 inches thick)

Cr--45 to 55 inches; highly shattered weathered sandstone with prominent dark stains. Fragments slake in water.

TYPE LOCATION: Marin County, California; in the Golden Gate National Recreation Area, 400 feet up hill east of Muir Woods Road, 1/2 mile NW of the intersection of Shoreline Hwy and Muir Woods Road.

RANGE IN CHARACTERISTICS: Depth to the paralithic contact is 40 to 60 inches. The mean annual soil temperature is about 53 degrees to 58 degrees F. The difference between mean summer and mean winter temperatures is less than 9 F. The soil moisture control section is usually moist in all parts from mid-November to June. It is dry in some or all parts the rest of the time but is not dry in all parts for 45 consecutive days. The soil is slightly acid or neutral and commonly becomes less acid with increasing depth. Organic matter is more than 1 percent to a depth of 20 inches or more. Base saturation is more than 50 percent throughout the profile and increases with increasing depth.

The A horizon has dry color of 10YR 4/2, 5/2 or 5/3, and moist color of 10YR 2/1, 3/2 or 3/3.

The Bt horizon has variegated dry color of 10YR 5/6, 5/8, 6/6; 7.5YR 4/2, 5/2 or 5/8 and moist color of 10YR 3/2, 4/2, 4/3 or 4/4. It is clay or clay loam and has 35 to 50 percent clay. The upper boundary of the Bt horizon is abrupt with less than 15 percent absolute clay increase from the A horizon.

COMPETING SERIES: These are the Olompali and Tomales series in other families. Olompali and Tomales soils have a mesic soil temperature and an umbric epipedon.

GEOGRAPHIC SETTING: Cronkhite soils are on hills. Slopes are 9 to 75 percent. The soils formed in material weathered from sandstone and shale. Elevations are 50 to 800 feet. The climate is subhumid mesothermal with cool foggy summers and cool moist winters. Mean annual precipitation is 24 to 35 inches. Mean January temperature is about 52 degrees F.; mean July temperature is about 55 degrees F.; mean annual temperature is about 52 degrees to 57 degrees F. Frost-free season is 275 to 300 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Barnabe, Centissima, Dipsea and Tocaloma soils and the competing Olompali soils. Barnabe soils are less than 20 inches deep to a lithic contact. Centissima soils are 20 to 40 inches deep to a paralithic contact and have a fine-loamy particle-size control section. Dipsea soils lack a mollic epipedon and have a loamy-skeletal particle-size control section. Tocaloma soils are 20 to 40 inches deep to a paralithic contact and lack an argillic horizon.

DRAINAGE AND PERMEABILITY: Moderately well drained; medium to very rapid runoff; slow permeability.

USE AND VEGETATION: Used for range, wildlife habitat and recreation. Native vegetation is annual grasses and shrubs.

DISTRIBUTION AND EXTENT: Small extent along central and northern California coast.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Marin County, California, 1979.

National Cooperative Soil Survey
U. S. A.

Attachment B
National Wetland Inventory Map

U.S. Fish and Wildlife Service

National Wetlands Inventory

4H870

Nov 23, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Riparian Status

- Digital Data

User Remarks:

Attachment C
Point Bonita 7.5 Minute Topographic Quadrangle Map

USGS 7.5 Minute Bolinas Topographic Quadrangle Map (2015)

Attachment D
Wetland Determination Datasheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HWY 1 41/870 City/County: STINSON BEACH Sampling Date: NOV. 25, 2015

Applicant/Owner: CALTRANS State: CA Sampling Point: SP-01

Investigator(s): R. HUDDLESTON, R. COTRONEO Section, Township, Range: 28 01N 07W (MD)

Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): SLIGHT CONCAVE Slope (%): 2-2%

Subregion (LRR): C Lat: 37.89883 Long: -122.641551 Datum: NAD83

Soil Map Unit Name: BLUCHER-COLE COMPLEX NWI classification: NONE

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: OVERALL BELOW AVE RAINFALL YEAR, OVER ½" RAIN DAY PRIOR TO SURVEY.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 FT)			
1. OENANTHE SARMENTOSA	35	YES	OBL
2. MIMULUS GUTTATUS	30	YES	OBL
3. JUNCUS EFFUSUS	5		FACW
4. RUMEX CRISPUS	5		FAC
5. EPILOBIUM SP.	TR		—
6.			
7.			
8.			
9.			
10.			
11.			
	50% = Total Cover		
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP-01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100%	—	—	—	—	CLAY LOAM	- GRAVELLY
5-12	2.5Y 3/1	100%					SANDY LOAM	VERY GRAVELLY

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: NO REDOX OBSERVED - DARK SOILS, - SOIL SATURATION ALONG W/ PRESENCE OF OBL DOMINANT VEGETATION SUGGEST THAT HYDRIC CONDITIONS ARE PRESENT

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): _____

Water Table Present? Yes X No ___ Depth (inches): 5

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 5

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: SOILS SATURATED, STANDING WATER PRESENT

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HWY 1 4H870 City/County: STINSON BEACH Sampling Date: NOV. 25, 2015
Applicant/Owner: CALTRANS State: CA Sampling Point: SP-02
Investigator(s): R. HUDDLESTON, R. CATRONEO Section, Township, Range: 28 01N 07W (MD)
Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): NONE Slope (%): 0-2%
Subregion (LRR): C Lat: 37.89885 Long: -122.64154 Datum: NAD83
Soil Map Unit Name: BLUCHER-COLE COMPLEX NWI classification: NONE
Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation X, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: ROADSIDE VEGETATION, BELOW AVERAGE RAINFALL IN 2015

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5FT)			
1. LOLIUM PERENNE	80%	YES	FAC
2. PLANTAGO MAJOR	5%		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	= Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
_____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
_____ 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: - MOST GRASS NOT IN FLOWER - FEW OTHER LOW COVER PLANTS ALSO PRESENT

SOIL

Sampling Point: SP-C2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1						GRAVELLY	CLAY COBBLES
4-12	MIXED FILL MATERIAL							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

- GRAVELLY FILL SOILS AT THIS LOCATION - NEXT TO PAVED ROADWAY

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): 12+

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 12+

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

- SOME SATURATED SOILS, SHALLOW WATER NOTED AT 12" POSSIBLE DUE TO RECENT RAIN OVER ½" PREVIOUS DAY

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HWY 1 4H870 City/County: STINSON BEACH Sampling Date: DEC. 1 2015
Applicant/Owner: CALTRANS State: CA Sampling Point: SP-03
Investigator(s): R. HUDDLESTON, R. COTTONEO Section, Township, Range: 28 01N 07W (MD)
Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): NONE Slope (%): 0-2%
Subregion (LRR): C Lat: 37.89868 Long: -122.64088 Datum: NAD 83
Soil Map Unit Name: BLUCHER-COLE COMPLEX NWI classification: NONE
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: BELOW AVERAGE RAINFALL IN 2015

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5FT)			
1. PERSICARIA HYDROPIPEROIDIES	30	YES	OBL
2. OENANTHE SARMENTOSA	5		OBL
3. NASTURTIUM OFFICINALE	5		OBL
4. RUMEX CRISPUS	5		FAC
5. MIMULUS GUTTATUS	5		
6.			
7.			
8.			
9.			
10.			
11.			
	50% = Total Cover		
Woody Vine Stratum (Plot size: 5FT)			
1. DELAIREA ODORATA	2	NO	NL
2. RUBUS URSINUS	2	NO	FACU
	4% = Total Cover		

% Bare Ground in Herb Stratum 50%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
__ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ 5 - Wetland Non-Vascular Plants[1]
__ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP-03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100%					SILTY CLAY LOAM	
2-3	10YR 3/2	100%					FINE GRAVEL / SAND	
3-12	10YR 2/1	100%					SANDY CLAY LOAM, VERY GRAVELLY	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

NO REDOX OBSERVED, DARK SOILS - SANDY TEXTURE POSSIBLE FILL - BASED ON OBL PLANTS AND SATURATION AND SHALLOW GROUND WATER HYDRIC CONDITIONS ASSUMED PRESENT.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 6

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HWY 1 4H870 City/County: STINSON BEACH Sampling Date: DEC 1, 2015

Applicant/Owner: CALTRANS State: CA Sampling Point: SP-04

Investigator(s): R. HUDDLESTON, R. COTTRONEO Section, Township, Range: 28 01N 07W (MD)

Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): NONE Slope (%): 0-2%

Subregion (LRR): C Lat: 37.89870 Long: -122.64088 Datum: NAD83

Soil Map Unit Name: BLUCHER-COLE COMPLEX NWI classification: NONE

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: BELOW AVE RAINFALL IN 2015

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5FT)			
1. HOLCUS LANATUS	60	YES	FAC
2. MIMULUS GUTTATUS	10		OBL
3. CYPERUS ERAGROSTIS	5		FACW
4. OENANTHE SARMENTOSA	2		OBL
5. PERSICARIA HYDROPIPEROIDIES	2		OBL
6. LOLIUM PERENNE	2		FAC
7. SOLANUM AMERICANUM	3		FACU
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP-04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/1	100%					SANDY CLAY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks:

HARD COMPACT ROAD BASE AT DEPTH OF 3"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOILS MOIST BUT NOT SATURATED IN UPPER 3" BELOW HARD COMPACTED ROAD BASE

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HWY 1 4H870 City/County: STINSON BEACH Sampling Date: DEC 1, 2015

