Long Form - Storm Water Data Report

Dist-County-Route: 07-LA-101

Post Mile (Kilometer Post) Limits: 33.0/34.4 (KP 53.1/55.4)

Project Type: Interchange Improvements

EA: 25720K

RU: 186

Program Identification: HE-11

Phase: ☒PID ☐PA/ED ☐PS&E

Regional Water Quality Control Board(s): Los Angeles (Region 4)

Is the project required to consider incorporating Treatment BMPs? ☒Yes ☐No

If yes, can Treatment BMPs be incorporated into the project? ☒Yes ☐No

If No, a Technical Data Report must be submitted to the RWQCB at least 60 days prior to PS&E Submittal. List submittal date: _____

Total Disturbed Soil Area: 7.1-acres

Estimated Construction Start Date: August 20, 2012 Construction Completion Date: August 20, 2014

Notice of Intent (NOI) Date to be submitted: July 20, 2012

Notification of ADL reuse (if Yes, provide date) ☐Yes Date: _____ ☒No

Separate Dewatering Permit (if Yes, permit number) ☐Yes Permit #: _____ ☒No

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the data upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

Surfael Teshale, *Registered Project Engineer*

Trilly Nguyen, *Caltrans Designated Oversight Representative* 2/26/09 Date

I have reviewed the storm water quality design issues and find this report to be complete, current, and accurate:

Ravi B. Ghate, *Project Manager* 02-26-09 Date

Roger E. Castillo, *Designated Maintenance Representative* 02-26-09 Date

Ron Russak, *Designated Landscape Architect Representative* 02-26-09 Date

STAMP *[Required for PS&E only]*

Shirley Pak, *District/Regional SW Coordinator or Designee* 2/26/2009 Date

STORM WATER DATA INFORMATION

1. Project Description

The City of Agoura Hills (City) proposes to improve the US-101 Palo Comado Canyon Road Interchange and the Palo Comado Canyon Road/Chesebro Road Intersection adjacent to the interchange, in Los Angeles County. The proposed work includes the widening of the US-101 Palo Comado Canyon Road Overcrossing (OC) from 1-lane to 2-lanes in each direction with median and sidewalks and the modification of the northbound on-ramps and the modification of signalized intersections to facilitate the increased volume of traffic using the interchange, improve flow, and enhance safety. The proposed project alternatives are as follows:

Alternative 1: No Build
The No Build Alternative would maintain the configuration of the US 101/Palo Comado Canyon Road interchange and the Palo Comado Canyon Road/Canwood Street intersection as proposed under the Heschel School project. The northbound ramp intersection at Palo Comado Canyon Road will include a fifth leg to Canwood Street, and the intersection will be signalized. The Palo Comado Canyon Road Overcrossing would remain as a two-lane road and would not accommodate the future traffic demand. Congestion would not be alleviated, and the situation would deteriorate with time. There are no construction or right-of-way costs associated with this alternative.

Alternative 2: Widen Palo Comado Canyon Road and Overcrossing and Maintain Tight Diamond Ramps

This alternative proposes to maintain the existing tight diamond configuration of the northbound ramps and widen the entire length of Palo Comado Canyon Road and the existing overcrossing from 2 lanes to 4 lanes. The project will provide access to the Heschel School via a new signalized intersection on Palo Comado Canyon Road between the northbound ramps and Driver Avenue. The project will eliminate the five legged intersection at Palo Comado Canyon Road, Northbound Ramps, and Canwood Street that is proposed as part of the school project. Canwood Street east of Palo Comado Canyon Road will be closed. The northbound ramps intersection will be modified to provide standard approach angles at the intersection and signals.

Alternative 3: Widen Palo Comado Canyon Road and Construct Northbound Hook Off Ramp.

This alternative proposes to reconfigure the northbound off ramp to a partial Type L-6 hook ramp and widen the entire length of Palo Comado Canyon Road and the existing overcrossing from 2 lanes to 4 lanes. The school driveway will be relocated to the eastern end of Canwood Street approximately 60 feet east of the proposed hook off ramp. The existing tight diamond northbound off ramp will be removed and the frontage road, Canwood Street, will be realigned and reconstructed to provide two lanes in each direction. The intersection at Palo Comado Canyon Road/Canwood Street will be signalized and westbound Canwood Street will be configured to have dual left turn lanes to southbound Palo Comado Canyon Road, one shared through/right turn lane to the northbound on ramp and northbound Palo Comado Canyon Road and one right turn lane to northbound Palo Comado Canyon Road. The intersection at the hook off ramp/Canwood Street will be signalized and the hook off ramp will be configured with one right turn lane to eastbound and dual left turn lanes to westbound Canwood Street. This alternative will widen the existing overcrossing and its approaches from 2 lanes to 4 lanes similar to Alternative 2. The existing northbound tight diamond on ramp will be modified to provide a standard approach angle at the intersection with Palo Comado Canyon Road.

Alternative 3a: Widen Palo Comado Canyon Road with Full Overcrossing Replacement and Construct Northbound Hook Off-Ramp

This alternative is identical to Alternative 3 except that the existing Palo Comado Canyon Road overcrossing will be replaced instead of being widened. The overcrossing and its approaches will be constructed at a higher vertical profile to allow for a standard vertical clearance over the US 101.

- Total Disturbed Soil Area (DSA) was estimated to be 7.1 acres, and was based on the alternative with the largest project footprint, which is Alternative 3a. The DSA for this project consists of all areas disturbed by construction activities associated with proposed project alternative maps.
- Within the project limits, the existing paved surface area is estimated to be 3.3 acres. The proposed project is expected to add an additional 2.3 acres, based on build Alternative 3a. Upon completion of the proposed project there would be approximately 5.6 acres of impervious surface area.
- This project limits fall within the Los Angeles County MS4 area (Order No. 01-182, NPDES No. CAS004001).

2. Define Site Data and Storm Water Quality Design Issues (refer to Checklists SW-1, SW-2, and SW-3)

- The Los Angeles Regional Water Quality Control Board (Region 4) has jurisdiction within the project limits.
- The proposed project is located within the upper reach of the Malibu Creek Watershed. The project area resides in the Santa Monica Bay Hydrologic Unit, Malibu Creek Hydrologic Area, and is within the Lindero Canyon Sub-Area, 404.23. Surface water from the proposed project site and immediate project vicinity is collected by designed flood control/storm drain facilities, and is eventually routed to Chesebro Creek, which discharges to Medea Creek.
- Chesebro Creek is not listed on the 2006 Clean Water Act Section 303(d) list of impaired waterways.
- The following are the Total Maximum Daily Loads (TMDLs)

Established TMDLs

Malibu Creek Nutrients TMDL

On March 21, 2003, in absence of State versions, the US Environmental Protection Agency (EPA) issued the Nutrients TMDL for the Malibu Creek watershed. The TMDL requires a special monitoring program to evaluate effectiveness of actions to reduce both dry and wet weather urban runoff.

Malibu Creek Watershed Bacteria TMDL

The Malibu Creek Watershed Bacteria TMDL became effective on January 24, 2006. Caltrans is working cooperatively with a group of Responsible Agencies to jointly comply with the TMDL. Project Engineer of projects located where dry weather diversion exists needs only consider infiltration devices for bacteria removal; however, all other projects, shall consider both dry weather flow diversion and infiltration devices.

Future TMDL

The Malibu Creek Trash TMDL was adopted by the Los Angeles Regional Water Quality Control Board on March 6, 2008. The TMDL requires the Responsible Agencies, including Caltrans to reduce the amount of trash deposited in the waterbody and in the storm water discharges to "zero" in eight (8) years. Responsible agencies may implement a Minimum Frequency of Assessment and Collection Program in or adjacent to the waterbody or place full capture devices at the drainage outfalls. Project Engineer shall consider treatment controls for the project and consult with the District NPDES Storm Water Coordinator.

- A 401 certification may be required for this project.
- There are no Drinking Water Reservoirs/ Recharge Basins identified within the project limits.
- There have not been any discussions or agreements with local agencies or RWQCB in regards to this project.
- Chesebro Interchange project is located in Agoura Hills Ca. Agoura is described as sub-humid mesothermal climate having a mean annual precipitation between 12 in. and 22 in. of rain a year. Rainy season for this area according to the Irrigation Training and Research Center (ITRC) is from the month of October 1 through May 1. Average January temperature is 45 degrees to 55 degrees F., average July temperature is 67 degrees to 79 degrees F., and the mean annual temperature is 55 degrees to 62 degrees F. The average frost-free season is 200 to 330 days.
- Topography of this area includes mountainous uplands and foothills ranging from 5 to 75% slopes.
- Soils found within or near the proposed project site, according to the NRCS soil survey website, are Cumulic Haploxerolls, 0 to 9 percent slopes and Linne Silty Clay loam, 9 to 15 percent. These soils, according to the Natural Resource Conservation Service (NRCS), are classified in Hydrologic soils group C.
- Depth to Groundwater level has not been determined at this time, but will be identified during the PS&E phase of this project.
- On the East side of 101 local land uses in the area are high density residential R4 apartment complexes, the Heschel West School, gas stations, and Agoura Park. On the west side of 101 there is a plant nursery, and commercial and industrial buildings.
- As of now soil has not been identified for containing Aerially Deposited Lead (ADLs). This will be explored further during the PS&E phase of the project.
- The proposed treatment BMPs are capable of fitting within the existing right-of-way.
- Within the project limits, there is no existing treatment BMPs.

3. Regional Water Quality Control Board Agreements

- To date, no meetings have been held with the RWQCB.
- This project will be constructed within Caltrans right-of-way. Therefore, NPDES-Caltrans Statewide Permit (Order No. 99-06-DWQ) (NPDES No.CAS 000003) and Construction General Permit (Order No. 99-08-DWQ) (NPDES No. CAS000002) apply to this project. The City of Agoura Hills will file a Notice of Intent (NOI) with the State Water Resources Control Board at least 30-days prior to start of construction. The re-use of lead-contaminated soil may be proposed with this project pending the ADL study; therefore, a permit from RWQCB could be required.

4. Describe Proposed Design Pollution Prevention BMPs to be used on the Project.

<u>Downstream Effects Related to Potentially Increased Flow, Checklist DPP-1, Parts 1 and 2</u>

- Within the project limits, the existing paved surface area is estimated to be 3.3 acres. The proposed project is expected to add an additional 2.3 acres, based on build Alternative 3a, which is the proposed alternative with the largest footprint.
- The total drainage tributary area, which consists of both the existing and proposed paved surface area, is estimated to be 5.6 acres based on Alternative 3a plus the existing impervious surface area. The PPDG (May 2007) recommends calculating the Water Quality Volume (WQV) utilizing the Basin Sizer Program. According to Basin Sizer, 0.92 inches/area should be used to determine the WQV for this geographic location. Therefore, the resulting total Water Quality Volume (WQV) anticipated from build Alternative 3a is 18,702 cubic feet. This can be expected to translate into localized increases in urban runoff within the project vicinity. With the increase in impervious surface, an increase in peak flow in

the overall flow regime for the project area is anticipated. This additional incremental discharge will be controlled through the incorporation of three Biofiltration Swales into the project. The PPDG (May 2007) recommends calculating the Water Quality Flow (WQF) utilizing a design storm of 0.2 inches/hour for this geographic location. Therefore, the resulting total Water Quality Flow (WQF) anticipated from build Alternative 3a is 1.5 cfs. Individual WQF/WQV figures for each proposed Treatment BMP are provided below.

Slope/Surface Protection Systems, Checklist DPP-1, Parts 1 and 3

- The proposed bridge widening and interchange project will result in existing slopes being cut and new slopes being created. This portion of the 101 freeway is classified as "landscaped" following Caltrans Policy all planting that is disturbed or removed will be replaced. All disturbed slopes will be stabilized with landscaping. Benches, rounded slopes, and other measures will be considered to reduce concentrated flow.
- A map showing proposed cut and fill quantities for each alternative has been provided as an attachment. Slope paving under the structures have 1 ½: 1 (H:V) slopes for the proposed bridges.

