SR 710 North Study

Storm Water Data Report

Prepared for

Metro

Los Angeles County
Metropolitan Transportation Authority

September 2014

Dist-County-Route: 07-LA-710
Post Mile Limits: PM 26.7/32.1T
Project Type: New Roadway Construction
Project ID (or EA): 0700000191
Program Identification: 20.XX.075.600, 20.30.010.680,20.XX.025.700
Phase: ☒ PID ☐ PA/ED ☐ PS&E

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

Is the Project required to consider 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 30 days prior to the projects RTL date. List RTL Date: _____

Total Disturbed Soil Area: 21.3 to 93.0 ac Risk Level: 2
Estimated: Construction Start Date: June 1, 2019 Construction Completion Date: June 1, 2024
Notice of Intent (NOI) Date to be submitted: April 30, 2019

Erosivity Waiver	Yes ☐	Date: _____	No ☒
Notification of ADL reuse (if Yes, provide date)	Yes ☐	Date: _____	No ☒
Separate Dewatering Permit (if yes, permit number)	Yes ☒	Permit # T.B.D.	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 date upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

Tianpeng Guo, Registered Project Engineer — Derek Higa, Caltrans Designated Oversight Representative — 12/4/14 Date

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

John Lee, Project Manager — 12/9/14 *Date*

Roger Castillo, Designated Maintenance Representative — 12-11-14 *Date*

Ron Russak, Designated Landscape Architect Representative — 12.12.14 *Date*

[Stamp Required for PS&E only) *Shirley Pak, District/Regional Design SW Coordinator or Designee* — 12/12/2014 *Date*

STORM WATER DATA INFORMATION

1. Project Description

- The California Department of Transportation (Caltrans), in cooperation with the Los Angeles Metropolitan Transportation Authority (Metro) proposes transportation improvements to improve mobility and relieve congestion in the area between State Route (SR) 2 and Interstates (I) 5, 10, 210, and 605 in east/northeast Los Angeles and the San Gabriel Valley. The study area is centrally located within the extended urbanized area of Southern California.

  The purpose of the project is to effectively and efficiently accommodate regional and local north-south travel demands in the study area of the western San Gabriel Valley and east/northeast Los Angeles, including the following considerations: 1) improve efficiency of the existing regional freeway and transit networks; 2) reduce congestion on local arterials adversely affected due to accommodating regional traffic volumes; and 3) minimize environmental impacts related to mobile sources.

- The five alternatives being evaluated are No-Build, Transportation System Management/Transportation Demand Management (TSM/TDM), Bus Rapid Transit (BRT), Light Rail Transit (LRT), and Freeway Tunnel.

  No Build Alternative — The No Build Alternative does not include any planned improvements to the SR 710 Corridor.

  TSM/TDM Alternative — The TSM/TDM Alternative consists of strategies and improvements to increase efficiency and capacity for all modes in the transportation system with lower capital cost investments and/or lower potential impacts. The TSM/TDM Alternative is designed to maximize the efficiency of the existing transportation system by improving capacity and reducing the effects of bottlenecks and chokepoints. TSM strategies include Intelligent Transportation Systems (ITS), local street and intersection improvements, and Active Traffic Management (ATM). The TDM strategies include expanded bus service, bus service improvements, and bicycle improvements. TSM/TDM improvements spread at 35 local intersections, 7 local street segments, 2 street extensions, and 1 interchange improvement within the cities of Los Angeles, Pasadena, South Pasadena, Alhambra, San Gabriel, Rosemead, and San Marino.

  The cost for this TSM/TDM Alternative is estimated to be $105 million.

  BRT Alternative — The BRT Alternative would provide high-speed, high-frequency bus service through a combination of new, dedicated, and existing bus lanes, and mixed-flow traffic lanes to key destinations between East Los Angeles and Pasadena. The BRT Alternative includes the BRT trunk line arterial street and station improvements, frequent bus service, new bus feeder services, and enhanced connecting bus services. The proposed route length is approximately 12 miles.

  The cost for this BRT Alternative is estimated to be $135 million.