Applicant/Owner: CALTRANS State: CA Sampling Point: SP-05

Investigator(s): R. HUDDLESTON Section, Township, Range: 29 01N 07W (MD)

Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): _____ Slope (%): 0-2%

Subregion (LRR): C Lat: 37.899622 Long: -122.643105 Datum: NAD 83

Soil Map Unit Name: CRONKHITE - BARNABE COMPLEX NWI classification: NONE

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks: SAMPLE POINT TAKEN IN LOW AREA ADJACENT TO ROAD. NOTE 2015 BELOW AVE RAINFALL

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 FT)			
1. OENANTHE SARMENTOSA	15	YES	OBL
2. CONIUM MACULATUM	10	YES	FAC
3. PERSICARIA HYDROPIPEROIDIES	10	YES	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: 5 FT)			
1. DELAREA ODORATA	50%	YES	NL
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: DITCH COVERED IN CAPE IVY - SOME WETLAND PLANTS PRESENT IN LOW SPOT BUT NO EVIDENCE OF HYDROLOGY

SOIL

Sampling Point: SP-05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1						SANDY	LOAM

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

NO EVIDENCE OF HYDRIC SOILS.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches) _____

Water Table Present? Yes _____ No X Depth (inches): 7/6"

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): 7/6"

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HWY 1 41/870 City/County: STINSON BEACH Sampling Date: DEC 1, 2015
Applicant/Owner: CALTRANS State: CA Sampling Point: SP-06
Investigator(s): R. HUDDLESTON Section, Township, Range: 29 01N 07W (MD)
Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): NONE Slope (%): 0-2%
Subregion (LRR): C Lat: 37.899682 Long: -122.643228 Datum: NAD83
Soil Map Unit Name: CRONKHITE-BARNABE COMPLEX NWI classification: NONE
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes ____ No X	

Remarks: BELOW AVE RAINFALL IN 2015

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. SALIX LASIOLEPIS		YES	FACW
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. CORNUS SERICEA (ALBA)		YES	FACW
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 FT)			
1. OENANTHE SARMENTOSA	2%		OBL
2. JUNCUS EFFUSUS	5%	YES	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	7% = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1. RUBUS DISCOLOR	10%		FACW
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: LITTER 95% GROUND COVER AT THIS LOCATION

SOIL

Sampling Point SP-06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	95%	7.5YR 3/4	5%	C	M	SANDY LOAM	

[1]Type C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (If present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): 7/6

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): 7/6

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: SOILS DRY - FLOOD PLAIN AREA, BUT NO EVIDENCE CURRENT HYDROLOGY

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HWY 1 41+870 City/County: STINSON BEACH Sampling Date: DEC 8, 2015

Applicant/Owner: CALTRANS State: CA Sampling Point: SP-08

Investigator(s): R. HUDDLESTON Section, Township, Range: 29 01N 07W (MD)

Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): _____ Slope (%): 0-2

Subregion (LRR): C Lat: 37.899932 Long: -122.643786 Datum: NAD 83

Soil Map Unit Name: CRONKHITE - BARNABE COMPLEX NWI classification: NONE

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: 2015 BELOW AVE RAINFALL - RIPARIAN AREA ADJACENT TO CREEK

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. SALIX LASIOLEPIS		YES	FACW
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5FT)			
1. TROPAEOLUM MAJUS	10	YES	NL
2. EQUISETUM TELMATEIA	2		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	= Total Cover		
Woody Vine Stratum (Plot size: 5FT)			
1. DELAIREA ODORATA	50	YES	NL
2. RUBUS URSINUS / AMERIACUS	2		FACU
	= Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

Sampling Point: SP08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1						SILT LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): 12

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HWY 1 4H870 City/County: STINSON BEACH Sampling Date: DEC 1, 2015
Applicant/Owner: CALTRANS State: CA Sampling Point: SP-07
Investigator(s): R. HADDLESTON Section, Township, Range: 29 01N 07W (MD)
Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): NONE Slope (%): 0-2%
Subregion (LRR): C Lat: 37.899958 Long: -122.643792 Datum: NAD83
Soil Map Unit Name: CRONKHITE-BARNABE COMPLEX NWI classification: NONE
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: BELOW AVE RAINFALL IN 2015 – ROADSIDE VEGETATION

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5FT)			
1. CRAMS PES-CAPRAE	20	YES	NL
2. RAPHANUS SATIVUS	15	YES	NL
3. ~~FESTUCA PERENNES~~			
4. LOLIUM PERENNE	5		FAC
5. CONIUM MACULATUM	5		FACW
6. PASPALUM DILATATUM	5		FAC
7.			
8.			
9.			
10.			
11.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1. RUBUS ARMENICUS	5	YES	FACW
2. RUBUS CALIFORNICUS	5	YES	FAC
	10 = Total Cover		

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: SP-07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2						SANDY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches) _____

Water Table Present? Yes _____ No X Depth (inches) 7/2

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches) 7/2

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Attachment E
Representative Photographs

Photo 1. Overview of pullout location 1, looking east, December 1, 2015

Photo 2. Wetland W-2 located in pullout location 1, looking east, December 1, 2015

Photo 3. Overview of pullout location 2, looking west, November 25, 2015

Photo 4. Wetland Ditch W-1 located in pullout location 2, looking southeast, November 25, 2015

Photo 5. Sample Point SP-01 located in pullout location 2, looking south, November 25, 2015

Photo 6. Overview of pullout location 3, looking west, December 1, 2015

Photo 7. Overview of pullout location 3, looking west, November 25, 2015

Photo 8. View of Easkoot Creek looking east from Calle Del Sierra road, and standing south of pullout location 3 (not in the wetland study area) on November 25, 2015

Photo 9. View of Easkoot Creek looking west from Calle Del Sierra road, and standing south of pullout location 4 (not in the wetland study area) on November 25, 2015

Photo 10. Overview of pullout location 4, looking west, November 25, 2015

Photo 11. Overview of pullout location 4, looking west, November 25, 2015

Photo 10. Riparian vegetation in pullout location 4, looking south, November 25, 2015

Attachment F
Plant Species Observed

Table F-1. Plant Species Observed

Rumble Strip and Shoulder Widening on State Route 1 Project

Scientific Name	Common Name	Wetland Indicator	CT 10/30/2015[1]	CH2M 11/25/2015[2]
Athyrium cyclosorum	Western Lady Fern	FAC		x
Brassica nigra	Black Mustard	NL (UPL)	x	x
Bromus carinatus	California Brome	NL (UPL)		x
Bromus catharticus	Rescuegrass	NL (UPL)		x
Cirsium aruense	Canadian Thistle	FACU		x
Conium maculatum	Poison Hemlock	FACW	x	x
Cornus alba	Red Osier	FACW		x
Cornus sericea	Dogwood	NL (UPL)		x
Cyperus eragrostis	Nutsedge	FACW	x	x
Delairea odorata	Cape Ivy	NL (UPL)	x	x
Ehrharta erecta	Ehrharta	NL (UPL)		x
Epilobium sp.	Willowherb	-		x
Equisetum sp	Horsetail	FAC, FACW, or OBL	x	
Equisetum telmateia	Giant Horsetail	FACW		x
Erigeron sp.	Fleabane	-		x
Festuca californica	California Fescue	FACU		x
Foeniculum vulgare	Fennel	NL (UPL)		x
Fumaria capreolata	Fumitory	NL (UPL)		x
Helminthotheca echioides	Asian Asante	FACU		x
Holcus lanatus	Common Velvet Grass	FAC		x
Juglans hindsii	Northern California Walnut	FAC		x
Juncus (assume FAC or wetter)	Rush	FAC	x	
Juncus bufonius	Toad Rush	FACW		x
Juncus effusus	Lamp Rush	FACW		x
Lolium perenne	Italian Ryegrass	FAC	x	x
Malva nicaeensis	Bull Mallow	NL (UPL)		x
Mimulus guttatus	Seep Monkeyflower	OBL	x	x
Nasturtium officinale	Watercress	OBL		x
Oenanthe sarmentosa	Pacific Water Dropwort	OBL	x	x
Oxalis pes-carpe	Bermuda Buttercup	NL (UPL)		x
Paspalum dilatatum	Golden Crown Grass	FAC		x
Persicaria hydropiperoides	Swamp Smartweed	OBL		x

Table F-1. Plant Species Observed

Rumble Strip and Shoulder Widening on State Route 1 Project

Scientific Name	Common Name	Wetland Indicator	CT 10/30/2015[1]	CH2M 11/25/2015[2]
Plantago lanceolata	English Plantain	FAC		x
Plantago major	Great Plantain	FAC		x
Poa annua	Annual Blue Grass	FACU		x
Polypodium californicum	California Polypody	NL (UPL)		x
Polypogon interruptus	Ditch Rabbit's-Foot Grass	FACW		x
Quercus agrifolia	Coast Live Oak	NL (UPL)		x
Raphanus sativus	Wild Radish	NL (UPL)	x	x
Rubus armeniacus	Himalayan Blackberry	FACU	x	x
Rubus ursinus	California Blackberry	FAC	x	x
Rumex crispus	Curly Dock	FAC	x	x
Salix lasiolepis	Arroyo Willow	FACW	x	x
Solanum americanum	American Black Nightshade	FACU		x
Sonchus oleraceus	Common Sow-Thistle	UPL		x
Stachys ajugoide	Bugle Hedge Nettle	OBL	x	
Symphyotrichum chilense	Pacific American Aster	FAC		x
Tropaeolum majus	Nasturtium	UPL	x	x
Vinca major	Periwinkle	NL (UPL)	x	
Zantedeschia aethiopica	Calla Lilly	OBL		x