Concentrated Flow Conveyance Systems, Checklist DPP-1, Parts 1 and 4

- This project will create and modify drainage ditches, berms, dikes, swales, etc. The project will create new slopes and modify existing slopes. A majority of surface water from the project will be diverted to proposed Treatment BMPs or designed collection devices adjacent the freeway.

Preservation of Existing Vegetation, Checklist DPP-1, Parts 1 and 5

- The project design has considered minimizing the project footprint and matching the existing grading as close as possible in order to preserve as much of the existing vegetation as possible.
- Total Estimated Cost For Design Pollution Prevention BMPs = **$40,000.**

5. Describe Proposed Permanent Treatment BMPs to be used on the Project

Treatment BMP Strategy, Checklist T-1

- All nine Caltrans approved permanent treatment BMPs have been analyzed. Individual narratives outlining the applicability of particular Treatment BMPs are outlined below.
- According to the Caltrans Water Quality Planning Tool, there are no Targeted Design Constituents (TDCs) identified for Chesebro Creek. In accordance with the Deputy District Directive DD-92 dated March 17, 2008 this project may be required to implement all treatment BMPs recommended in the Corridor Storm Water Management Studies (Corridor Studies) once the studies become available.
- The current treatment BMP strategy identified for all the build alternatives (Alternative 2 – Alternative 3a) for this project consists of three Biofiltration Swales. The PPDG (May 2007) recommends calculating the Water Quality Flow (WQF) utilizing a design storm of 0.2 inches/hour for this geographic location. Therefore, the resulting total Water Quality Flow (WQF) anticipated from build Alternative 3a proposed BMP tributary areas is 1.5 cfs. Estimated WQF due to total impervious surface from post project conditions for Alternative 3a was estimated to be 1.1 cfs. Individual WQF/WQV figures for each proposed Treatment BMP are provided below.
- The percentage of WQV/WQF estimated to be treated by the BMP strategy proposed for Build Alternative 3a is 100%. This was estimated using the proposed BMP tributary area WQF rate for Alternative 3a (1.5 cfs) and the estimated WQF rate generated from total impervious surface area during post project conditions (1.5 cfs).
- If a corridor study is available prior to project implementation the devices recommended in the study must be implemented.

Biofiltration Swales/Strips, Checklist T-1, Parts 1 and 2

- Biofiltration Swales are proposed for all three build Alternatives at this time.
- The tributary area for the Biofiltration Swales proposed for all three build alternatives are approximately 3.2 acres for BMP 1, 2.8 acres for BMP 2, and 2.0 acres for BMP 3. These tributaries equate to a WQF of 0.6 cfs for BMP 1, 0.5 cfs for BMP 2, and 0.3 cfs for BMP 3). Estimated Water Depth in the

Biofiltration Swale at the estimated Water Quality Flows was calculated as 0.26 ft. for BMP 1, 0.23 ft. for BMP 2, and 0.17 ft. for BMP 3. Estimated velocities for the Biofiltration Swales at these depths were calculated as 0.2 ft/s for BMP 1, 0.19 ft/s for BMP 2, and 0.15 ft/s for proposed BMP 3.

- Funding has been allocated to allow for the placement of the proposed devices.

Dry Weather Diversion, Checklist T-1, Parts 1 and 3

- Dry weather flows occur so rarely in the project area that Dry Weather Flow Diversion is not feasible and not proposed to be implemented for this project.

Infiltration Devices – Checklist T-1, Parts 1 and 4

- For all three Build Alternatives, adequate space does not exist for the placement of Infiltration Basins within the project limits. However, adequate area does exist for the placement of Biofiltration Swales, and they are proposed in lieu of other treatment BMPs. Therefore Infiltration Basins are not proposed for implementation on this project.
- According to Caltrans Project Planning and Design Guide Table B-2, Infiltration Trenches HSG classification must be either A or B. NRCS online soil survey classifies the soils within the project limits as Hydrologic Soils Group (HSG) C. A detailed soil study will need to be performed during future phases of this project to determine the actual infiltration characteristics of the soil located within the project limits. This study will help determine the feasibility of implementing infiltration trench devices for this project. As of now this device is not proposed for implementation on this project.

Detention Devices, Checklist T-1, Parts 1 and 5

- For all three Build Alternatives, adequate space does not exist for the placement of Detention Basins within the project limits. However, adequate area does exist for the placement of Biofiltration Swales, and they are proposed in lieu of other treatment BMPs. Therefore Detention Basins are not proposed for implementation on this project.

Gross Solids Removal Devices (GSRDs), Checklist T-1, Parts 1 and 6

- GSRDs are not proposed for this project because the receiving waters are not on the 303(d) list for trash and there is no established trash TMDL within the watershed.

Traction Sand Traps, Checklist T-1, Parts 1 and 7

- Traction sand is not applied at least twice a year within the project area, therefore, Traction Sand Traps are not feasible and are not proposed to be implemented on this project.

Media Filters, Checklist T-1, Parts 1 and 8

- For all three Build Alternatives, adequate space does not exist for the placement of Media Filters within the project limits. However, adequate area does exist for the placement of Biofiltration Swales, and they are proposed in lieu of other treatment BMPs. Therefore, Media Filters are not feasible and are not proposed for implementation on this project.

Multi-Chambered Treatment Trains (MCTTs), Checklist T-1, Parts 1 and 9

- None of the proposed treatment BMP locations serve a "critical source area," therefore, MCTTs are not feasible and are not proposed for implementation on this project.

Wet Basins, Checklist T-1, Parts 1 and 10

- There is no permanent source of water available in sufficient quantities to maintain the permanent pool required for a Wet Basin, therefore, Wet Basins are not feasible and are not proposed to be implemented on this project.
- Cost for Treatment BMPs have been estimated using the Lane Mile Method as outlined in the Caltrans PPDG (May 2007) Appendix F.6.1. This method is an acceptable means to estimate Storm Water Quality Best Management Practices (BMPs) for the Project Initiation Document (PID) phase Storm Water Data Report (SWDR). More specific cost estimates will be submitted during the PS&E phase of this project.

Total Estimated Cost for Treatment BMPs = **$277,200**

6. Describe Proposed Temporary Construction Site BMPs to be used on Project

- A Storm Water Pollution Prevention Plan (SWPPP) will be prepared and implemented for this project. It will identify construction-period Best Management Practices (BMPs) to reduce water quality impacts. The SWPPP will emphasize: 1) temporary erosion control measures to reduce sedimentation and turbidity of surface runoff from disturbed areas, 2) personnel training, 3) scheduling and implementation of BMPs during construction and for the various seasons (noting the rainy season is from October 1st to May 1st), 4) identification of non-storm water discharge BMPs, and 5) mitigation and monitoring during construction.

- Since this project is in the PID phase, Construction Site BMPs are not known at this time. However, the following is a general list of Construction Site BMPs from Appendix C and of the Project Planning and Design Guide that are expected to be implemented for this project: SS-1 Scheduling, SS-2 Preservation of Existing Vegetation, SS-4 Hydroseeding, SS-5 Soil Binders, SS-9 Earth Dikes/Drainage Swales & Ditches, SS-10 Outlet Protection/Velocity Dissipation Devices, SC-1 Silt Fence, SC-5 Fiber Rolls, SC-6 Gravel Bag Berm, SC-7 Street Sweeping and Vacuuming, SC-8 Sandbag Barrier, SC-10 Storm Drain Inlet Protection, TC-1 Stabilized Construction Entrance/Exit, TC-3 Entrance/Outlet Tire Wash, NS-1 Water Conservation Practices, NS-2 Dewatering Operations, NS-3 Paving and Grinding Operations, NS-6 Illicit Connection/Illegal Discharge Detection and Reporting., WM-1 Material Delivery and Storage, WM-2 Material Use, WM-3 Stockpile Management, WM-4 Spill Prevention and Control, WM-5 Solid Waste Management, WM-6 Hazardous Waste Management, WM-7 Contaminated Soil Management, WM-8 Concrete Waste Management, WM-9 Sanitary/Septic Waste Management, WM-10 Liquid Waste Management.
- Cost for Construction BMPs have been estimated using the Percent Cost Method as outlined in the Caltrans PPDG (May 2007) Appendix F.6.1. This method is an acceptable means to estimate Storm Water Quality Best Management Practices (BMPs) for the Project Initiation Document (PID) phase SWDR's. More specific cost estimates will be submitted during the PS&E phase of this project.

  Total Estimated Cost for Construction Site BMPs for proposed Alternative 3 = **$349,860**

  Total Estimated Cost for Construction Site BMPs for proposed Alternative 3a = **$396,240**

7. Maintenance BMPs (Drain Inlet Stenciling)

- Drain inlets will be stenciled in areas accessible to pedestrians in accordance with project plans and specifications. Exact locations will be defined at the PS&E phase of this project.

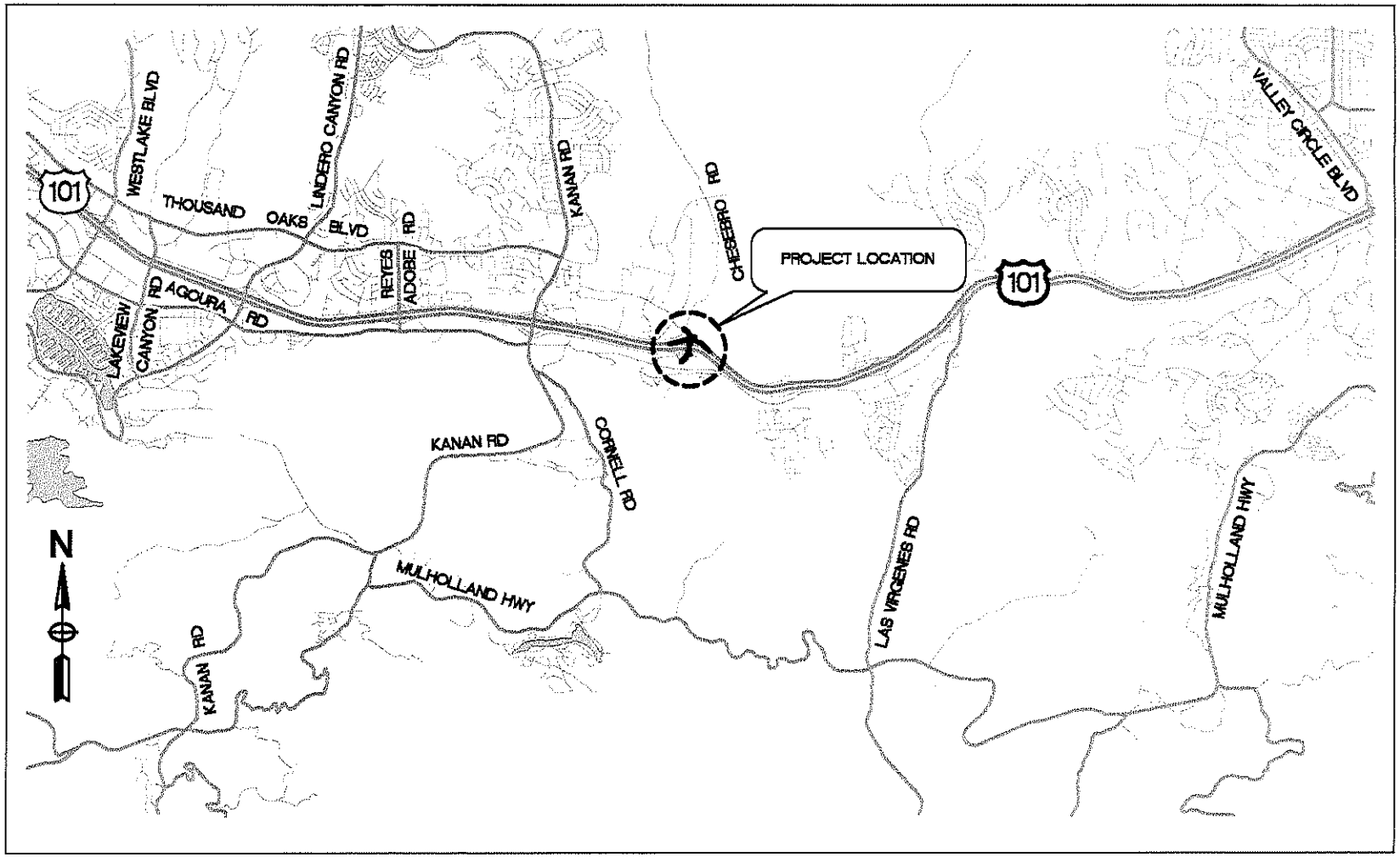
REQUIRED ATTACHMENTS

- ⇒ **Vicinity Map**
- ⇒ **Evaluation Documentation Form (EDF)**
- ⇒ **Construction Site BMP Consideration Form (required at PS&E only)**
- ⇒ **Treatment BMP Summary Spreadsheets (required, if Treatment BMPs are incorporated into project)**
- ⇒ **Quantities for Construction Site BMPs (required at PS&E only)**

SUPPLEMENTAL ATTACHMENTS

Note: Supplement Attachments are to be supplied during the SWDR approval process; where noted, some of these items may only be required on a project-specific basis.