  LRT Alternative — The LRT Alternative would include passenger rail operated along a dedicated guideway, similar to other Metro light rail lines. The LRT alignment would begin at an aerial station on Mednik Avenue adjacent to the existing East Los Angeles

Civic Center Station on the Metro Gold Line and end at an underground station beneath Raymond Avenue adjacent to the existing Fillmore Station on the Metro Gold Line. The LRT is approximately 7.5 miles long, with 3 miles of aerial segments and 4.5 miles of bored tunnel segments.

The total cost for this LRT alternative is estimated to be $2.4 billion. Excluding the tunnel section, the cost is $974 million approximately.

Freeway Tunnel Alternative — The alignment for the Freeway Tunnel alternative starts at the existing southern stub of SR 710 in Alhambra, just north of I-10, and connects to the existing northern stub of SR 710, south of the I-210/SR 134 interchange in Pasadena. The Freeway Tunnel alternative is approximately 6.3 miles long, with 4.2 miles of bored tunnel, 0.7 mile of cut-and-cover tunnel, and 1.4 miles of at-grade segments. The Freeway Tunnel Alternative includes two design variations. These variations relate to the number of tunnels constructed. The dual-bore design variation includes two tunnels that independently convey northbound and southbound vehicles. The single-bore design variation includes one tunnel that carries both northbound and southbound vehicles. The bored tunnel would have an outside diameter of approximately 60 feet and would be located approximately 120 to 160 feet below surface. Short segments of cut-and-cover tunnels would be located at the south and north termini to provide access via portals to the bored tunnels. The portal at the southern terminus would be located south of Valley Boulevard. The portal at the northern terminus would be located north of Del Mar Boulevard.

The costs for the dual-bore alternative and single-bore alternative are estimated to be $5.6 billion ($1.1 billion, excluding tunnel section) and $3.1 billion ($720 million, excluding tunnel section), respectively.

- Construction of the project would disturb the existing soils as a result of the following activities: construction of soundwall/retaining wall, widening, and grading of the resulting cut/fill slopes. Disturbed soil area (DSA) is calculated based on existing topography and proposed grading plans. Table 1 presents the DSA for each alternative.

Table 1 Disturbed Soil Area

Alternative	Disturbed Soil Area (ac)		
	Within Caltrans ROW	Outside Caltrans ROW	Total
TSM/TDM	5.7	15.6	21.3
BRT	1.0	33.5	34.5
LRT	3.9	29.4	33.3
Freeway Tunnel:			
Single-Bore	80.6	0.0	80.6
Dual-Bore	93.0	0.0	93.0

- Impervious surface areas within Caltrans right-of-way and outside Caltrans right-of-way for each alternative are quantified and listed in Table 2.

Table 2 Existing and Proposed Impervious Area

Alternative	Existing Impervious Area (ac)	Proposed Impervious Area (ac)	Net New Impervious area (ac)
Within Caltrans ROW			
TSM/TDM	11.9	11.7	-0.2
BRT	5.8	5.8	0.1
LRT	2.6	8.1	5.5
Freeway Tunnel			
Single-Bore	34.9	36.6	1.7
Dual-Bore	41.6	55.2	13.5
Outside Caltrans ROW			
TSM/TDM	91.6	95.6	4.0
BRT	111.2	112.2	1.1
LRT	20.6	31.5	11.0
Freeway Tunnel			
Single-Bore	0.0	0.0	0.0
Dual-Bore	0.0	0.0	0.0

- The project lies within the Los Angeles Municipal Separate Storm Sewer System (MS4) permit (National Pollutant Discharge Elimination System [NPDES] No. CAS004001).

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

- The Receiving Water Bodies for this project are identified as Arroyo Seco Reach 1, Rio Hondo Reach 2 and Los Angeles River Reach 2. The project is located within three Hydrologic Sub Areas (HSAs): 412.10, 412.25 and 412.31, as presented in Table 3.