Notes:

[1] Species observed during Caltrans' survey on October 30, 2015

[2] Species observed during CH2M HILL survey on November 25, 2015

FAC = Facultative

FACU = Facultative Upland

FACW = Facultative Wet

NL = Not Listed on the National Wetland Plant List

OBL = Obligate

UPL = Upland

United States Department of the Interior

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

In Reply Refer to:
08ESMF00-
2016-F-0830-1

MAY 05 2016

Ms. JoAnn Cullom
California Department of Transportation
Environmental Division, MS-8E
111 Grand Avenue
Oakland, California 94612

Subject: Formal Consultation on the Centerline Rumble-Strip and Shoulder Widening Project, Marin and Napa Counties, California (Caltrans EA 4H870)

Dear Ms. Cullom:

This Biological Opinion (BO) is in response to the California Department of Transportation's (Caltrans) February 9, 2016 request for consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Centerline Rumble-Strip and Shoulder Widening Project in Marin and Napa Counties, California. The proposed project includes installation of a center line rumble strip and shoulder widening for a total of 48 miles of State Route (SR) 1 from the Mill Valley to Valley Ford in Marin County and 0.58 mile on SR 29 in Napa County. The project is intended to address vehicle, bicycle, and pedestrian safety. At issue are the proposed project's effects on the Federally threatened California red-legged frog (*Rana draytonii*). As described in this BO, the effects to the listed frog are limited to a segment of the project on SR 1 within the Community of Stinson Beach in Marin County. This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 et seq.)(Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law on July 6, 2012. Effective October 1, 2012, MAP-21 includes provisions to promote streamlined and accelerated project delivery. Caltrans was approved to participate in the MAP-21 Surface Transportation Project Delivery Program through the National Environmental Policy Act (NEPA) Assignment Memorandum of Understanding (MOU). The MOU allows Caltrans to assume the Federal Highway Administration's (FHWA) responsibilities under NEPA as well as FHWA's consultation and coordination responsibilities under Federal environmental laws for most highway projects in California. Caltrans is exercising this authority as the Federal nexus for section 7 consultation on this project.

This BO is based on: (1) Caltrans January 2016, BA; (2) additional project information provided by Caltrans's on February 26, 2016; and (3) other baseline information regarding the subject species and project location available to the Service.

Consultation History

December 28, 2015	The Service received initial project description information from Caltrans via an electronic-mail (e-mail) message.
December 29, 2015	The Service and Caltrans exchanged e-mail correspondence regarding our review of the initial project description.
December 31, 2015	The Service visited the Stinson Beach area of the proposed project with Caltrans.
February 9, 2016	The Service received Caltrans' February 9, 2015, request for consultation accompanied by a January 2016 BA.
February 12, 2016	The Service sent Caltrans comments regarding our review of their January 2016 BA. The comments were included in an e-mail message and were the functional equivalent of a 30-day letter.
February 26, 2016	The Service received additional project information from Caltrans in response to the Service's February 12, 2016, e-mail message.
February 26, 2016	Caltrans provided the Service additional project description clarification via an e-mail message.

BIOLOGICAL OPINION

Description of the Action

The following project description for the activities associated with the construction of the proposed rumble-strip and shoulder widening and associated restoration activities is adapted from Caltrans' January 2016 BA and additional subsequent information provided by Caltrans.

The proposed project activities will be occurring along a continuous 48-mile length of SR 1 from the Mill Valley to Valley Ford in Marin County and a 0.58 mile length of SR 29 in Napa County. Throughout the action area, SR 1 is a two-lane, undivided road with 10 to 12-foot wide lanes and 0 to 2 foot wide shoulders. According to Caltrans' assessment, potential effects to listed species are limited to a 0.24-mile segment of the larger project along SR 1 within the Stinson Beach Community in Marin County. Caltrans refers to this Stinson Beach segment as "Location 7".

Key components of the overall proposed project are summarized as follows.

Staging
Staging, including material stockpiles and vehicle parking, will be limited to previously disturbed areas, currently occupied by pavement or gravel.

Rumble Strip Installation
Equipment working within the existing paved area of the road will be used to grind groves into the centerline to create a tire vibration upon contact. The machine used to grind the groves is immediately followed by a sweeper that removes debris and cleans the roadway. Waste material is then hauled away. Afterwards, a fresh painted centerline stripe will be applied

Shoulder Widening
The existing shoulder widths along the 48 mile project vary. The proposed project will include the addition of 4 foot wide shoulders at 40 different locations on either side of the roadway. All but one of the locations, Location 7, is currently occupied by pavement, gravel, or hard-packed soil.

Shoulder construction includes a 14-inch depth excavation followed by the addition of base fill and pavement. The shoulder will be designed to promote proper drainage.

Vegetation Removal and Restoration
Vegetation within the shoulder widening will be permanently removed. Vegetation will be cleared only where necessary and will be cut above soil level in the surrounding area needed for temporary workspace. The intent is to promote the plants' ability to reproduce vegetatively or resprout following construction. All clearing and trimming of woody vegetation will occur by hand. All cleared vegetation will be removed from the project footprint to prevent attracting animals to the project site. The contractor will be responsible for obtaining all permits, licenses, and environmental clearances for properly disposing of such materials. Temporarily disturbed areas with vegetative ground cover will be reseeded with native grasses and shrubs to stabilize the soil and prevent erosion. Where disturbance includes the removal of woody shrubs, native species will be replanted based on local species composition.

Activities for Location 7
The Location 7 activities are located within a 0.24-mile length of SR 1 in Stinson Beach, roughly between post miles 12.6 and 12.8. Except for breaks at intersections, a rumble strip will be installed for the length of the centerline and 4-foot wide road shoulder pullouts will be added to the west side of the roadway, between the intersections. The intersection breaks divide the shoulder pullouts into four segments, comprising approximately 958 linear feet of widening. Widening will involve removal of ground cover vegetation and woody vegetation prior to the described excavation work. The affected west shoulder currently experiences seasonal flooding. Therefore, the new shoulder, shoulder backing, and associated drainage ditch will be designed to direct water away from the roadway.

Caltrans anticipates that the activities at Location 7 will take approximately 160 days to complete.

Conservation Measures
Caltrans proposes to reduce adverse effects to the California red-legged frog, birds, and other wildlife and their habitats by implementing the following measures. Measures associated with avoidance and minimization of effects to the California red-legged frog are specific to the proposed activities within Location 7.

1. The names and qualifications of the proposed Biological Monitor(s) will be submitted to Service for approval at least 30 calendar days prior to start of construction. The Biologist(s) will submit a letter to the Service verifying that they possess a copy of the BO and understand the *Terms and Conditions.*

2. The Service-approved Biological Monitor(s) will be onsite during all work that could reasonably result in a take of California red-legged frog, including all ground disturbance, and will keep a copy of the BO in their possession when onsite.

3. The Biological Monitor(s) will have the authority to stop work that may result in the unauthorized take of the California red-legged frog through communication with the

Resident Engineer. If the Biological Monitor(s) exercises this authority, the Service will be notified by telephone and e-mail within one (1) working day.

4. At least 30 calendar days prior to groundbreaking, the Resident Engineer's name and telephone number will be provided to the Service, The Resident Engineer will send a letter to the Service verifying that they possess a copy of the BO and understand the *Terms and Conditions.*

5. The Resident Engineer will maintain a copy of the BO onsite whenever construction is taking place.

6. The work limits at Location 7 will be identified with high visibility fencing, flagging, or other barrier. Limits will also be defined near other environmentally sensitive locations, such as nest sites. The features used to identify work boundaries will be removed at the end of construction.

7. Caltrans has limited the area available for project staging in order to restrict worker access to California red-legged frog habitat and the associated risks to the listed frog. As a result, no staging will be allowed between SR 1 post miles 50.1-50.2, 46.4-47.9, 15.2-30.7, and 4.7-6.9 as shown in Figure 3 of the January 2016 BA.

8. Construction personnel will attend a mandatory environmental education program delivered by the Service-approved biologist prior to any work, vegetation clearing, or construction activities at Location 7. The program will focus on the conservation measures that are relevant to an employee's personal responsibility and will include an explanation as how to best avoid take of California red-legged frog. At a minimum, the training will include a description of the California red-legged frog and how they may be encountered within the action area; their status and protection; and the relevant *Conservation Measures* and *Terms and Conditions* of the BO. A fact sheet conveying this information will be prepared and distributed to all construction and project personnel. Distributed materials will include cards with a distinctive California red-legged frog photograph, compliance reminders, and relevant contact information. As needed, training will be conducted in Spanish for Spanish-language speakers. Documentation of the training, including sign-in sheets, will be kept on file and available to the Service on request. An outline of the program will be submitted to the Service at least 20 working days prior to the first training session.

9. To the extent practicable, ground-disturbing construction activities at Location 7 will be limited to between May and October.