- ⇒ BMP cost information from: Preliminary Project Cost Estimate (PPCE) during PID and PA/ED project phases; Engineer's Cost Estimate for PS&E project phase
- ⇒ Plans showing BMP Deployment (i.e. BMP Layout Sheets, etc)
- ⇒ Checklist SW-1, Site Data Sources
- ⇒ Checklist SW-2, Storm Water Quality Issues Summary
- ⇒ Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water BMPs
- ⇒ Checklists DPP-1, Parts 1–5 (Design Pollution Prevention BMPs) [only those parts that are applicable]
- ⇒ Checklists T-1, Parts 1–10 (Treatment BMPs) [only those Parts that are applicable]



US101 PALO COMADO CANYON ROAD INTERCHANGE
(PM 33.0/34.4)
VICINITY MAP (EA25720K)

Evaluation Documentation Form

DATE: 02/24/09

See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPS EA: 25720K

NO.	CRITERIA	YES	NO	SUPPLEMENTAL INFORMATION FOR EVALUATION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	☒		Go to 2
2.	Is this an emergency project?	☐	☒	If **Yes**, go to 11. If **No**, continue to 3.
3.	Have TMDLs or other Pollution Control Requirements been established for surface waters within the project limits? Information provided in the water quality assessment or equivalent document.	☒	☐	If **Yes**, contact the District/Regional NPDES Coordinator to discuss the Department's obligations under the TMDL (if Applicable) or Pollution Control Requirements, go to 10 or 4. P.P. for Bowen S.P. *(Dist./Reg. SW Coordinator initials)* If **No**, continue to 4.
4.	Is the project located within an area of a local MS4 Permittee?	☒	☐	If **Yes**. (Los Angeles County), go to 5. If **No**, document in SWDR go to 5.
5.	Is the project directly or indirectly discharging to surface waters?	☒	☐	If **Yes**, continue to 6. If **No**, go to 11.
6.	Is this a new facility or major reconstruction?	☒	☐	If **Yes**, continue to 8. If **No**, go to 7.
7.	Will there be a change in line/grade or hydraulic capacity?	☐	☐	If **Yes**, continue to 8. If **No**, go to 11.
8.	Does the project result in a net increase of one acre or more of new impervious surface?	☒	☐	If **Yes**, continue to 10. If **No**, go to 9. *2.3 acre (Net Increase New Impervious Surface)*
9.	Is the project part of a Common Plan of Development?	☐	☐	If **Yes**, continue to 10. If **No**, go to 11.
10.	Project is required to consider approved Treatment BMPs.	☒	See Sections 2.4 and either Section 5.5 or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.	
11.	Project is not required to consider Treatment BMPs. _____*(Dist./Reg. SW Coord. Initials)* _____*(Project Engineer Initials)* _____ *(Date)*	☐	Document for Project Files by completing this form, and attaching it to the SWDR.	

See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs

Checklist SW-1, Site Data Sources

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101

PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K

RWQCB: Los Angeles RWQCB

Information for the following data categories should be obtained, reviewed and referenced as necessary throughout the project planning phase. Collect any available documents pertaining to the category and list them and reference your data source. For specific examples of documents within these categories, refer to Section 5.5 of this document. Example categories have been listed below; add additional categories, as needed. Summarize pertinent information in Section 2 of the SWDR.

DATA CATEGORY/SOURCES	Date
Topographic	
• USGS Quadrangle Maps	Varies
Hydraulic	
•	
Soils	
http://www.carcd.org/wisp/santamonica/lr-plan.htm	June 2008
Climatic	
• http://www.itrc.org/	November 2008
Water Quality	
• Caltrans Water Quality Planning Tool	November 2008
Other Data Categories	
• Heschel West School Draft EIR	March 2005
• http://websoilsurvey.nrcs.usda.gov/app/	November 2008
• Caltrans Project Planning & Design Guide (PPDG)	May 2007

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

The following questions provide a guide to collecting critical information relevant to project stormwater quality issues. Complete responses to applicable questions, consulting other Caltrans functional units (Environmental, Landscape Architecture, Maintenance, etc.) and the District/Regional Storm Water Coordinator as necessary. Summarize pertinent responses in Section 2 of the SWDR.

1. Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation).	☒Complete	☐NA
2. For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	☒Complete	☐NA
3. Determine if there are any municipal or domestic water supply reservoirs or groundwater percolation facilities within the project limits. Consider appropriate spill contamination and spill prevention control measures for these new areas.	☒Complete	☐NA
4. Determine the RWQCB special requirements, including TMDLs, effluent limits, etc.	☒Complete	☐NA
5. Determine regulatory agencies seasonal construction and construction exclusion dates or restrictions required by federal, state, or local agencies.	☒Complete	☐NA
6. Determine if a 401 certification will be required.	☒Complete	☐NA
7. List rainy season dates.	☒Complete	☐NA
8. Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves.	☒Complete	☐NA
9. If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater.	☒Complete	☐NA
10. Determine contaminated or hazardous soils within the project area.	☒Complete	☐NA
11. Determine the total disturbed soil area of the project.	☒Complete	☐NA
12. Describe the topography of the project site.	☒Complete	☐NA
13. List any areas outside of the Caltrans right-of-way that will be included in the project (e.g. contractor's staging yard, work from barges, easements for staging, etc.).	☐Complete	☒NA
14. Determine if additional right-of-way acquisition or easements and right-of-entry will be required for design, construction and maintenance of BMPs. If so, how much?	☒Complete	☐NA
15. Determine if a right-of-way certification is required.	☒Complete	☐NA
16. Determine the estimated unit costs for right-of-way should it be needed for Treatment BMPs, stabilized conveyance systems, lay-back slopes, or interception ditches.	☐Complete	☒NA
17. Determine if project area has any slope stabilization concerns.	☒Complete	☐NA
18. Describe the local land use within the project area and adjacent areas.	☒Complete	☐NA
19. Evaluate the presence of dry weather flow.	☒Complete	☐NA

Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water Impacts

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

The PE must confer with other functional units, such as Landscape Architecture, Hydraulics, Environmental, Materials, Construction and Maintenance, as needed to assess these issues. Summarize pertinent responses in Section 2 of the SWDR.

Options for avoiding or reducing potential impacts during project planning include the following:

1.	Can the project be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions?	☐Yes	☒No	☐NA
2.	Can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts?	☐Yes	☐No	☒NA
3.	Can any of the following methods be utilized to minimize erosion from slopes:			
	a. Disturbing existing slopes only when necessary?	☒Yes	☐No	☐NA
	b. Minimizing cut and fill areas to reduce slope lengths?	☒Yes	☐No	☐NA
	c. Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?	☒Yes	☐No	☐NA
	d. Acquiring right-of-way easements (such as grading easements) to reduce steepness of slopes?	☐Yes	☐No	☒NA
	e. Avoiding soils or formations that will be particularly difficult to re-stabilize?	☒Yes	☐No	☐NA
	f. Providing cut and fill slopes flat enough to allow re-vegetation and limit erosion to pre-construction rates?	☒Yes	☐No	☐NA
	g. Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?	☒Yes	☐No	☐NA
	h. Rounding and shaping slopes to reduce concentrated flow?	☒Yes	☐No	☐NA
	i. Collecting concentrated flows in stabilized drains and channels?	☒Yes	☐No	☐NA
4.	Does the project design allow for the ease of maintaining all BMPs?	☒Yes	☐No	
5.	Can the project be scheduled or phased to minimize soil-disturbing work during the rainy season?	☒Yes	☐No	
6.	Can permanent storm water pollution controls such as paved slopes, vegetated slopes, basins, and conveyance systems be installed early in the construction process to provide additional protection and to possibly utilize them in addressing construction storm water impacts?	☐Yes	☐No	☒NA

Design Pollution Prevention BMPs
Checklist DPP-1, Part 1

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

Consideration of Design Pollution Prevention BMPs

1. Consideration of Downstream Effects Related to Potentially Increased Flow [to streams or channels]?

(a)	Will project increase velocity or volume of downstream flow?	☒Yes	☐No	☐NA
(b)	Will the project discharge to unlined channels?	☐Yes	☒No	☐NA
(c)	Will project increase potential sediment load of downstream flow?	☒Yes	☐No	☐NA
(d)	Will project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?	☐Yes	☒No	☐NA

If Yes was answered to any of the above questions, consider ***Downstream Effects Related to Potentially Increased Flow***, complete the DPP-1, Part 2 checklist.

2. Slope/Surface Protection Systems

(a)	Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA

If Yes was answered to the above question, consider ***Slope/Surface Protection Systems***, complete the DPP-1, Part 3 checklist.

3. Concentrated Flow Conveyance Systems

(a)	Will the project create or modify ditches, dikes, berms, or swales?	☒Yes	☐No	☐NA
(b)	Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA
(c)	Will it be necessary to direct or intercept surface runoff?	☐Yes	☒No	☐NA
(d)	Will cross drains be modified?	☐Yes	☒No	☐NA

If Yes was answered to any of the above questions, consider ***Concentrated Flow Conveyance Systems***; complete the DPP-1, Part 4 checklist.

4. Preservation of Existing Vegetation

a) It is the goal of the Storm Water Program to maximize the protection of desirable existing vegetation to provide erosion and sediment control benefits on all projects. ☒Complete

Consider ***Preservation of Existing Vegetation***, complete the DPP-1, Part 5 checklist.

Design Pollution Prevention BMPs
Checklist DPP-1, Part 2

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101

PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K

RWQCB: Los Angeles RWQCB

Downstream Effects Related to Potentially Increased Flow

1. Review total paved area and reduce to the maximum extent practicable.	☒Complete
2. Review channel lining materials and design for stream bank erosion control.	☒Complete
(a) See Chapters 860 and 870 of the HDM.	☒Complete
(b) Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity.	☒Complete
3. Include, where appropriate, energy dissipation devices at culvert outlets.	☒Complete
4. Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.	☒Complete
5. Include, if appropriate, peak flow attenuation basins to reduce peak discharges.	☒Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 3

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

Slope / Surface Protection Systems

1. What are the proposed areas of cut and fill? (attach plan or map) ☒Complete

2. Were benches or terraces provided on high cut and fill slopes to reduce concentration of flows? ☒Yes ☐No

3. Were slopes rounded and/or shaped to reduce concentrated flow? ☒Yes ☐No

4. Were concentrated flows collected in stabilized drains or channels? ☒Yes ☐No

5. Are slopes > 1:4 vertical:horizontal (V:H))? ☒Yes ☐No

   If Yes, District Landscape Architecture must prepare or approve an erosion control plan.

6. Are slopes > 1:2 (V:H)? ☐Yes ☒No

   If Yes, Geotechnical Services must prepare a Geotechnical Design Report, and the District Landscape Architect should prepare or approve an erosion control plan. Concurrence must be obtained from the District Maintenance Storm Water Coordinator for slopes steeper than 1:2 (V:H).