Table 3 Hydrologic Areas

HSA	Sub-Area	Area	Unit
412.10	Undefined	Los Angeles	Los Angeles River
412.25	Eagle Rock	San Fernando	Los Angeles River
412.31	Pasadena	Raymond	Los Angeles River

- The Pollutants of Concern for the project are identified based on California's 2010 303(d) list. Arroyo Seco Reach 1 has been designated as impaired for benthic-macroinvertebrate bioassessments, coliform bacteria, and trash. Rio Hondo Reach 2 has been designated as impaired for coliform bacteria and cyanide. Los Angeles River Reach 2 has been designated as impaired for ammonia, coliform bacteria, copper, lead, nutrients (algae), oil, and trash.

- Clean Water Act 401 Certification is required for any project that may result in a discharge into the waters of the state to ensure that the proposed project will not violate state water quality standards. The project will not require Regional Water Quality Control Board (RWQCB) 401 Certification because no direct discharges to waters of the state are anticipated.
- There are no drinking water reservoirs or recharge facilities within the project limits.
- The project limits are in the Los Angeles River watershed. The total maximum daily loads (TMDLs) are:

  Los Angeles River

  Established TMDL

  Los Angeles River Trash TMDL

  The Los Angeles River Trash TMDL became effective August 28, 2002. Caltrans is proceeding with Trash TMDL Implementation Projects, which are to retrofit Gross Solids Removal Devices (GSRDs) at the existing drainage outfalls in the right-of-ways. Table 4 lists those Trash TMDL Implementation Projects that are either in construction or completed. Any projects that overlap within the limits of freeway corridors listed in Table 4 are not required to consider GSRDs for those overlapping limits. However, Project Engineers shall consider placing infiltration basins or media filters as much as possible in lieu of GSRDs at existing and proposed drainage systems.

Table 4 TMDL Implementation Projects

EA	Route	Post Mile		Status
		From	To	
226611	405	30.31	36.15	Completed
226711	60	2.7	6.6	Completed
	710	22.5	23.8	
2266A1	5	27.62	28.15	Completed
	10	9.02	13.82	
	90	1.84	2.70	
2267A1	10	5.59	8.80	Completed
	91	10.25	13.88	
	105	8.25	13.15	
	110	21.65	23.61	
231311	2	15.40	21.64	Completed
	101	7.21	7.21	
	170	14.78	19.92	
	134/710	13.34	13.34	
	210	22.73	23.88	
	405	25.46	29.41	

235901	5	16.35	16.35	Completed
	101	12.70	26.50	
	134	0.00	9.86	

Los Angeles River Nitrogen Compounds and Related Effects TMDL

The Los Angeles River Nitrogen Compounds and Related Effects TMDL became effective March 23, 2004. The TMDL requires the Storm Water NPDES Permittees to submit a Monitoring Work Plan by March 23, 2005, to estimate nitrogen loadings associated with runoff from the storm drain systems. The County of Los Angeles has submitted the Monitoring Work Plan as required on behalf of Caltrans and other Storm Water NPDES Co-Permittees in the watershed. Targeted pollutants are total ammonia as nitrogen (NH3-N), nitrate-nitrogen (NO_3-N), nitrite-nitrogen (NO2-N), and nitrate-nitrogen plus nitrite-nitrogen (NO_3-N + NO_2-N). The Caltrans monitoring data depict Caltrans discharges to be below the TMDL limits; thus, no additional measures are needed to be considered for meeting the conditions of the Nitrogen TMDL.

Los Angeles River and Tributaries Metals TMDL

The Los Angeles River and tributaries Metals TMDL became effective on January 11, 2006. Caltrans will work with five groups of responsible agencies toward compliance of the TMDL. Targeted pollutants are total copper (Cu), lead (Pb), zinc (Zn), cadmium (Cd), and selenium (Se). Project Engineers shall consider treatment controls for the project and consult with the District Storm Water Coordinator.

Total Maximum Daily Loads for Indicator Bacteria in the Los Angeles River

The Total Maximum Daily Loads for Indicator Bacteria in the Los Angeles River became effective on March 23, 2012. The TMDL requires the responsible agencies, including Caltrans, to reduce the number of exceedance days of bacteria concentrations in the Los Angeles River and achieve waste load allocations in 25 years. Caltrans will be working with groups of responsible agencies to jointly comply with the TMDL. The Project Engineer shall consider treatment controls for the project and consult with the District NPDES Storm Water Coordinator.

Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL

Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL became effective on March 23, 2012. Targeted pollutants are copper, lead, zinc, PAH, DDT, PCBs, Benzopyrene and Dieldrin for water column in the channel and harbors, and for sediments in the harbors. The TMDL requires the dischargers of the Los Angeles River and the San Gabriel River to monitor water quality at the mouth of each River. Caltrans will participate in groups of agencies to jointly comply with the TMDL. Project engineers shall consider treatment controls for the project and consult with the District NPDES Storm Water Coordinator.

- The BMPs proposed for this project are consistent with Caltrans and local MS4 permit requirements. The BMPs proposed for the project are also approved for consideration

by local agencies. No other local agency requirements and concerns regarding water quality are anticipated.

- The project design considerations, including climate, soil, topography, geology, groundwater, and right-of-way requirements, are discussed below.

  Climate. The project site has a Mediterranean-type climate characterized by long dry summers and mild winters. Overall, the climate of the area is relatively mild, with summer daytime high temperatures averaging about 82 degrees Fahrenheit (°F), with overnight lows of 63 °F. Winter daytime high temperatures are up to around 63 °F on average, with overnight lows of 48 °F; and during this season, rain is common.

  Nearly all precipitation occurs during the months of December through March. Precipitation during summer months is infrequent, and rainless periods of several months are common. The average annual precipitation is approximately 15 inches.

  Topography. The San Gabriel Valley, which encompasses the project area, is essentially a flat, gently south-sloping surface consisting of ancient (Pleistocene age) alluvial fans, flood plain, and basin fill alluvium. Elevations in the northern part of the valley are in the 800- to 900-foot range, whereas in the south, elevations are in the 400- to 500-foot range. The flatness of the San Gabriel Valley surface is interrupted by several small hills and knolls, which are outliers of the Repetto Hills and San Rafael Hills.

  Geology and Soil. The project area has a diverse geology. Quaternary-age alluvium occurs as narrow valley fill in the valleys of the Repetto Hills and over the entire San Gabriel Valley. Alluvium is present at the northern portion of the zone where it is approximately 500 to 600 feet thick, and at the southern portion of the zone where it is much thinner and on the order of 0 to 50 feet thick. Alluvium at the northern portion of the zone is expected to consist of clay, silt, and sand with a major component of gravels and cobbles and some boulders, all composed of igneous and metamorphic rocks. The alluvium in the small valleys of the Repetto Hills is more silty and clayey with a smaller proportion of sand and gravel.

  The central part of the project area is composed of the Puente and Topanga Formations, separated by a fault on the north flank of the South Pasadena Anticline. The Puente Formation ranges from soft to moderately hard, well-bedded siltstone, mudstone, and sandstone, and minor local zones of carbonate-cemented beds from hard rock. The Puente Formation in the southern portion of the project area includes white to very pale-brown, soft, siliceous shale and thin-bedded mudstone. The Topanga Formation occurs in the northern half of the project area. The Topanga Formation includes a wide variety of rock types ranging from coarse-grained rocks to fine-grained sandstone and siltstone with minor claystone (mudstone). The part of the Topanga Formation south of the Raymond fault is predominantly thin- to thick-bedded siltstone with thin interbeds of sandstone and shale. The Topanga Formation north of the Raymond fault is predominantly sandstone, conglomerate, and breccias.

  Groundwater. The historically highest groundwater in the sand and gravel deposits is shallowest on the north side of the Raymond fault, where historically it has seeped or risen to the ground surface and formed small ponds and springs. According to the California Division of Mines and Geology (CDMG) Seismic Hazard Evaluation of the

Los Angeles 7.5-Minute Quadrangle, the water level has been as shallow as 10 feet. The depth to groundwater gradually increases both northerly and southerly to about 200 feet below ground surface (bgs) south of the Raymond fault zone, and to about 100 feet bgs north of the Raymond fault zone. Groundwater depth varied from 13 to 158 feet bgs in the piezometers installed as part of the Final Geotechnical Summary Report, SR 710 Tunnel Technical Study (CH2M HILL, April 2010).