10. To the extent practicable, nighttime construction will be minimized at Location 7.

11. Pre-construction surveys will be conducted by a Service-approved Biological Monitor(s) for California red-legged frog no more than 30 calendar days prior to ground disturbance at Location 7, and will include areas within 50 feet of the project limits when possible. Native vertebrates found in cover sites will be documented and relocated. Entrances or refuge features will be collapsed or removed following investigation.

12. The Service-approved Biological Monitor(s) will perform a California red-legged frog clearance survey immediately prior to initial ground disturbance at sensitive locations. Safety

permitting, the Biological Monitor will investigate areas of disturbed soil for signs of the California red-legged frog within 30 minutes following initial disturbance of that given area.

13. If a California red-legged frog gains access to a construction zone, work will be halted immediately within 50 feet until the animal leaves the site or is removed by the Service-approved Biological Monitor.

14. Steep-walled holes or trenches equal or more than 1 foot deep will either be covered at the close of each working day or outfitted with escape ramps. Alternatively, an additional 4-foot-high vertical barrier, independent of exclusionary fences, will be used to further prevent the inadvertent entrapment of California red-legged frog. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. California red-legged frogs and other wildlife found in excavations will be captured and relocated.

15. Pre-construction nesting surveys will be performed along with nest monitoring and establishment of resource agency recommended buffers by a qualified biologist during the typical bird nesting season (February 1 through August 31).

16. Materials and equipment left onsite overnight will be inspected by the Service-approved Biologist(s) prior to the beginning of each day's activities.

17. The Service-approved Biological Monitor(s) will inspect the Location 7 project site within one (1) week prior to a forecasted rain event to ensure that adequate storm-water Best Management Practices (BMPs) are properly installed. The Biological Monitor will also inspect the site during and/or within two (2) calendar days following the onset of a rain event to ensure that restarting activities would not result in harm to California red-legged frog and their habitat.

18. Construction activities will be limited to vehicle and equipment operation within Caltrans right-of-way unless otherwise noted.

19. To eliminate an attraction to predators of the California red-legged frog, all food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in closed containers and removed at least once a day from the project site.

20. No firearms will be allowed on the project site except for those carried by authorized security personnel or local, state, or Federal law enforcement officials.

21. No pets will be allowed on the project site.

22. Plastic monofilament netting (erosion control matting) or similar material will not be used at the project site because California red-legged frog may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

23. Erosion control measures will include silt fencing and fiber rolls.

24. Waste management measures will be implemented to avoid fuel spills and properly dispose of excess concrete, soil, or other materials.

25. All grindings and asphaltic concrete waste will be stored within previously disturbed areas absent of habitat and at a minimum of 150 feet from any culvert or drainage feature.

26. Caltrans standard BMPs will be implemented to control erosion and sedimentation during construction and post-construction. These are required by Caltrans' statewide National Pollutant Discharge Elimination System permit, which also includes measures for stormwater management.

27. Noxious weeds will be controlled in accordance with Caltrans Highway Design Manual Topic 110.5 "Control of Noxious Weeds—Exotic and Invasive Species," Executive Order 13112 (Invasive Species), and by methods approved by Caltrans' landscape architect or vegetation control specialist.

28. Temporarily affected areas where vegetation is to be removed, will be re-vegetated (e.g., hydro-seeding) with locally appropriate native plant species. Narrow leaved milkweed (*Asclepias fasciularius*) and/or showy milkweed (*A. speciosa*) will be added to the seed mix to enhance habitat for the monarch butterfly.

29. Caltrans will submit a post-construction compliance report to the Sacramento Fish and Wildlife Office within 60 calendar days following construction at Location 7 or within 60 calendar days of any break in construction activity lasting more than 60 days calendar days. This report will detail (1) dates that construction occurred; (2) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (3) an explanation of failure to meet such measures, if any; (4) known project effects on the California red-legged frog, if any; (5) occurrences of incidental take; (6) documentation of employee environmental education; and (7) other pertinent information.

Action Area

An 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." For the purposes of the effects assessment, the action area for the entire project encompasses 138.89-acres. This area consists of 135.83 acres of existing pavement and 2.47 acres of existing gravel shoulder. Caltrans estimates that there is approximately 0.25 acre of California red-legged frog habitat within the action area, which is limited to Location 7.

Analytical Framework for the Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this BO relies on four components: (1) the *Status of the Species*, which evaluates California red-legged frog range-wide conditions, the factors responsible for those conditions, and the species' survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the listed species in the action area, the factors responsible for those conditions, and the relationship of the action area to the survival and recovery of the California red-legged frog; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the California red-legged frog; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the listed species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the California red-legged frog's current

status, taking into account any cumulative effects, to determine if implementation of the action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

The jeopardy analysis in this BO places an emphasis on consideration of the range-wide survival and recovery needs of the California red-legged frog and the role of the action area in the survival and recovery of this 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 the Species

Listing Status
The California red-legged frog was listed as a threatened species on May 23, 1996 (Service 1996). Critical habitat was re-designated for this species on March 17, 2010 (Service 2010). A recovery plan was published for the California red-legged frog on September 12, 2002 (Service 2002).

Description
The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background. Dorsal spots usually have light centers (Stebbins 2003), and dorsolateral folds are prominent on the back. California red-legged frogs have paired vocal sacs and vocalize in air (Hayes and Krempels 1986). Larvae (tadpoles) range from 0.6 to 3.1 inches in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

Distribution
The historic range of the red-legged frog extended coastally from the vicinity of Elk Creek in Mendocino County, California, and inland from the vicinity of Redding, Shasta County, California, southward to northwestern Baja California, Mexico (Jennings and Hayes 1985; Hayes and Krempels 1986; Fellers 2005). The red-legged frog was historically documented in 46 California counties but the taxon now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2002). California red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the Central Coast. Within the remaining distribution of the species, only isolated populations have been documented in the Sierra Nevada, northern Coast Range, northern Transverse Ranges, southern Transverse Ranges, and Peninsular Ranges.

Status and Natural History
California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and man-made ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 feet in elevation (Jennings and Hayes 1994, Bulger *et al.* 2003, Stebbins 2003). However, California red-legged frogs also have been found in ephemeral creeks and drainages and in ponds that may or may not have riparian vegetation. California red-legged frogs also can be found in disturbed areas such as channelized creeks and drainage ditches in urban and agricultural areas. For example, an adult California red-legged frog was observed in a shallow isolated pool on North Slough Creek in the American Canyon area of Napa County (C. Gaber, PG&E, pers. comm., 2008). This frog location was surrounded by vineyard development. Another adult California red-legged frog was observed under debris in an unpaved parking lot in a heavily industrial area of Burlingame

(P. Kobernus, Coast Ridge Ecology, pers. comm., 2008). This frog was likely utilizing a nearby drainage ditch. Caltrans also has discovered California red-legged frog adults, tadpoles, and egg masses within a storm drainage system within a major cloverleaf intersection of Millbrae Avenue and SR 101 in a heavily developed area of San Mateo County (Caltrans 2007). California red-legged frog has the potential to persist in disturbed areas as long as those locations provide at least one or more of their life history requirements.

California red-legged frogs typically breed between November and April in still or slow-moving water at least 2.5 feet in depth with emergent vegetation, such as cattails, tules or overhanging willows (Hayes and Jennings 1988). There are earlier breeding records from the southern portion of their range (Storer 1925). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or near the surface of the water (Hayes and Miyamoto 1984). Individuals occurring in coastal areas are active year-round (Jennings *et al.* 1992), whereas those found in interior sites are normally less active during the cold and dry seasons.

During other parts of the year, habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer (Fellers 2005). According to Fellers (2005), this can include vegetated areas with coyote brush, California blackberry thickets, and root masses associated with willow and California bay trees. Sometimes the non-breeding habitat used by California red-legged frogs is extremely limited in size. For example, non-breeding California red-legged frogs have been found in a 6-foot wide coyote brush thicket growing along a small intermittent creek surrounded by heavily grazed grassland (Fellers 2005). Sheltering habitat for California red-legged frogs is potentially all aquatic, riparian, and upland areas within the range of the species and includes any landscape features that provide cover, such as existing animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned structures, or hay stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adult frogs are often associated with permanent bodies of water. Some frogs remain at breeding sites all year while others disperse. Dispersal distances are typically less than 0.5 mile, with other individuals moving up to 1-2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

In a study of California red-legged frog terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger *et al.* (2003) categorized terrestrial use as migratory and non-migratory. The latter occurred over one to several days and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger *et al.* (2003) reported that non-migrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time and were most often associated with dense vegetative cover, *i.e.* California blackberry, poison oak and coyote brush. Dispersing frogs in northern Santa Cruz County traveled distances from 0.25-mile to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003).

In a study of California red-legged frog terrestrial activity in a xeric environment, Tatarian (2008) noted that 57 percent of frogs fitted with radio transmitters in the Round Valley study area in

eastern Contra Costa County stayed at their breeding pools, whereas 43 percent moved into adjacent upland habitat or to other aquatic sites. This study reported a peak of seasonal terrestrial movement occurring in the fall months, with movement commencing with the first 0.2 inch of precipitation. Movements away from the source pools tapered off into spring. Upland movement activities ranged from 3 to 233 feet, averaging 80 feet, and were associated with a variety of refugia including grass thatch, crevices, cow hoof prints, ground squirrel burrows at the bases of trees or rocks, logs, and a downed barn door; others were associated with upland sites lacking refugia (Tatarian 2008). The majority of terrestrial movements lasted from 1-4 days; however, an adult female was reported to remain in upland habitat for 50 days (Tatarian 2008). Uplands closer to aquatic sites were used more often and frog refugia were more commonly associated with areas exhibiting higher object cover (*e.g.*, woody debris, rocks, and vegetative cover). Subterranean cover was not significantly different between occupied upland habitat and non-occupied upland habitat.