7. Estimate the change to the impervious areas that will result from this project. 2.3acres ☒Complete

VEGETATED SURFACES

1. Identify existing vegetation. ☐Complete
2. Evaluate site to determine soil types, appropriate vegetation and planting strategies. ☒Complete
3. How long will it take for permanent vegetation to establish? ☐Complete
4. Minimize overland and concentrated flow depths and velocities. ☐Complete

HARD SURFACES

1. Are hard surfaces required? ☐Yes ☒No

   If Yes, document purpose (safety, maintenance, soil stabilization, etc.), types, and general locations of the installations. ☐Complete

Review appropriate SSPs for Vegetated Surface and Hard Surface Protection Systems. ☐Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 4

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

Concentrated Flow Conveyance Systems

Ditches, Berms, Dikes and Swales

1. Consider Ditches, Berms, Dikes, and Swales as per Chapters 813, 836, and 860 of the HDM. ☒Complete
2. Evaluate risks due to erosion, overtopping, flow backups or washout. ☒Complete
3. Consider outlet protection where localized scour is anticipated. ☒Complete
4. Examine the site for run-on from off-site sources. ☒Complete
5. Consider channel lining when velocities exceed scour velocity for soil. ☒Complete

Overside Drains

1. Consider downdrains, as per Index 834.4 of the HDM. ☒Complete
2. Consider paved spillways for side slopes flatter than 1:4 V:H. ☒Complete

Flared Culvert End Sections

1. Consider flared end sections on culvert inlets and outlets as per Chapter 827 of the HDM. ☒Complete

Outlet Protection/Velocity Dissipation Devices

1. Consider outlet protection/velocity dissipation devices at outlets, including cross drains, as per Chapters 827 and 870 of the HDM. ☒Complete

Review appropriate SSPs for Concentrated Flow Conveyance Systems. ☒Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 5

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

Preservation of Existing Vegetation

1. Review Preservation of Property, Standard Specifications 16.1.01 and 16-1.02 (Clearing and Grubbing) to reduce clearing and grubbing and maximize preservation of existing vegetation. ☒Complete

2. Has all vegetation to be retained been coordinated with Environmental, and identified and defined in the contract plans? ☐Yes ☒No

3. Have steps been taken to minimize disturbed areas, such as locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling? ☒Complete

4. Have impacts to preserved vegetation been considered while work is occurring in disturbed areas? ☒Yes ☐No

5. Are all areas to be preserved delineated on the plans? ☐Yes ☒No

Treatment BMPs

Checklist T-1, Part 1

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101

PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K

RWQCB: Los Angeles RWQCB

Consideration of Treatment BMPs

This checklist is used for projects that require the consideration of Approved Treatment BMPs, as determined from the process described in Section 4 (Project Treatment Consideration) and the Evaluation Documentation Form (EDF). This checklist will be used to determine which Treatment BMPs should be considered for each watershed and sub-watersheds within the project. Supplemental data will be needed to verify siting and design applicability for final incorporation into a project.

Complete this checklist for each phase of the project, when considering Treatment BMPs. Use the responses to the questions as the basis when developing the narrative in Section 5 of the Storm Water Data Report to document that Treatment BMPs have been appropriately considered.

Answer all questions, unless otherwise directed.

1. Dry Weather Flow Diversion

   (a) Are dry weather flows generated by Caltrans anticipated to be persistent? ☐Yes ☒No

   (b) Is a sanitary sewer located on or near the site? ☒Yes ☐No

   (c) Is the connection to the sanitary sewer possible without extraordinary plumbing, features or construction practices? ☒Yes ☐No

   (d) Is the domestic wastewater treatment authority willing to accept flow? ☐Yes ☒No

   If Yes was answered to <u>all</u> of these questions consider Dry Weather Flow Diversion, complete and attach Part 3 of this checklist

2. Is the receiving water on the 303(d) list for litter/trash or has a TMDL been issued for litter/trash? ☐Yes ☒No

   If Yes, consider Gross Solids Removal Devices (GSRDs), complete and attach Part 6 of this checklist. Note: Biofiltration Systems, Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins also can capture litter – consult with District/Regional NPDES if these devices should be considered to meet litter/trash TMDL.

3. Is project located in an area (e.g., mountain regions) where traction sand is applied more than twice a year?
   If Yes, consider ***Traction Sand Traps***, complete and attach **Part 7** of this checklist. ☐Yes ☒No

4. (a) Are there local influent limits for infiltration or Basin Plan restrictions or other local agency prohibitions that would restrict the use of the infiltration devices? ☐Yes ☒No

(b) Would infiltration pose a threat to local groundwater quality as determined by the District/Regional Storm Water Coordinator? ☐Yes ☒No

If the answer to either part of Question 4 is Yes, then Infiltration Devices are infeasible and the consideration of Infiltration Devices should not be made when completing Questions 5 through 17.

5. (a) Does the project discharge to any 303(d) listed water body? ☐Yes ☒No
   If No, go to Question 17, General Purpose Pollutant Removal

   (b) If Yes, is the identified pollutant(s) considered a Targeted Design Constituent (TDC) (check all that apply):

   ___phosphorus, ___nitrogen, ___total copper, ___dissolved copper,
   ___total lead ___dissolved lead, ___total zinc, ___dissolved zinc,
   ___sediments, ___general metals [unspecified metals].

   (c) If only one TDC is checked above, continue to Question 6. ☐Complete

   (d) If more than one TDC is checked, contact your District/Regional NPDES Coordinator to determine priority before continuing with this checklist. ☐Complete

6. Consult with the District/Regional Storm Water Coordinator to determine whether Treatment BMP selection will be affected by any existing or future TMDL requirements. ☐Complete

The following questions show the approved Treatment BMPs in order of preference based on load reduction (performance) for the listed constituent and lifetime costs for the device, excluding right-of-way. Note that a line separates Treatment BMPs into groups of approximately equal effectiveness and within each grouping, any of the Treatment BMPs may be selected for placement if meeting site conditions. In the space provided next to the BMP, use Yes or a check mark to indicate a positive response.

If none of the listed Treatment BMPs for a specific constituent of concern (TDC) can be sited, go to Step #17 (General Purpose Pollutant Removal) to determine whether another Treatment BMP can be incorporated into the project.

***For the SWDRs developed for the PID and PA/ED phases of a project:* Consider all approved Treatment BMPs listed that can be reasonably incorporated into the project for each TDC.**

***For the SWDR developed for the PS&E phase:* Indicate (Yes or check mark) only those BMPs that will be incorporated into the project.**

7. Is phosphorus the TDC? [Use this constituent if "eutrophic" or "nutrients" is the TDC for the water body.] If Yes, consider: ☐Yes ☐No

   _____Infiltration Devices
   _____Austin Sand Filters

8. Is nitrogen the TDC? If Yes, consider: ☐Yes ☐No

   _____ Infiltration Devices
   _____ Austin Sand Filters
   _____ Delaware Filter
   _____ Detention Device
   _____ MCTT

9. Is copper (total) the TDC? If Yes for total Copper, consider: ☐Yes ☐No

   _____ Infiltration Devices
   _____ Wet Basins
   _____ Biofiltration Strips
   _____ Detention Device
   _____ Biofiltration Swales
   _____ Austin Sand Filter
   _____ Delaware Filter
   _____ MCTT

10. Is copper (dissolved) the TDC? If Yes for dissolved Copper, consider: ☐Yes ☐No

    _____ Infiltration Devices
    _____ Biofiltration Strips
    _____ Wet Basin
    _____ Biofiltration Swale

11. Is lead (total) the TDC? If Yes for total Lead, consider: ☐Yes ☐No

    _____ Infiltration Devices
    _____ Wet Basin
    _____ Biofiltration Strips
    _____ Austin Sand Filter
    _____ **Delaware Filter**
    _____ Detention Device
    _____ Biofiltration Swales
    _____ MCTT

12. Is lead (dissolved) the TDC? If Yes for dissolved Lead, consider: ☐Yes ☐No

    _____ Infiltration Devices
    _____ Biofiltration Strips
    _____ Wet Basin
    _____ Detention Device
    _____ Biofiltration Swales
    _____ Austin Sand Filter

13. Is zinc (total) the TDC? If Yes for total Zinc, consider: ☐Yes ☐No

    _____ Infiltration Devices
    _____ Delaware Filter
    _____ Wet Basin
    _____ Biofiltration Strips
    _____ Biofiltration Swales
    _____ Austin Sand Filter
    _____ MCTT
    _____ Detention Devices

14. Is zinc (dissolved) the TDC? If Yes for dissolved Zinc, consider: ☐Yes ☐No

    ____ Infiltration Devices
    ____ Delaware Filter
    ____ Biofiltration Strip
    ____ Biofiltration Swale
    ____ Austin Sand Filter
    ____ MCTT

15. Is sediment (total suspended solids [TSS]) the TDC? If Yes for TSS, consider: ☐Yes ☐No

    ____ Infiltration Devices
    ____ Austin Sand Filter
    ____ Delaware Filter
    ____ Wet Basin
    ____ Detention Device
    ____ Biofiltration Strip
    ____ MCTT
    ____ Biofiltration Swale

16. Are "General Metals" or (unspecified) "Metals" the TDC? If Yes for General Metals, consider: ☐Yes ☐No

    ____ Infiltration Devices
    ____ Biofiltration Strips
    ____ Wet Basin
    ____ Biofiltration Swale
    ____ Austin Sand Filter
    ____ Delaware Filter
    ____ MCTT

17. General Purpose Pollutant Removal.: When it is determined that there are no TDCs, consider the Treatment BMPs in the order listed below. ☒Yes ☐No

    X Infiltration Devices
    X Biofiltration Strips
    X Wet Basin
    X Biofiltration Swale
    X Austin Sand Filter
    X Detention Device
    X Delaware Filter
    X MCTT

18. Biofiltration

    (a) Are site conditions and climate favorable to allow suitable vegetation to be established? ☒Yes ☐No

    (b) Have Biofiltration strips and swales been considered to the extent practicable? Note: Biofiltration BMPs should be considered for all projects, even if other Treatment BMPs are placed. ☒Yes ☐No

    If No to (a) or (b), document justification in Section 5 of the SWDR.

19. After completing the above, complete and attach the checklists shown below for every Treatment BMP under consideration ☒Complete

- X Biofiltration Strips and Biofiltration Swales: Checklist T-1, Part 2
- ___ Dry Weather Diversion: Checklist T-1, Part 3
- X Infiltration Devices: Checklist T-1, Part 4
- X Detention Devices: Checklist T-1, Part 5
- X GSRDs: Checklist T-1, Part 6
- ___ Traction Sand Traps: Checklist T-1, Part 7
- X Media Filter [Austin Sand Filter and Delaware Filter]: Checklist T-1, Part 8
- X Multi-Chambered Treatment Train: Checklist T-1, Part 9
- X Wet Basins: Checklist T-1, Part 10

20. (a) Estimate what percentage of WQV/WQF will be treated by the preferred Treatment BMP(s): 100% ☒Complete

(b) Have Treatment BMPs been considered for use in parallel or series to increase this percentage? ☒Yes ☐No

21. Prepare cost estimate, including right-of-way, for selected Treatment BMPs and include as supplemental information for SWDR approval. ☐Complete

Treatment BMPs

Checklist T-1, Part 2

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101

PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K

RWQCB: Los Angeles RWQCB

Biofiltration Swales / Biofiltration Strips

Feasibility

1. Do the climate and site conditions allow vegetation to be established? ☒Yes ☐No

2. Are flow velocities < 4 fps (i.e. low enough to prevent scour of the vegetated bioswale as per HDM Table 873.3E)? ☒Yes ☐No

   If No to either question above, Biofiltration Swales and Biofiltration Strips are not feasible.

3. Are Biofiltration Swales proposed at sites where known hazardous soils or contaminated groundwater plumes exist? ☐Yes ☒No
   If Yes, consult with District/Regional NPDES Coordinator about how to proceed.

4. Does adequate area exist within the right-of-way to place biofiltration device(s)? ☒Yes ☐No
   If Yes, continue to the Design Elements section. If No, continue to Question 5.

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Biofiltration Devices and how much right-of way would be needed to treat WQF? _____ acres ☐Yes ☐No
   If Yes, continue to Design Elements section. If No, continue to Question 6.