California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Egg masses containing 2,000-5,000 eggs are attached to vegetation below the surface and hatch after 6-14 days (Storer 1925, Jennings and Hayes 1994). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand results in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3.5-7 months following hatching and reach sexual maturity at 2-3 years of age (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1985, 1990, 1994). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). Sexual maturity normally is reached at 3-4 years of age (Storer 1925; Jennings and Hayes 1985). California red-legged frogs may live 8-10 years (Jennings *et al.* 1992). Populations of California red-legged frogs fluctuate from year to year. When conditions are favorable California red-legged frogs can experience extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, California red-legged frogs may temporarily disappear from an area when conditions are stressful (*e.g.*, drought).

California red-legged frogs have a diverse diet which changes as they mature. The diet of larval California red-legged frogs is not well studied, but is likely similar to that of other ranid frogs, which feed on algae, diatoms, and detritus by grazing on the surfaces of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b, 1997). Hayes and Tennant (1985) analyzed the diets of California red-legged frogs from Cañada de la Gaviota in Santa Barbara County during the winter of 1981 and found invertebrates (comprising 42 taxa) to be the most common prey item consumed; however, they speculated that this was opportunistic and varied based on prey availability. They ascertained that larger frogs consumed larger prey and were recorded to have preyed on Pacific tree frogs, three-spined stickleback and to a limited extent, California mice, which were abundant at the study site (Hayes and Tennant 1985, Fellers 2005). Although larger vertebrate prey was consumed less frequently, it represented over half of the prey mass eaten by larger frogs suggesting that such prey may play an energetically important role in their diets (Hayes and Tennant 1985). Juvenile and subadult/adult frogs varied in their feeding activity periods; juveniles fed for longer periods throughout the day and night, while subadult/adults fed nocturnally (Hayes and Tennant 1985). Juveniles were significantly less successful at capturing prey and all life history stages exhibited poor prey discrimination; feeding on several inanimate objects that moved through their field of view (Hayes and Tennant 1985).

Metapopulation and Patch Dynamics

The direction and type of habitat used by dispersing animals is especially important in fragmented environments (Forys and Humphrey 1996). Models of habitat patch geometry predict that individual animals will exit patches at more "permeable" areas (Buechner 1987; Stamps *et al.* 1987). A landscape corridor may increase the patch-edge permeability by extending patch habitat (La Polla and Barrett 1993), and allow individuals to move from one patch to another. The geometric and habitat features that constitute a "corridor" must be determined from the perspective of the animal (Forys and Humphrey 1996).

Because their habitats have been fragmented, many endangered and threatened species exist as metapopulations (Verboom and Apeldom 1990; Verboom *et al.* 1991). A metapopulation is a collection of spatially discrete subpopulations that are connected by the dispersal movements of the individuals (Levins 1970; Hanski 1991). For metapopulations of listed species, a prerequisite to recovery is determining if unoccupied habitat patches are vacant due to the attributes of the habitat patch (food, cover, and patch area) or due to patch context (distance of the patch to other patches and distance of the patch to other features). Subpopulations of patches with higher quality food and cover are more likely to persist because they can support more individuals. Large populations have less of a chance of extinction due to stochastic events (Gilpin and Soule 1986). Similarly, small patches will support fewer individuals, increasing the rate of extinction. Patches that are near occupied patches are more likely to be recolonized when local extinction occurs and may benefit from emigration of individuals via the "rescue" effect (Hanski 1982; Fahrig and Merriam 1985; Gotelli 1991; Holt 1993). For the metapopulation to persist, the rate of patches being colonized must exceed the rate of patches going extinct (Levins 1970). If some subpopulations go extinct regardless of patch context, recovery actions should be placed on patch attributes. Patches could be managed to increase the availability of food and/or cover.

Movements and dispersal corridors likely are critical to California red-legged frog population dynamics, particularly because the animals likely currently persist as metapopulations with disjunct population centers. Movement and dispersal corridors are important for alleviating over-crowding and intraspecific competition, and also they are important for facilitating the recolonization of areas where the animal has been extirpated. Movement between population centers maintains gene flow and reduced genetic isolation. Genetically isolated populations are at greater risk of deleterious genetic effects such as inbreeding, genetic drift, and founder effects. The survival of wildlife species in fragmented habitats may ultimately depend on their ability to move among patches to access necessary resources, retain genetic diversity, and maintain reproductive capacity within populations (Petit *et al.* 1995; Buza *et al.* 2000; Hilty and Merenlender 2004).

Most metapopulation or metapopulation-like models of patchy populations do not directly include the effects of dispersal mortality on population dynamics (Hanski 1994; With and Crist 1995; Lindenmayer and Possingham 1996). Based on these models, it has become a widely held notion that more vagile species have a higher tolerance to habitat loss and fragmentation than less vagile species. But models that include dispersal mortality predict the opposite: more vagile species should be more vulnerable to habitat loss and fragmentation because they are more susceptible to dispersal mortality (Fahrig 1998; Casagrandi and Gatto 1999). This prediction is supported by Gibbs (1998), who examined the presence-absence of five amphibian species across a gradient of habitat loss. He found that species with low dispersal rates are better able than more vagile species to persist in landscapes with low habitat cover. Gibbs (1998) postulated that the land between habitats serves as a demographic "drain" for many amphibians. Furthermore, Bonnet *et al.* (1999) found that snake species that use frequent long-distance movements have higher mortality rates than do sedentary species.

Threats

Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the red-legged frog throughout its range. Several researchers in central California have noted the decline and eventual local disappearance of California and northern California red-legged frogs (*Rana aurora*) in systems supporting bullfrogs (Jennings and Hayes 1990; Twedt 1993), red swamp crayfish, signal crayfish, and several species of warm water fish including sunfish, goldfish, common carp, and mosquitofish (Moyle 1976, Barry 1992, Hunt 1993, Fisher and Schaffer 1996). This has been attributed to predation, competition, and reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern California red-legged frogs, and suggested that bullfrogs could prey on subadult northern California red-legged frogs as well. Bullfrogs may also have a competitive advantage over California red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Furthermore, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with red-legged frog reproduction. Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat. Both California and northern California red-legged frogs have also been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990; Jennings 1993; Twedt 1993).

The urbanization of land within and adjacent to red-legged frog habitat has also adversely affected California red-legged frogs. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks red-legged frog dispersal, and the introduction of predatory fishes and bullfrogs.

Diseases may also pose a significant threat though the specific effects of diseases on the California red-legged frog are not known. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Chytridiomycosis and ranaviruses are a potential threat to the red-legged frog because these diseases have been found to adversely affect other amphibians, including the listed species (Davidson *et al.* 2003; Lips *et al.* 2003). Non-native species, such as bullfrogs and non-native tiger salamanders that live within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner *et al.* 2005). Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (*i.e.*, contaminated boots or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in the listed species being more susceptible to the effects of disease. Disease will likely become a growing threat because of the relatively small and fragmented remaining California red-legged frog breeding sites, the many stresses on these sites due to habitat losses and alterations, and the many other potential disease-enhancing anthropogenic changes that have occurred both inside and outside the species' range.

Negative effects to wildlife populations from roads and pavement may extend some distance from the actual road. The phenomenon can result from any of the effects already described in this BO, such as vehicle-related mortality, habitat degradation, and invasive exotic species. Forman and Deblinger (1998, 2000) described the area affected as the "road effect" zone. Along a 4-lane road in Massachusetts, they determined that this zone extend for an average of approximately 980 feet to either side of the road for an average total zone width of approximately 1,970 feet. They describe the boundaries of this zone as asymmetric and in some areas diminished wildlife use attributed to road effects was detected greater than 0.6 mile from Massachusetts Route 2. The "road-zone" effect can also be subtle. Van der Zande *et al.* (1980) reported that lapwings and black-tailed godwits feeding at 1,575-6,560 feet from roads were disturbed by passing vehicles. The heart rate, metabolic rate and

energy expenditure of female bighorn sheep increase near roads (MacArthur *et al.* 1979). Trombulak and Frissell (2000) described another type of "road-zone' effect due to contaminants. Heavy metal concentrations from vehicle exhaust were greatest within 66 feet of roads, but elevated levels of metals in both soil and plants were detected at 660 feet of roads. The "road-zone" apparently varies with habitat type and traffic volume. Based on responses by birds, Forman (2000) estimated the effect zone along primary roads of 1,000 feet in woodlands, 1,197 feet in grasslands, and 2,657 feet in natural lands near urban areas. Along secondary roads with lower traffic volumes, the effect zone was 656 feet. The "road-zone" effect with regard to California red-legged frogs has not been adequately investigated.

The necessity of moving between multiple habitats and breeding ponds means that many amphibian species, such as the California red-legged frog, are especially vulnerable to roads and well-used large paved areas in the landscape. Van Gelder (1973) and Cooke (1995) have examined the effect of roads on amphibians and found that because of their activity patterns, population structure, and preferred habitats, aquatic breeding amphibians are more vulnerable to traffic mortality than some other species. Large, high-volume highways pose a nearly impenetrable barrier to amphibians and result in mortality to individual animals as well as significantly fragmenting habitat. Hels and Buchwald (2001) found that mortality rates for anurans on high traffic roads are higher than on low traffic roads. Vos and Chardon (1998) found a significant negative effect of road density on the occupation probability of ponds by the moor frog (*Rana arvalis*) in the Netherlands. In addition, incidents of very large numbers of road-killed frogs are well documented (*e.g.*, Ashley and Robinson 1996), and studies have shown strong population level effects of traffic density (Carr and Fahrig 2001) and high traffic roads on these amphibians (Van Gelder 1973; Vos and Chardon 1998). Most studies regularly count road kills from slow moving vehicles (Hansen 1982; Rosen and Lowe 1994; Drews 1995; Mallick *et al.* 1998) or by foot (Munguira and Thomas 1992). These studies assume that every victim is observed, which may be true for large conspicuous mammals, but it certainly is not true for small animals, such as the California red-legged frog. Amphibians appear especially vulnerable to traffic mortality because they readily attempt to cross roads, are slow-moving and small, and thus cannot easily be avoided by drivers (Carr and Fahrig 2001).

Environmental Baseline

The action area is located within the range of the California red-legged frog. A map depicting the species' range is included in the Service's online profile for the species at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=D02D.

This BO focuses on the actions occurring within Location 7. Location 7 is within California Red-Legged Frog Recovery Unit 3 (North Coast and North San Francisco Bay) and within the Point Reyes Peninsula Core Area (Service 2002). The conservation needs for this core area are: (1) protect existing populations; (2) control bullfrogs; (3) continue genetics research on *R. aurora* and *R. draytonii*; and (4) manage livestock and horse corrals to prevent nutrient loading problems.

Stinson Beach is a small and low density community whose current development and activities do not preclude California red-legged frog occupation or present an impassable constructed barrier to California red-legged frog movement between resource areas. The urban growth of the Stinson Beach community has long been restricted to its current boundary by rugged topography, surrounding Golden Gate National Recreation Area public land, and restrictive zoning.

SR 1 and the Stinson Beach community winds through a narrow path that is situated between the base of the coastal mountains and the Pacific Ocean. As rugged land meets sea, a variety of habitat

types converge. Ocean, beach, estuary, tidally influenced streams, fresh and brackish wetlands, riparian, redwood, coastal scrub, and coastal prairie, can all be found in the vicinity with a mix of non-native vegetation, such as eucalyptus and other landscape vegetation. The road widening in Location 7 will encroach upon forest, wetland, and dense riparian/marsh scrub vegetation. According to Caltrans, a narrow groundwater depression wetland feature parallels the existing road shoulder along the northern half of the proposed widening. This wetland is likely the result of past flood control grading which involved the placement of elevated fill between Easkoot Creek and SR 1 (NPS 2003). The new shoulder will encroach upon 0.14 acre of this wetland and the new shoulder backing and associated drainage will be in contact with the wetland. Easkoot Creek also runs parallel to SR 1 immediately west of the wetland feature. Easkoot is a small perennial stream that empties into Bolinas Lagoon to the north. The lower reach of the creek backs up during high tide, historically resulting in flooding that reaches the project footprint. Along its length, the proposed road widening areas vary between 30 and 60 feet from the creek. In an effort to restore salmonid habitat, a fish passage project has been completed in the vicinity and a watershed restoration plan has been proposed (NPS 2003).

Caltrans did not conduct protocol California red-legged frog surveys to support their January 2016 BA but the species is known to occupy similar habitat throughout the local coastal area. The CNDDB includes records of the listed frog in the community of Muir Beach, approximately 4.4 miles south of the action area (CDFW 2016a & b, occurrences 104 and 971) and another cluster of records between 3 and 4.2 miles to the north (CDFW 2016a & b, occurrences 1051, 1050, 1127, and 977). These records include variety of situations including breeding activity, co-occurrence with bullfrogs, and frogs within a roadside drainage.

It is likely that the California red-legged frog population along SR 1 in Marin County has been subject to a long history of road mortality. There are no discernable barriers to prevent California red-legged frogs from entering the existing SR 1 roadway and compared to other locations within the Bay Area; traffic volumes are relatively low through the action area. This local travel corridor does not service commuter or business traffic between major residential or business areas. The corridor remains a two-lane highway utilized primarily by the small local population and tourists. According to the traffic data on Caltrans' website, the annual average daily traffic in the proposed project vicinity on SR 1 (monitored at the post mile 12.21) has increased approximately 18 percent between 1993 and 2014 (http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm). Traffic volume and congestion has not increased commensurate with the other highway corridors in the San Francisco Bay Area over the same 21 year period. In addition, traffic volumes do not remain consistently high from day to day or on rainy nights when frogs are more likely to be moving across the roadway. Although road mortality is a threat to the California red-legged frog on SR 1, baseline conditions represent a relatively moderate risk.

There are street and business lights in the action area. California red-legged frogs are most active at night and artificial night lighting may affect their behaviors and their ability to avoid detection when moving.

The Service believes that the California red-legged frog is reasonably certain to occur within the action area due to: (1) the project being located within the species' range and current distribution; (2) suitable aquatic and upland habitat for forage and cover are located within the action area; (3) the ability of the California red-legged frog to move a considerable distance; and (4) the biology and ecology of the animal.

Effects of the Action

The direct effects of the proposed project are those effects occurring within the action area during construction of the proposed project. Direct effects may be temporary (lasting less than 1 year) or permanent (lasting more than 1 year). Indirect effects are the effects of the proposed project generally occurring later in time after construction has been completed (*e.g.*, degradation of habitat due to the spread of invasive plant species; barriers to dispersal due to the installation of retaining walls). An interrelated activity is an activity that is part of the proposed project and depends on the proposed project for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation.

According to the information provided by Caltrans in their January 2016 BA and their February 26, 2016 e-mail message, the project will include 0.245-acre of ground disturbance activities in California red-legged frog habitat, of which 0.234-acre will involve the permanent loss of baseline habitat value. The 0.245-acre area is located immediately adjacent to the existing SR 1 road shoulder and is occupied by a wetland with dense ground cover vegetation.

Adult and juvenile frogs could be found throughout the Location 7 work area which will be subject to staging, access, and ground disturbance. Frogs may be in above or underground refugia or moving through the landscape.

Vegetation removal, personnel and equipment access, and ground disturbance within this 0.245-acre area may result in exposure, stranding, crushing, entombing, maiming, or otherwise harassing or harming of California red-legged frogs. The conversion of wetland habitat to hardscape and compacted road shoulder will result in the loss of cover and forage habitat.

Activities throughout Location 7, including noise, vibration, and increased human activity will be disruptive and may result in California red-legged frogs avoiding the action area, therefore modifying their behavior and creating a barrier to resources. This disruption may also result in California red-legged frogs taking cover rather than fleeing potential harm. This will make them more difficult to find, avoid, and rescue from harm's way.

Caltrans proposes to minimize adverse effects related to the proposed project by implementing the *Conservation Measures* included in the *Description of the Action* section of this BO. Effective implementation of the *Conservation Measures* will likely minimize but not prevent adverse effects to the California red-legged frog.

Educating project personnel will encourage compliance with the conservation measures and increase the possibility that California red-legged frogs in the work area will be identified and addressed appropriately for avoidance. Worker education is limited by the effectiveness of the presentation and the willingness of the construction personnel to participate in compliance.

Pre-construction surveys by a Service-approved biologist will assist in clearing California red-legged frogs from the work area prior to initial vegetation clearing and ground disturbance. Biological clearance of work areas prior to the start of each day's work by the Service-approved biologist during construction will increase the chances of identifying frogs in the work area that would be susceptible to injury. Biological clearance of work areas is limited by the experience of the biologist, the complexity and abundance of potential cover sites, the small size and inconspicuous nature of the species, and the challenges of completing a thorough clearance given the construction schedule. Clearance and overall implementation of the conservation measures may be the responsibility of a

non-Service approved designee in times when activities other than vegetation clearing or ground disturbance are taking place. In addition to the discussed factors limiting personal abilities to identify frogs in harms' way, the effectiveness of the designee will depend upon their commitment to ensuring compliance.

Despite being "cleared" prior to construction, California red-legged frogs can continue to move into the work site undetected. The project is located adjacent to upland and aquatic habitat that likely supports California red-legged frogs. Frogs may be actively moving around, through, or within the work area during the evening as well as during the day. This places greater emphasis on thorough biological clearance of work areas and under staged equipment and materials prior to the start of each day's activities.

Frogs occupying excavations may be unable to escape and be killed due to predation, desiccation, entombment, or starvation. This risk will be minimized with monitoring and the installation of escape ramps. Proper trash disposal is often difficult to enforce and is a common non-compliance issue. Improperly disposed edible trash could attract predators, such as raccoons, crows, and ravens, to the site, which could subsequently prey on the listed herpetofauna.

If unrestricted, biologists and construction workers traveling to the action area from other project sites may transmit diseases by introducing contaminated equipment. The chance of a disease being introduced into a new area is greater today than in the past due to the increasing occurrences of disease throughout amphibian populations in California and the United States. It is possible that chytridiomycosis, caused by chytrid fungus, may exacerbate the effects of other diseases on amphibians or increase the sensitivity of the amphibian to environmental changes (*e.g.*, water pH) that reduce normal immune response capabilities (Bosch *et al.* 2001, Weldon *et al.* 2004).