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of these Treatment BMPs into the project. ☐Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Has the District Landscape Architect provided vegetation mixes appropriate for climate and location? * ☐Yes ☒No

Treatment BMPs
Checklist T-1, Part 4

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

Infiltration Devices

Feasibility

1.	Does local Basin Plan or other local ordinance provide influent limits on quality of water that can be infiltrated, and would infiltration pose a threat to groundwater quality as determined by the District/Regional NPDES Storm Water Coordinator?	☐Yes	☒No
2.	Does infiltration at the site compromise the integrity of any slopes in the area?	☐Yes	☒No
3.	Per survey data or U.S. Geological Survey (USGS) Quad Map, are existing slopes at the proposed device site >15%?	☐Yes	☒No
4.	At the invert, does the soil type classify as NRCS Hydrologic Soil Group (HSG) D, or does the soil have an infiltration rate < 0.5 inches/hr?	☐Yes	☒No
5.	Is site located over a previously identified contaminated groundwater plume?	☐Yes	☒No
	If Yes to any question above, Infiltration Devices are not feasible; stop here and consider other approved Treatment BMPs.		
6.	(a) Does site have groundwater within 10 ft of basin invert?	☐Yes	☒No
	(b) Does site investigation indicate that the infiltration rate is significantly greater than 2.5 inches/hr?	☐Yes	☒No
	If Yes to either part of Question 6, the RWQCB must be consulted, and the RWQCB must conclude that the groundwater quality will not be compromised, before approving the site for infiltration.	☐Yes	☐No
7.	Does adequate area exist within the right-of-way to place Infiltration Device(s)? If Yes, continue to Design Elements sections. If No, continue to Question 8.	☐Yes	☒No
8.	If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Infiltration Devices and how much right-of way would be needed to treat WQV? _____ acres If Yes, continue to Design Elements section. If No, continue to Question 9.	☐Yes	☒No
9.	If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project.	☒Complete	

Design Elements – Infiltration Basin

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Has a detailed investigation been conducted, including subsurface soil investigation, in-hole conductivity testing and groundwater elevation determination? (This report must be completed for PS&E level design.) *	☐Yes	☐No
2.	Has an overflow spillway with scour protection been provided? *	☐Yes	☐No
3.	Is the Infiltration Basin size sufficient to capture the WQV while maintaining a 40-48 hour drawdown time? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet]) *	☐Yes	☐No
4.	Can access be placed to the invert of the Infiltration Basin? *	☐Yes	☐No
5.	Can the Infiltration Basin accommodate the Water Quality freeboard above the WQV elevation (reference Appendix B.1.3.1)? *	☐Yes	☐No
6.	Can the Infiltration Basin be designed with interior side slopes no steeper than 1:4(V:H) (may be 1:3 [V:H] with approval by District Maintenance)? *	☐Yes	☐No
7.	Can vegetation be established in the Infiltration Basin? **	☐Yes	☐No
8.	Can diversion be designed, constructed, and maintained to bypass flows exceeding the WQV? **	☐Yes	☐No
9.	Can a gravity-fed Maintenance/Emergency Drain be placed? **	☐Yes	☐No

Design Elements – Infiltration Trench

* **Required** Design Element – (see definition above)
** **Recommended** Design Element – (see definition above)

1.	Has a detailed investigation been conducted, including subsurface soil investigation, in-hole conductivity testing and groundwater elevation determination? (This report must be completed for PS&E level design.) *	☐Yes	☐No
2.	Is the surrounding soil within Hydrologic Soil Groups (HSG) Types A or B? *	☐Yes	☐No
3.	Is the volume of the Infiltration Trench equal to at least the 2.85x the WQV, while maintaining a drawdown time of ≤ 72 hours? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet], unless the District/Regional NPDES Coordinator will allow a volume between 2,830 ft^3 and 4,356 ft^3 to be considered.) *	☐Yes	☐No
4.	Is the depth of the Infiltration Trench ≤ 13 ft, and is the depth < the width? *	☐Yes	☐No
5.	Can an observation well be placed in the trench? *	☐Yes	☐No
6.	Can access be provided to the Infiltration Trench? *	☐Yes	☐No
7.	Can pretreatment be provided to capture sediment in the runoff (such as using Biofiltration)? *	☐Yes	☐No
8.	Can flow diversion be designed, constructed, and maintained to bypass flows exceeding the Water Quality Event? **	☐Yes	☐No
9.	Can a perimeter curb or similar device be provided (to limit wheel loads upon the trench)? **	☐Yes	☐No

Treatment BMPs
Checklist T-1, Part 5

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

Detention Devices

Feasibility

1. Is there sufficient head to prevent objectionable backwater conditions in the upstream drainage systems? ☒Yes ☐No

2. 2a) Is the volume of the Detention Device equal to at least the WQV? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet]) ☒Yes ☐No

   Only answer (b) if the Detention Device is being used also to capture traction sand.

   2b) Is the total volume of the Detention Device at least equal to the WQV and the anticipated volume of traction sand, while maintaining a minimum 12 inch freeboard (1 ft)? ☐Yes ☐No

3. Is basin invert ≥ 10 ft above seasonally high groundwater or can it be designed with an impermeable liner? (Note: If an impermeable liner is used, the seasonally high groundwater elevation must not encroach within 12 inches of the invert.) ☒Yes ☐No

If No to any question above, then Detention Devices are not feasible.

4. Does adequate area exist within the right-of-way to place Detention Device(s)?

   If Yes, continue to the Design Elements section. If No, continue to Question 5. ☐Yes ☒No

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Detention Device(s) and how much right-of way would be needed to treat WQV? _____ acres
   If Yes, continue to the Design Elements section. If No, continue to Question 6. ☐Yes ☒No

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☒Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Has the geotechnical integrity of the site been evaluated to determine potential impacts to surrounding slopes due to incidental infiltration? If incidental infiltration through the invert of an unlined detention device is a concern, consider using an impermeable liner. *	☐Yes ☐No
2.	Has the location of the Detention Device been evaluated for any effects to the adjacent roadway and subgrade? *	☐Yes ☐No
3.	Can a minimum freeboard of 12 inches be provided above the WQV? *	☐Yes ☐No
4.	Is an overflow outlet provided? *	☐Yes ☐No
5.	Is the drawdown time of the Detention Device within 24 to 72 hours? *	☐Yes ☐No
6.	Is the Detention Device outlet designed to minimize clogging (minimum outlet orifice diameter of 0.5 inches)? *	☐Yes ☐No
7.	Are the inlet and outlet structures designed to prevent scour and re-suspension of settled materials, and to enhance quiescent conditions? *	☐Yes ☐No
8.	Can vegetation be established in an earthen basin at the invert and on the side slopes for erosion control and to minimize re-suspension? Note: Detention Basins may be lined, in which case no vegetation would be required for lined areas. *	☐Yes ☐No
9.	Has sufficient access for Maintenance been provided? *	☐Yes ☐No
10.	Is the side slope 1:4 (V:H) or flatter for interior slopes? ** (Note: Side slopes up to 1:3 (V:H) allowed with approval by District Maintenance.)	☐Yes ☐No
11.	If significant sediment is expected from nearby slopes, can the Detention Device be designed with additional volume equal to the expected annual loading? **	☐Yes ☐No
12.	Is flow path as long as possible (≥ 2:1 length to width ratio at WQV elevation is recommended)? **	☐Yes ☐No

Treatment BMPs
Checklist T-1, Part 6

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

Gross Solids Removal Devices (GSRDs)

Feasibility

1. Is the receiving water body downstream of the tributary area to the proposed GSRD on a 303(d) list or has a TMDL for litter been established? ☐Yes ☒No

2. Are the devices sized for flows generated by the peak drainage facility design event or can peak flow be diverted? ☒Yes ☐No

3. Are the devices sized to contain gross solids (litter and vegetation) for a period of one year? ☒Yes ☐No

4. Is there sufficient access for maintenance and large equipment (vacuum truck)? ☒Yes ☐No

   If No to any question above, then Gross Solids Removal Devices are not feasible. Note that Biofiltration Systems, Infiltration Devices, Detention Devices, Dry Weather Flow Diversion, MCTT, Media Filters, and Wet Basins may be considered for litter capture, but consult with District/Regional NPDES if proposed to meet a TMDL for litter.

5. Does adequate area exist within the right-of-way to place Gross Solids Removal Devices? ☐Yes ☐No
   If Yes, continue to Design Elements section. If No, continue to Question 6.

6. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Gross Solids Removal Devices and how much right-of way would be needed? _____ acres ☐Yes ☐No
   If Yes, continue to the Design Elements section. If No, continue to Question 7.

7. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

Design Elements – Linear Radial Device

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Does sufficient hydraulic head exist to place the Linear Radial GSRD? * ☐Yes ☐No

2. Was the litter accumulation rate of 10 ft^3/ac/yr (or a different rate recommended by Maintenance) used to size the device? * ☐Yes ☐No

3. Were the standard detail sheets used for the layout of the devices? **
   If No, consult with Headquarters Office of Storm Water Management and District/Regional NPDES. ☐Yes ☐No

4. Is the maximum depth of the storage within 10 ft of the ground surface, or another depth as required by District Maintenance? * ☐Yes ☐No

Design Elements – Inclined Screen

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Does sufficient hydraulic head exist to place the Inclined Screen GSRD? * ☐Yes ☐No

2. Was the litter accumulation rate of 10 ft^3/ac/yr (or a different rate recommended by Maintenance) used to size the device? * ☐Yes ☐No

3. Were the standard details sheets used for the layout of the devices? **
   If No, consult with Headquarters Office of Storm Water Management and District NPDES. ☐Yes ☐No

4. Is the maximum depth of the storage within 10 ft of the ground surface, or another depth as required by District Maintenance? * ☐Yes ☐No

Treatment BMPs
Checklist T-1, Part 8

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

Media Filters

Caltrans has approved two types of Media Filter: Austin Sand Filters and Delaware Filters. Austin Sand filters are typically designed for larger drainage areas, while Delaware Filters are typically designed for smaller drainage areas. The Austin Sand Filter is constructed with an open top and may have a concrete or earthen invert, while the Delaware is always constructed as a vault. See Appendix B, Media Filters, for a further description of Media Filters.

Feasibility – Austin Sand Filter

1. Is the volume of the Austin Sand Filter equal to at least the WQV using a 40 to 48 hour drawdown? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet]) ☒Yes ☐No

2. Is there sufficient hydraulic head to operate the device (minimum 3 ft between the inflow and outflow chambers)? ☒Yes ☐No

3. If initial chamber has an earthen bottom, is initial chamber invert ≥ 3 ft above seasonally high groundwater? ☒Yes ☐No

4. If a vault is used for either chamber, is the level of the concrete base of the vault above seasonally high groundwater or is a special design provided? ☒Yes ☐No

   If No to any question above, then an Austin Sand Filter is not feasible.

5. Does adequate area exist within the right-of-way to place an Austin Sand Filter(s)? ☐Yes ☒No
   If Yes, continue to Design Elements sections. If No, continue to Question 6.

6. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ acres ☐Yes ☒No
   If Yes, continue to the Design Elements section.

   If No, continue to Question 7.

7. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐ Complete

   If an Austin Sand Filter meets these feasibility requirements, continue to the Design Elements – Austin Sand Filter below.

Feasibility- Delaware Filter

1. Is the volume of the Delaware Filter equal to at least the WQV using a 40 to 48 hour drawdown? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet], consult with District/Regional NPDES if a lesser volume is under consideration.) ☒Yes ☐No

2. Is there sufficient hydraulic head to operate the device (minimum 3 ft between the inflow and outflow chambers)? ☒Yes ☐No

3. Would a permanent pool of water be allowed by the local vector control agency? ☒Yes ☐No

If No to any question, then a Delaware Filter is not feasible

4. Does adequate area exist within the right-of-way to place a Delaware Filter (s)? If Yes, continue to Design Elements sections. If No, continue to Question 5. ☐Yes ☒No

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ acres If Yes, continue to the Design Elements section. If No, continue to Question 6. ☐Yes ☐No

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐ Complete

If a Delaware Filter is still under consideration, continue to the Design Elements – Delaware Filter section.