Discovery, capture, and relocation of individual California red-legged frogs may avoid injury or mortality due to construction activities; however, capturing and handling animals may result in stress and/or inadvertent injury during handling, containment, and transport. Nearby release of captured frogs within the Easkoot Creek riparian corridor should avoid significant adverse effects often associated with displacement.

California red-legged frogs and their prey could also be affected by contamination due to chemical or sediment discharge. Exposure pathways could include inhalation, dermal contact, direct ingestion, or secondary ingestion of contaminated soil, plants or prey species. Exposure to contaminants could cause short- or long-term morbidity, possibly resulting in reduced productivity or mortality. However, Caltrans proposes to reduce these risks by implementing BMPs that consist of refueling, oiling, or cleaning of vehicles and equipment a minimum of 50 feet from drainages; installing coir rolls, straw wattles and/or silt fencing to capture sediment and prevent runoff or other harmful chemicals from entering the aquatic habitat; and locating staging, storage and parking areas away from drainages.

Caltrans' commitment to use erosion control devices other than mono-filament should be effective in avoiding the associated risk of entrapment that can result in death by predation, starvation, or desiccation (Stuart *et al.* 2001).

The completed project will not enable increased vehicle speeds or traffic capacity and will not result in the addition of barriers to frog movement. Therefore completion of the project is not expected to result in an increased risk of animal-vehicle collision risk or movement barrier for the California red-legged frog.

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 BO. Future Federal actions that are unrelated to the Centerline Rumble-Strip and Shoulder Widening Project are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service is not aware of specific projects that might affect listed species in the action area that are currently under review by State, county, or local authorities.

Conclusion

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area, and the effects of the proposed action, and the cumulative effects on the species, it is the Service's biological opinion that the Centerline Rumble-Strip and Shoulder Widening Project, as described herein, is not likely to jeopardize the continued existence of the California red-legged frog. We base this conclusion on the following: (1) successful implementation of the described *Conservation Measures* is likely to reduce the potential for proposed construction activities to result in the disruption of normal California red-legged frog behavior or risk of injury; (2) within California red-legged frog habitat, the project is small in scope and size, and short in duration; (3) habitat loss will be limited to small area paralleling and immediately adjacent to the existing road shoulder; and (4) the project is not expected to result in the addition of movement barriers or increased risk of road mortality.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed animals by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this *Incidental Take Statement.*

The measures described below are non-discretionary, and must be implemented by Caltrans so that they become binding conditions of any grant or permit issued to Caltrans as appropriate, in order for the exemption in section 7(o)(2) to apply. Caltrans has a continuing duty to regulate the activity covered by this *Incidental Take Statement.* If Caltrans (1) fails to assume and implement the *Terms and Conditions* or (2) fails to adhere to the *Terms and Conditions* of the *Incidental Take Statement* through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Caltrans must report the progress of the action and its impact on the species to the Service as specified in the *Incidental Take Statement* [50 CFR §402.14(i)(3)].

Amount or Extent of Take

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect due to their small size, wariness, and cryptic nature. Finding an injured or dead California red-legged frog is unlikely due to their relatively small body size, rapid carcass deterioration, and likelihood that the remains will be removed by a scavenger or indistinguishable amongst the disturbed soil and debris. Losses of this species may also be difficult to quantify due to a lack of baseline survey data and seasonal/annual fluctuations in their numbers due to environmental or human-caused disturbances. There is a risk of harm, harassment, injury and mortality as a result of the proposed construction activities, ground disturbance of upland habitat, and capture and relocation efforts; therefore, the Service is authorizing take incidental to the proposed action as: (1) the harassment and capture of all California red-legged frogs within the action area; and (2) the injury or mortality of no more than one adult or juvenile California red-legged frog.

Upon implementation of the following *Reasonable and Prudent Measures*, the incidental take of California red-legged frogs within the action area in proportion to the amount and type of take outlined above will become exempt from the prohibitions described under section 9 of the Act. No other forms of take are exempted under this opinion.

Effect of the Take

The Service has determined that this level of anticipated take for the California red-legged frog is not likely to jeopardize the continued existence of the species.

Reasonable and Prudent Measure

The Service has determined that the following reasonable and prudent measure is necessary and appropriate to minimize the effect of the action on the California red-legged frog. Caltrans will be responsible for the implementation and compliance with this measure:

1. Minimize the adverse effects to the California red-legged frog and its habitat in the action area by implementing their proposed project, including the conservation measures as described, with the following terms and conditions.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Caltrans must comply with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1. The following *Terms and Conditions* implement *Reasonable and Prudent Measure* one (1):

    a. Caltrans shall include language in their contracts that expressly requires contractors and subcontractors to work within the boundaries of the project footprint identified in this BO, including staging and access.

    b. If requested, before, during, or upon completion of groundbreaking and construction activities, Caltrans shall allow access by Service personnel into the project footprint to inspect the project and its activities.

c. Each California red-legged frog encounter shall be treated on a case-by-case basis in coordination with the Service but general guidance is as follows: (1) leave the non-injured animal if it is not in danger or (2) move the frog to a nearby location if it is in danger.

These two options are further described as follows:

1) When a California red-legged frog is encountered in the action area the first priority is to stop all activities in the surrounding area that have the potential to result in the harm, harassment, injury, or death of the individual. Then the monitor needs to assess the situation in order to select a course of action that will minimize adverse effects to the individual. Contact the Service once the site is secure. The contacts for this situation are Ryan Olah (*ryan_olah@fws.gov*) or John Cleckler (*john_cleckler@fws.gov*). They can also be reached at (916) 414-6600.

The first priority is to avoid contact with the animal and allow it to move out of the project footprint and hazardous situation on its own to a safe location. The animal should not be picked up and moved because it is not moving fast enough or it is inconvenient for the construction schedule. This guidance only applies to situations where a California red-legged frog is encountered on the move during conditions that make their upland travel feasible. This does not apply to animals that are uncovered or otherwise exposed or in areas where there is not sufficient adjacent habitat to support the life history of the California red-legged frog should they move outside the construction footprint.

Avoidance is the preferred option if the animal is not moving and is using aquatic habitat or is within some sort of burrow or other refugia. The area should be well marked for avoidance by construction and a Service-approved biological monitor should be assigned to the area when work is taking place nearby.

2) The animal should be captured and moved when it is the only option to prevent its death or injury.

If appropriate habitat is located immediately adjacent to the capture location then the preferred option is short distance relocation to that habitat. This must be coordinated with the Service but the general guidance is the frog should not be moved outside of the area it would have traveled on its own. Under no circumstances should a frog be relocated to another property without the owner's written permission. It is Caltrans' responsibility to arrange for that permission.

The release must be coordinated with the Service and will depend on where the individual was found and the opportunities for nearby release. In most situations the release location is likely to be into the mouth of a small burrow or other suitable refugia and in certain circumstances pools without non-native predators may be suitable. The preferred release location will be within the Easkoot Creek riparian corridor.

Only Service-approved biologists for the project can capture California red-legged frogs. Nets or bare hands may be used to capture California red-legged frogs. Soaps, oils, creams, lotions, repellents, or solvents of any sort cannot be used on

hands within 2 hours before and during periods when they are capturing and relocating California red-legged frogs. To avoid transferring disease or pathogens between sites during the course of surveys or handling of amphibians, Service-approved biologists must use the following guidance for disinfecting equipment and clothing. These recommendations are adapted from the *Declining Amphibian Population Task Force's Code* (http://www.open.ac.uk/daptf/).

i. All dirt and debris, including mud, snails, plant material (including fruits and seeds), and algae, must be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water and/or an amphibian. Cleaned items should be rinsed with fresh water before leaving each site.

ii. Boots, nets, traps, etc., must then be scrubbed with either a 70 percent ethanol solution, a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water), QUAT 128 (quaternary ammonium, use 1:60 dilution), or a 6 percent sodium hypochlorite 3 solution and rinsed clean with water between sites. Avoid cleaning equipment in the immediate vicinity of a pond or wetland. All traces of the disinfectant must be removed before entering the next aquatic habitat.

iii. Used cleaning materials (liquids, etc.) must be disposed of safely, and if necessary, taken back to the lab for proper disposal.

iv. Service-approved biologists must limit the duration of handling and captivity. While in captivity, California red-legged frogs shall be kept in a cool, dark, moist, aerated environment, such as a clean and disinfected bucket or plastic container with a damp sponge. Containers used for holding or transporting should not contain any standing water.

Reporting Requirements

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, Caltrans shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, Caltrans must reinitiate formal consultation as per 50 CFR 402.16.

1. Notification of injured or dead listed species will be made to the Coast-Bay Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6623. When an injured or dead individual of the listed species is found, Caltrans shall follow the steps outlined in the following *Disposition of Individuals Taken* section.

2. Sightings of any listed or sensitive animal species should be reported to the CNDDB (http://www.dfg.ca.gov/biogeodata/cnddb/).

3. Construction compliance reports will be addressed to the Coast-Bay Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office.

4. Caltrans shall submit post-construction compliance reports prepared by the Service-approved biologist to the Service within 60 calendar days following completion of each construction season or within 60 calendar days of any break in construction activity lasting

more than 60 calendar days. This report shall detail (1) dates that relevant project activities occurred; (2) pertinent information concerning the success of the project in implementing avoidance and minimization measures; (3) an explanation of failure to meet such measures, if any; (4) known project effects on the California red-legged frog; (5) occurrences of incidental take of any listed species; (6) documentation of employee environmental education; and (7) other pertinent information.

Disposition of Individuals Taken
Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact person is the Coast-Bay Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6623.

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 to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1. Caltrans District 4 should work with the Service to develop a conservation strategy that would identify the current safe passage potential along Bay Area highways and the areas where safe passage for wildlife could be enhanced or established.

2. Caltrans should assist the Service in implementing recovery actions identified in the *Recovery Plan for the California Red-legged Frog* (Service 2002).

3. Caltrans should consider participating in the planning for a regional habitat conservation plan for the California red-legged frog, other listed species, and sensitive species.

4. Caltrans should consider establishing functioning preservation and creation conservation banking systems to further the conservation of the California red-legged frog. Such banking systems also could be utilized for other required mitigation (i.e., seasonal wetlands, riparian habitats, etc.) where appropriate. Particular emphasis should be on the preservation of habitat along roadways in association with wildlife crossings.

5. The Service appreciates Caltrans' proposals to use native plants as part of their restoration plans and right of way seed mix. The establishment of monarch adult and larval food plants are an appropriate response to President Obama's June 20, 2014 Executive Memorandum (https://www.whitehouse.gov/the-press-office/2014/06/20/presidential-memorandum-creating-federal-strategy-promote-health-honey-b) that encourages the Department of Transportation to increase pollinator habitat within road right-of-ways, as well as the Service's goals for monarch butterfly recovery. The Service encourages Caltrans to implement a roadside management program that is compatible with the monarch's life cycle. Compatible maintenance would exclude the use of herbicides/pesticides as well as limiting

mowing to one swath closest to the shoulder, outside the butterfly's peak activity and milkweed blooming period.

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.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the Centerline Rumble-Strip and Shoulder Widening Project. 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 maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is 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 BO, including work outside of the described project footprint, including vehicle parking, staging, lay down areas, and access roads; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this BO, including use of rodenticides or herbicides, relocation of utilities, and use of vehicle parking, staging, lay down areas, and access roads; 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 additional take will not be exempt from the prohibitions of section 9 of the Act, pending reinitiation.

If you have questions concerning this BO, please contact John Cleckler, Caltrans Liaison (*john_cleckler@fws.gov*) or Ryan Olah, Coast-Bay Division Chief (*ryan_olah@fws.gov*), at the letterhead address, (916) 414-6623, or by e-mail.

Sincerely,

for Jennifer M. Norris
Field Supervisor

cc:
Melissa Escaron, California Department of Fish and Wildlife, Napa, California
Geoffrey Mitchell, Caltrans District 4, Oakland, California

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MCBC
MARIN COUNTY BICYCLE COALITION

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August 5, 2014

Wajahat Nyaz
Caltrans, District 4 HQ
111 Grand Avenue
Oakland, CA 94612

Subject: Proposed Highway 1 MRN Center Line Rumble Strips

Dear Mr. Nyaz:

The Marin County Bicycle Coalition (MCBC) would like to thank you for the opportunity to comment on the proposed installation of center line rumble strips on Highway 1 in Marin County. The MCBC has several concerns regarding this project's potential impacts to cyclists and also questions the overall need for a center line rumble strip based on existing local crash data.

Determination of Project Need

National guidance provided by the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials **(**AASHTO) on how state agencies can balance the motorist safety benefits of rumble strips with the needs of bicyclists notes that the use of rumbles should be determined appropriate to the context and should be used *only* when careful study determines that significant opposing direction crashes have been identified (i.e. location-specific corridor safety improvements).

Bicyclist Safety and Considerations

Popularity of the Route

The FHWA recommends that safe accommodation of all road users, including bicyclists, should be considered when designing and applying rumble strips and that the needs of these users should be addressed based on the existing and projected use in the specific corridor. Highway 1 is recognized as the Pacific Coast Bicycle Route and due to its spectacular scenery, draws many recreational bicycle riders, mountain bikers accessing adjacent trails, charity ride participants, weekly training group riders, and triathlon and bicycle road races, most notably the Amgen Tour of California.

Context Sensitive Design

FHWA guidance notes that center line rumble strips may not be appropriate for very narrow pavements, as is the case along many sections of Highway 1 through Marin which is narrow, windy and provides little to no shoulder. The FHWA recommends that agencies maintain 14 feet of pavement beyond the edge of the center line rumble where vehicles and bicycles are expected to share the lane, which is not available along sections of Highway 1 through Marin.

Ensuring 3 Feet of Passing Space

FHWA guidance on the use of rumble strips notes that while bicyclists will rarely need to cross a center line rumble strip, the presence of the rumble strip may cause passenger and commercial vehicles to shy away from the center. This effectively moves these vehicles closer to bicyclists who may be traveling on the outer edge of the lane and is in conflict with California's 3 foot passing law.

Hazards to Cyclists Crossing Center Line

When there is need for cyclists to cross the center line, rumble strips present additional hazards for cyclists. Rumble strips are at best uncomfortable to ride a bicycle over, even for a very short distance, and at worst can cause a cyclist to lose control of their bike and crash, with the potential for severe injury or death.

MCBC Recommendations

- MCBC requests that Caltrans conduct an assessment of local crash data for Highway 1 in Marin to determine this project's necessity.

- MCBC requests that Caltrans follow the FHWA guidance and not install center line rumble strips where lane widths are narrower than 14 feet from beyond the edge of the centerline rumble strip.

The MCBC appreciates the opportunity to provide the above comments and looks forward to hearing back from your department and getting more information about the rumble strip project and its necessity. If you have any questions, please feel free to contact me.

Sincerely,

Alisha Oloughlin

Alisha Oloughlin, Planning Director
Marin County Bicycle Coalition

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January 21, 2015

Mr. Oliver Iberien
Senior Environmental Planner
Caltrans District 4
Office of Environmental analysis
P.O. Box 23660 MS 8B
Oakland, California 94623-0660

Re: Shoulder Widening along Highway 1 into town

Dear Mr. Iberien,

At the Stinson Beach Village Association Meeting held on January 3, 2015 the topic of widening the shoulder along Highway 1 into town was discussed at length with members of the community. As a result of this discussion, the Stinson Beach Village Association would like to go on record as recommending, endorsing, and requesting the expansion and improvement of the shoulder on the seaward side of Highway 1 as it passes through Stinson Beach.

Very truly yours,

The Stinson Beach Village Association
Lawrence Crutcher
Mike Matthews
Terry Gordon
Sam Matthews
Christine Ruppe
David Goldstein

MARIN COUNTY BICYCLE COALITION

February 7, 2017

Mr. Roland Au-Yeung
Chief, Office of Traffic
Department of Transportation
111 Grand Avenue
PO Box 23660
Oakland, CA 94623-0660

Dear Mr. Au-Yeung:

Marin County Bicycle Coalition (MCBC) appreciates Caltrans' ongoing dialogue with MCBC on the proposed centerline rumble strips project along Highway 1 in Marin County. We look forward to continuing to collaborate on this and other Caltrans projects.

As expressed in our initial letter on August 5, 2014 and at a recent meeting, MCBC's primary concern is that the installation of centerline rumble strips may cause vehicles to shy away from the center of the road when passing cyclists, possibly in violation of California's three foot passing law. We greatly appreciate the addition of 40 widened passing zones along the project corridor in order to help mitigate this conflict.

Prior to this letter, MCBC's feedback focused primarily on the location and lengths of bicycle refuge areas. We understand that our criteria for the selection of these locations has been thoroughly vetted. The focus of this letter is on the signage and markings that we would like to see included in this project.

MCBC has been informed of a number of conflicts between people driving and biking along Highway 1 due to limited passing opportunities. While MCBC will work to educate cyclists on proper etiquette and use of the pull-out zones, it is crucial that Caltrans uses signage and markings to make the roadway operations intuitive for all users.

Our recommendations are as follows:

- Install "Bicycles May Use Full Lane" (not “Share the Road”) signage at egress points from all pull-out sections, on downhill sections where speed differential is low, along sharp curves, and in any other location where passing distance is constrained, shoulders are absent, and cyclists will be compelled to use the full lane.[1]
- Likewise, install greenback sharrows along the route, with an emphasis on locations identified above.[2] Sharrows should be placed in the center of the lane.
- Where necessary, install signage indicating that vehicles may not park in the pull-out sections in order to preserve them for bicycle and pedestrian use.
- If the Olema Valley district (between northbound PM 18.0 and southbound PM 25.9) cannot accommodate any of the above, install “Bicycles May Use Full Lane” and greenback sharrows at the district’s boundaries. MCBC may request a more detailed review of this section if signage, markings, and widening cannot be accommodated in tandem with the centerline rumble strips.

We hope the above recommendations are included in a signage and striping plan for this project. We would appreciate a copy of these plans if and when they are made available.

Respectfully Submitted,

Bjorn Griepenburg
Policy & Planning Director
Marin County Bicycle Coalition

Cc:
Wajahat Nyaz, Caltrans
Sergio Ruiz, Caltrans
Shannon Fiala, Coastal Commission
Dan Dawson, County of Marin

[1] See https://mutcd.fhwa.dot.gov/htm/2009/part9/part9b.htm
[2] See https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/mutcd/gcp_slm.cfm