Design Elements – Austin Sand Filter

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Is the drawdown time of the 2nd chamber 24 hours? * ☐Yes ☐No

2. Is access for Maintenance vehicles provided to the Austin Sand Filter? * ☐Yes ☐No

3. Is a bypass/overflow provided for storms > WQV? * ☐Yes ☐No

4. Is the flow path length to width ratio for the sedimentation chamber of the "full" Austin Sand Filter ≥ 2:1? ** ☐Yes ☐No

5. Can pretreatment be provided to capture sediment and litter in the runoff (such as using biofiltration)? ** ☐Yes ☐No

6. Can the Austin Sand Filter be placed using an earthen configuration? ** If No, go to Question 9. ☐Yes ☐No

7. Is the Austin Sand Filter invert separated from the seasonally high groundwater table by ≥ 10 ft? * ☐Yes ☐No
   If No, design with an impermeable liner.
8. Are side slopes of the earthen chamber 1:3 (V:H) or flatter? * ☐Yes ☐No
9. Is maximum depth ≤ 13 ft below ground surface? * ☐Yes ☐No
10. Can the Austin Sand Filter be placed in an offline configuration? ** ☐Yes ☐No

Design Elements – Delaware Filter

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Can the first chamber be sized for the WQV? * ☐Yes ☐No
2. Is the drawdown time of the 2nd chamber between 40 and 48 hours? * ☐Yes ☐No
3. Is access for Maintenance vehicles provided to the Delaware Filter? * ☐Yes ☐No
4. Is a bypass/overflow provided for storms > WQV? ** ☐Yes ☐No
5. Can pretreatment be provided to capture sediment and litter in the runoff (such as using biofiltration)? ** ☐Yes ☐No
6. Can the Delaware Filter be placed in an offline configuration? ** ☐Yes ☐No
7. Is maximum depth ≤ 13 ft below ground surface? *

Treatment BMPs
Checklist T-1, Part 9

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

MCTT (Multi-chambered Treatment Train)

Feasibility

1. Is the proposed location for the MCTT located to serve a "critical source area" (i.e. vehicle service facility, parking area, paved storage area, or fueling station)?	☐Yes	☒No
2. Is the WQV ≥ 4,356 ft³ (0.1 acre-foot)?	☒Yes	☐No
3. Is there sufficient hydraulic head (typically ≥ 6 feet) to operate the device?	☒Yes	☐No
4. Would a permanent pool of water be allowed by the local vector control agency? If No to any question above, then an MCTT is not feasible.	☐Yes	☒No
5. Does adequate area exist within the right-of-way to place an MCTT(s)? If Yes, continue to Design Elements sections. If No, continue to Question 6.	☐Yes	☒No
6. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ acres If Yes, continue to Design Elements section. If No, continue to Question 7.	☐Yes	☒No
7. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project.	☒Complete	

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Is the maximum depth of the 3rd chamber ≤ 13 ft below ground surface and has Maintenance accepted this depth? *	☐Yes	☐No
2. Is the drawdown time in the 3rd chamber between 24 and 48 hours? *	☐Yes	☐No
3. Is access for Maintenance vehicles provided to all chambers of the MCTT? *	☐Yes	☐No
4. Is there sufficient hydraulic head to operate the device? *	☐Yes	☐No
5. Has a bypass/overflow been provided for storms > WQV? *	☐Yes	☐No
6. Can pretreatment be provided to capture sediment and litter in the runoff (such as using biofiltration)? **	☐Yes	☐No

Treatment BMPs
Checklist T-1, Part 10

Prepared by: Christopher Hinds Date: 2-16-09 District-Co-Route: 07-LA-101
PM (KP): 33.0/34.4 (KP 53.1/55.4) EA: 25720K
RWQCB: Los Angeles RWQCB

Wet Basin

Feasibility

1.	Is the volume of the Wet Basin above the permanent pool equal to at least the WQV using a 24 to 72 hour drawdown (40 to 48 hour drawdown preferred)? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet] and the permanent pool must be at least 3x the WQV.)	☒Yes	☐No
2.	Is a permanent source of water available in sufficient quantities to maintain the permanent pool for the Wet Basin?	☐Yes	☒No
3.	Is proposed site in a location where naturally occurring wetlands do not exist?	☒Yes	☐No
	Answer either question 4 or question 5:		
4.	For Wet Basins with a proposed invert above the seasonally high groundwater, are NRCS Hydrologic Soil Groups [HSG] C and D at the proposed invert elevation, or can an impermeable liner be used? (Note: If an impermeable liner is used, the seasonally high groundwater elevation must not encroach within 12 inches of the invert.)	☒Yes	☐No
5.	For Wet Basins with a proposed invert below the groundwater table: Can written approval from the local Regional Water Quality Control Board be obtained to place the Wet Basin in direct hydraulic connectivity to the groundwater?	☐Yes	☐No
6.	Is Water Quality freeboard provided ≥ 1 foot?	☒Yes	☐No
7.	Is the maximum impoundment volume < 14.75 acre-feet?	☒Yes	☐No
8.	Would a permanent pool of water be allowed by the local vector control agency?	☐Yes	☒No
	If No to any question above, then a Wet Basin is not feasible.		
9.	Is the maximum basin width ≤ 49 ft as suggested in Section B.10.2?	☐Yes	☐No
	If No, consult with the local vector control agency and District Maintenance.		
10.	Does adequate area exist within the right-of-way to place a Wet Basin? If Yes, continue to Design Elements sections.	☐Yes	☐No
	If No, continue to Question 10.		

11. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _____ acres ☐Yes ☐No

12. If Yes, continue to Design Elements section.

    If No, continue to Question 13.

13. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐ Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Can a controlled outlet and an overflow structure be designed for storm events larger than the Water Quality event? * ☐Yes ☐No
2. Is access for Maintenance vehicles provided? * ☐Yes ☐No
3. Is the drawdown time for the WQV between 24 and 72 hours? * ☐Yes ☐No
4. Has appropriate vegetation been selected for each hydrologic zone? * ☐Yes ☐No
5. Can all design elements required by the local vector control agency be incorporated? * ☐Yes ☐No
6. Has a minimum flow path length-to-width ration of at least 2:1 been provided? ** ☐Yes ☐No
7. Has an upstream bypass been provided for storms > WQV? ** ☐Yes ☐No
8. Can pretreatment be provided to capture sediment and litter in the runoff (such as using biofiltration, or a forebay)? ** ☐Yes ☐No
9. Can public access be restricted using a fence if proposed at locations accessible on foot by the public? ** ☐Yes ☐No
10. Is the maximum depth ≤ 10 ft? * ☐Yes ☐No

Chesebro Interchange Project – Treatment BMP Hydraulic Calculations

Hydraulic Calculations for Alternative 2 & 3 BMP1 1 Proposed Bioswale

Rational Formula, $Q = CiA$

Where C – Runoff Coefficient for Paved Surfaces = 1.0
i – Rainfall intensity for this region (per PPDG) = 0.2 in./hr
A – Area of impervious surface (acres) to be treated by each Bioswale.
Q – Flow (cfs)

Tributary Area to BMP 1 Biofiltration Swale – 3.2 acres
Tributary Area to BMP 2 Biofiltration Swale – 2.8 acres
Tributary Area to BMP 2 Biofiltration Swale – 1.8 acres

Therefore,

WQF to BMP 1 Bioswale = 1.0 * (0.2in/hr) * 3.2 acres = 0.6 cfs
WQF to BMP 2 Bioswale = 1.0 * (0.2in/hr) * 2.8 acres = 0.5 cfs
WQF to BMP 3 Bioswale = 1.0 * (0.2in/hr) * 1.8 acres = 0.3 cfs

To analyze the depth of flow and velocity for the Biofiltration Swales proposed for Alternative 1-4, the Manning's equation was utilized, and an analysis was performed for open channel flow of a trapezoidal channel. The following parameters were input into the model, and may be subject to change at subsequent stages of project development:

Bottom Width – 10 feet
Manning's n – 0.20 per PPDG guidelines for a routinely mowed swale
Channel Slope – 0.5%
Side Slope Ratio – 4:1 (H:V)
Length – 150 feet

For a 25-year design storm, the flow velocity in the Biofiltration Swale BMP 1 was estimated to be 0.2 feet/second (fps), with an approximate depth of 0.26 feet. For BMP 2 Biofiltration Swale velocity was estimated at 0.19 feet/second (fps), with an approximate depth of 0.23 feet. For BMP 3 Biofiltration Swale velocity was calculated at 0.15 ft/s (fps), with an approximate depth of 0.17 ft.

For a swale to be designated as a Treatment BMP, criteria relating depth, velocity, and Hydraulic Residence Time (HRT) as presented in the formula below must be met:

$(HRT \times 60)/(depth \times velocity) \geq C$

where:

BMP 1: HRT = Hydraulic Residence Time during WQF, minutes (≥ 5 minutes)
So, HRT = Length/Velocity = 100 feet/0.2 fps = 500 seconds = **8.3 minutes,**
60 = conversion factor from minutes to seconds

BMP 2: HRT = Hydraulic Residence Time during WQF, minutes (≥ 5 minutes)
So, HRT = Length/Velocity = 100 feet/0.19 fps = 526 seconds = **8.7 minutes,**

60 = conversion factor from minutes to seconds

BMP 3: HRT = Hydraulic Residence Time during WQF, minutes (≥ 5 minutes)
So, HRT = Length/Velocity = 100 feet/0.15 fps = 667 seconds = **11.1 minutes,**
60 = conversion factor from minutes to seconds

BMP 1: depth = depth of flow at WQF (varies with velocity selected, up to 0.5 ft) = 0.26
velocity = velocity of flow at WQF = **0.6 fps**
C = A constant: 1,300 (sec^2/ft^2)

BMP 2: depth = depth of flow at WQF (varies with velocity selected, up to 0.5 ft) = 0.23
velocity = velocity of flow at WQF = **0.5 fps**
C = A constant: 1,300 (sec^2/ft^2)

BMP 3: depth = depth of flow at WQF (varies with velocity selected, up to 0.5 ft) = 0.17
velocity = velocity of flow at WQF = **0.3 fps**
C = A constant: 1,300 (sec^2/ft^2)

To determine if the following formula is met (HRT x 60) / (depth x velocity) ≥ C:

(8.3 x 60) / (0.26 x 0.20) = 9,576 ≥ 1300 (O.K.)
(8.7 x 60) / (0.23 x 0.19) = 11,945 ≥ 1300 (O.K.)
(11.1 x 60) / (0.17 x 0.15) = 26,117 ≥ 1300 (O.K.)

% WQF Calculation

Alternative 3a Proposed Treatment BMP WQF = **1.5 cfs**
Alternative 3a Total Impervious Surface Area Post Construction WQF = **1.5 cfs**

%WQF = (1.5cfs/1.5cfs) * 100 = **100%**

Chesebro Interchange Project BMP Cost Estimate

Percentage of Total Cost Method:
The Caltrans Project Planning and Design Guide (PPDG, May 2007) identifies the Percentage of Total Cost Method, as an acceptable means to estimate Storm Water Quality Best Management Practices (BMPs) for projects in the Project Initiation Document (PID) phase. Costs for Construction Site BMPs typically range from 1% to 2% of the total project cost (not including right-of-way costs). The PPDG provides adjustment factors for project specific site conditions. These adjustments are added together and multiplied by the total estimated construction cost as follows:

Description	Recommended Adjustment (%)
Baseline Cost Percentage	**1.25**
Project Cost Greater than $12,000,000	0.0
Adjustment for Type of Project	0.0
Adjustment for Work near 303(d) Water Bodies	0.0
Total Adjustment for Water Pollution Control	**1.25**

The total construction cost for the proposed build Alternatives for this project (not including right-of-way costs) are estimated to be $17,493,000 for Alternative 3 and $19,812,000 for Alternative 3a the proposed alternatives with the largest footprint. Since the recommended adjustment factor calculation identified in the PPDG (May 2007) is based upon actual construction costs for projects completed in 2003, 2004, and 2005, an additional 0.75% was added to the 1.25% factor derived above. This resulted in a 2.00% final adjustment factor.

Alternative 3 – 2.00% * $17,493,000 = $349,860
Alternative 3a – 2.00% * $19,812,000 = $396,240

Therefore, the PID phase estimates for Water Pollution Control are $349,860 for Alternative 3 and $396,240 Alternative 3a.

Since Treatment BMPs are not defined well enough at the PID phase, the PPDG recommends that $100,000 to $250,000 per lane mile should be added to cover costs associated with incorporating Treatment BMPs for Major Reconstruction Projects. The lower end of this range would apply to projects such as this, that are not adjacent to a 303(d) listed water body. However, since the $100,000 per lane mile figure was based upon actual construction costs for projects completed in 2003, 2004, and 2005, a 20% contingency factor was added to handle any unforeseen costs. The proposed project is anticipated to result in the addition of 2.31 lane miles for Alternative 3 and Alternative 3a the proposed alternatives with the largest footprint.

Alternative 3 and Alternative 3a – 2.31 * $100,000 = $231,000 * 1.20 = $277,200

Therefore, the PID phase estimate for Treatment BMPs are $277,200.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	101	33.0/34.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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

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CITY OF AGOURA HILLS
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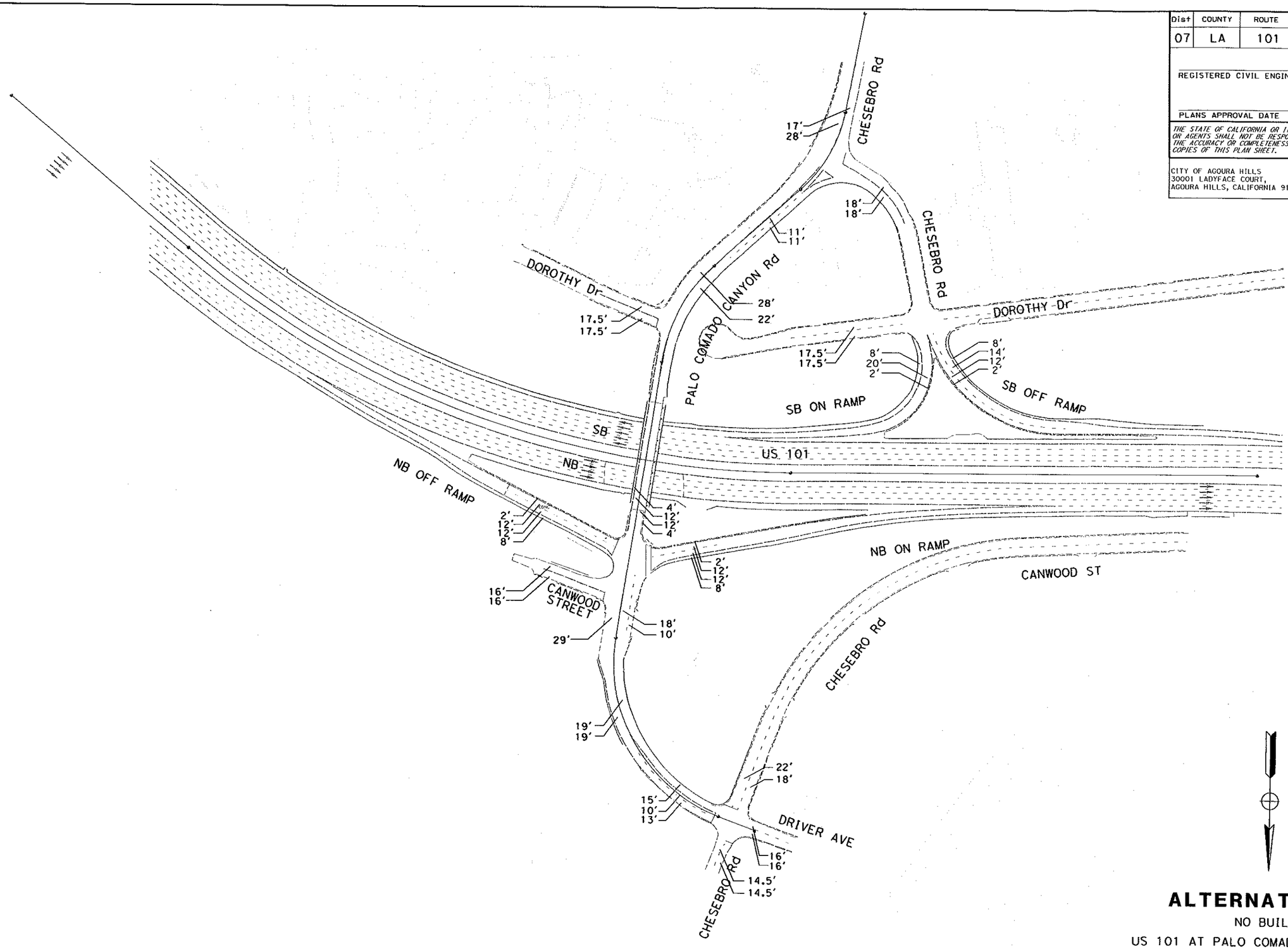
SUITE 200
IRVINE, CALIFORNIA 92612



ALTERNATIVE 1

NO BUILD

US 101 AT PALO COMADO CANYON ROAD
INTERCHANGE PROJECT
SCALE: 1"= 100'

ALL DIMENSIONS ARE IN FEET
UNLESS OTHERWISE SHOWN

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 10/24/2008 | TIME PLOTTED => 10:24:32 AM

BORDER LAST REVISED 3/1/2007

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => p0032249
DGN FILE => H:\646928_US101_CHESEBRO\REF\Alt-nobuild.dgn

CU 00000

EA 000000

MANDATORY DESIGN EXCEPTIONS				
#	HDM	DESCRIPTION	STANDARD	PROPSOED
M1	HDM 504.3(3)	LOCATION OF RAMP INTERSECTIONS	400'	212'
M2	HDM 309.2(1)	VERTICAL CLEARANCE	16.5' at ES	15.0' at ES
M3	HDM 202.2	STANDARDS FOR SUPERELEVATION	e=0.10	e=-0.02

ADVISORY DESIGN EXCEPTIONS				
#	HDM	DESCRIPTION	STANDARD	PROPOSED
A1	HDM 202.5	SUPERELEVATION TRANSITION	1% PER 2500'	6% PER 100' MAX
A2	HDM 504.3(3)	LOCATION OF RAMP INTERSECTIONS	500'	212'

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	101	33.0/34.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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

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IRVINE, CALIFORNIA 92612

CITY OF AGOURA HILLS
30001 LADYFACE COURT,
AGOURA HILLS, CALIFORNIA 91301

CHESEBRO Rd

DOROTHY Dr

PALO COMADO CANYON Rd

Exist OH ELECTRIC AND COMMUNICATION LINE
PROTECT IN PLACE

FIBER OPTIC LINE
PROTECT IN PLACE

SB ON RAMP

SB OFF RAMP

US 101

SOUTH BOUND

NORTH BOUND

NB OFF RAMP

NB ON RAMP

CANWOOD ST

Exist R/W

CONDUIT
PROTECT IN PLACE

21" Swr (42" Conc Csg)
PROTECT IN PLACE

RAMP METERING
CABINETS

18" CMP
PROTECT IN PLACE

R 350'

DRIVER AVE

ALTERNATIVE 2

WIDENING

US 101 AT PALO COMADO CANYON ROAD
INTERCHANGE PROJECT
SCALE: 1"= 100'

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

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BORDER LAST REVISED 3/1/2007

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => p0032249
DGN FILE => H:\646928_US101_CHESEBRO\REF\Alt-1a-71408.dgn

CU 00000 | EA 25720K

MANDATORY DESIGN EXCEPTIONS				
#	HDM	DESCRIPTION	STANDARD	PROPOSED
M1	HDM 504.3(3)	LOCATION OF RAMP INTERSECTIONS	400'	226'
M2	HDM 309.2(1)	VERTICAL CLEARANCE	16.5' at ES	15.0' at ES
M3	HDM 202.2	STANDARDS FOR SUPERELEVATION	NB OFF-RAMP e=0.12	NB OFF-RAMP e=0.03
			NB ON-RAMP e=0.10	NB ON-RAMP e=-0.02

ADVISORY DESIGN EXCEPTIONS				
#	HDM	DESCRIPTION	STANDARD	PROPOSED
A1	HDM 202.5	SUPERELEVATION TRANSITION	1% PER 2500'	6% PER 100' MAX
A2	HDM 502.2	POTENTIAL OF WRONG-WAY MOVEMENT		
A3	HDM 504.3(3)	LOCATION OF RAMP INTERSECTIONS	500'	212'
A4	HDM 504.8	ACCESS CONTROL		

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	101	33.0/34.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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

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CITY OF AGOURA HILLS
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CHESEBRO Rd
DOROTHY Dr
PALO COMADO CANYON Rd
Exist OH ELECTRIC AND COMMUNICATION LINE PROTECT IN PLACE
FIBER OPTIC LINE PROTECT IN PLACE
SB ON RAMP
SB OFF RAMP
US 101
SOUTH BOUND
NORTH BOUND
NB OFF RAMP
NB ON RAMP
CANWOOD ST
PROPOSED R/W
SCHOOL ACCESS RD (BY OTHERS)
RAMP METERING CABINETS
CONDUIT PROTECT IN PLACE
21" Swr (42" Conc Csg) PROTECT IN PLACE
18" CMP PROTECT IN PLACE
DRIVER AVE
R 350'
R 215'
R 850'

ALTERNATIVE 3& 3A

WIDENING

US 101 AT PALO COMADO CANYON ROAD
INTERCHANGE PROJECT
SCALE: 1"= 100'

ALL DIMENSIONS ARE IN FEET
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LAST REVISION 00-00-00
DATE PLOTTED => 2/19/2009
TIME PLOTTED => 8:40:25 AM

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
CONSULTANT FUNCTIONAL SUPERVISOR
CALCULATED-DESIGNED BY
CHECKED BY
REVISED BY
DATE REVISED

BORDER LAST REVISED 3/1/2007

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

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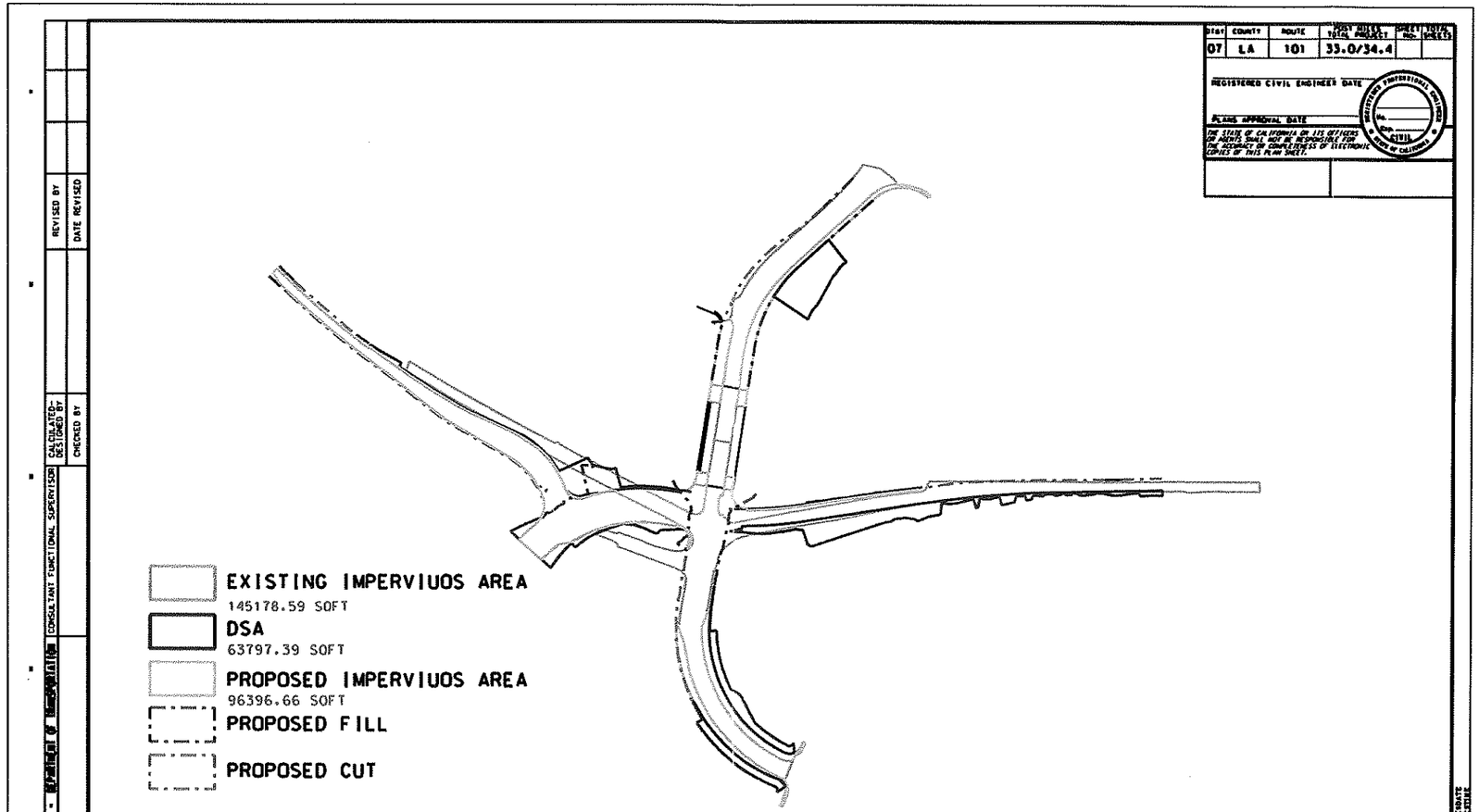
CU 00000

EA 25720K



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	101	33.0/34.4		

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 THIS PLAN SHEET.

ALTERNATIVE

US 101 AT PALO COMADO CANYON ROAD
INTERCHANGE PROJECT
SCALE: 1"= 100'

ALL DIMENSIONS ARE IN FEET
UNLESS OTHERWISE SHOWN

BORDER LAST REVISED 3/1/2007

RELATIVE BORDER SCALE TO BE IN INCHES 0 1 2 3

USERNAME => USER
DGN FILE => SWDR.DGN

CU 00000

EA 000000

DATE PLOTTED => DATE
10-30-08 TIME PLOTTED => TIME

REVISED BY

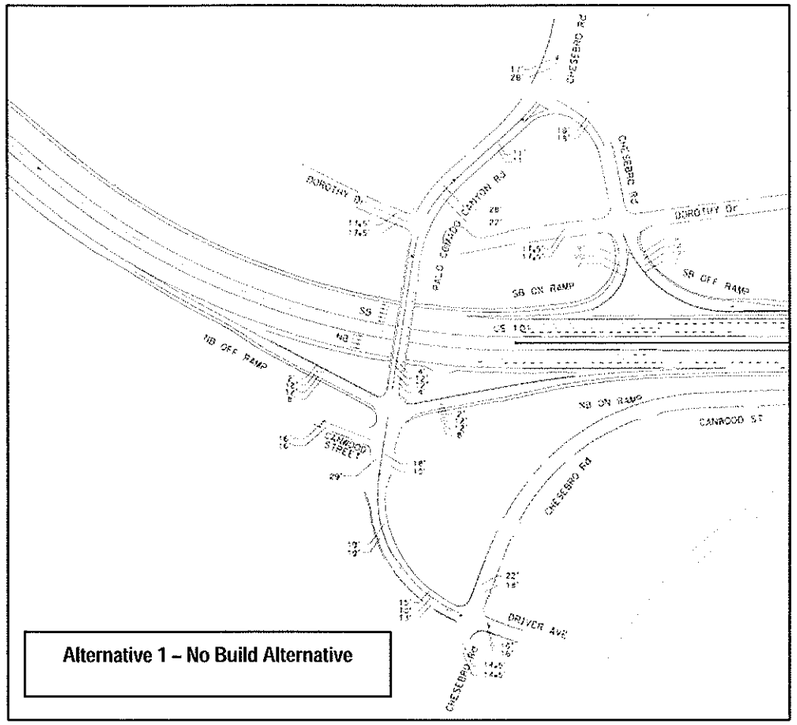
DATE REVISED

CALCULATED/DESIGNED BY

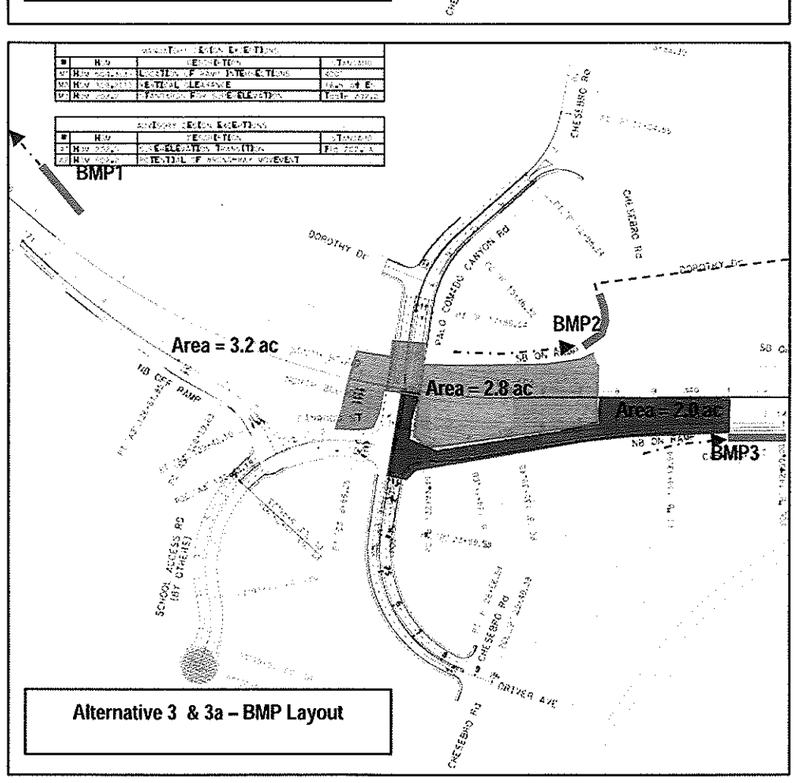
CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

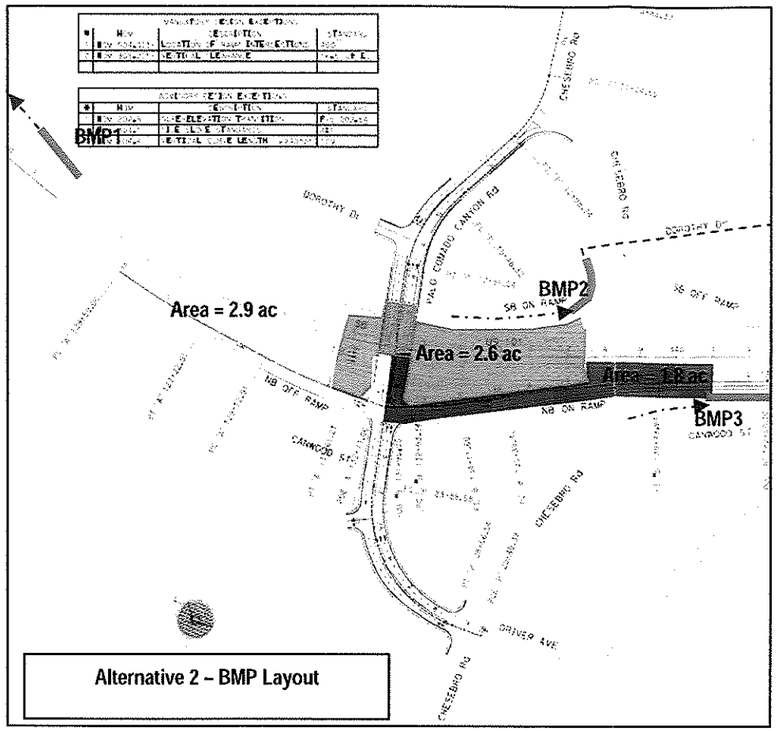
...\SWDR\SWDR-Alt-3.dgn 11/10/2008 3:21:56 PM



Alternative 1 – No Build Alternative

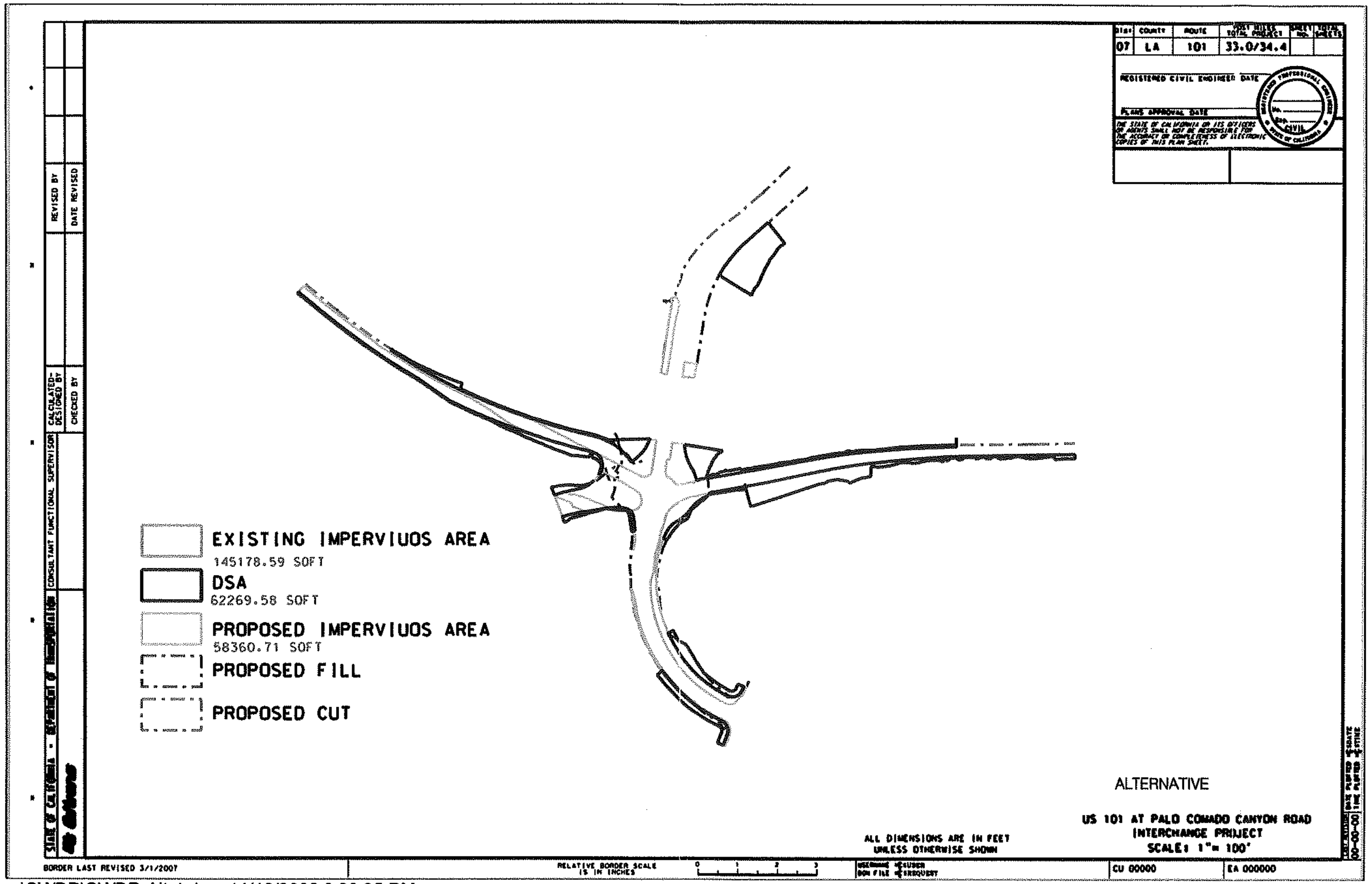


Alternative 3 & 3a – BMP Layout



Alternative 2 – BMP Layout

BMP Layout Sheet



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