A pressurized-face tunnel boring machine (TBM) is ideally suited due to the presence of high groundwater pressures combined with the varying permeability and strength of the soil units, including mixed face conditions (i.e., rock and soil in the excavation face) within the alternatives. To ensure that water flows are controlled behind the TBM, a relatively watertight initial support system would be required, such as a bolted, gasketed, precast segmental reinforced concrete lining system when tunneling in saturated alluvium or under the groundwater. To prevent or minimize water inflows into the tunnel, supplemental grouting operations would likely be used in conjunction with the bolted, gasketed, precast concrete lining system to satisfy the long-term operational requirements of the tunnel.

Right-of-Way. The project is located within the urbanized Los Angeles Metropolitan area. Existing developments within the project area consist primarily of single-family residential structures with some apartment and condominium buildings and local businesses along some of the major arterial streets. The northern part of the zone in the Pasadena area has a much greater number of commercial enterprises than the southern two-thirds of the area, which is largely residential.

Overall right-of-way acquisition needs are anticipated to be approximately from $9 million to $30 million for different alternatives in the project.

- Information for the Hydrologic Soil Group (HSG) was referenced from the Los Angeles County Department of Public Works (LACDPW) Hydrology Manual. The LACDPW Hydrology Manual was first used to obtain the soil name, and then the 2007 version of the Project Planning and Design Guide (PPDG) was used to convert the soil name to the HSG. The soil is classified as HSG Type D soil throughout the project study area.
- The Build Alternatives are identified as Risk Level 2. The risk level has been determined based on the most conservative construction schedule of the Freeway Dual-bore Alternative. See the required attachments for details on the Risk Level Determination.
- It is not anticipated that this project would reuse soil that contains aerially deposited lead (ADL). No ADL studies have been conducted to date. Final design/construction will identify and address ADL requirements.
- Aside from a right-of-way acquisition cost for the project, no additional right-of-way costs are anticipated for BMPs.
- The project will be designed to avoid or reduce stormwater impacts wherever feasible. Slope disturbance and cut-and-fill slopes will be minimized. Alternative materials for facilities will be utilized wherever feasible to reduce future maintenance impacts on water quality. Project construction schedules will be phased to minimize construction

during the rainy season as much as possible. Ease of maintenance will be considered as well.

Dry weather flows generated by Caltrans are not anticipated to be persistent within the project limits.

- There is one existing GSRD within the project limits, located on SR-710 south of Del Mar Blvd.

3. Regional Water Quality Control Board Agreements

- The project site lies within the jurisdiction of RWQCB Region 4 (Los Angeles). The Los Angeles RWQCB requires all new/major reconstruction projects that increase impervious area to evaluate the feasibility of post construction Treatment BMPs as a condition of the permit process. It has been determined that the following BMPs will be incorporated into the project: five biofiltration swales and two GSRDs to meet the permit requirement.
- This project does not qualify for a CE (Categorical Exemption); the following permits have the following impacts on storm water: NPDES Statewide Storm Water permit (Order No. 2012-0011-DWQ, NPDES No. CAS000003) and Construction General Permit (Order No. 2009-0009-DWQ, NPDES General Permit No. CAS 000002).
- A Notice of Intent (NOI) shall be submitted to the State Water Resources Control Board (SWRCB) 30 days prior to construction.

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

- A short narrative summarizing the responses to Checklist DPP-1, Parts 1 through 5, is provided below.

- The permanent erosion control strategy will be designed so that the project will not pose additional risk above pre-construction conditions. Design Pollution Prevention (DPP) BMPs will be incorporated to effectively limit sediment yield and stabilize the project site in compliance with the Construction General Permit (CGP) Part II.D,

- Qualitative benefits of DPP BMPs include reducing the mobilization of sediment and other pollutants in stormwater, increasing the detention time to allow for infiltration, reducing overall pollutant loads by reducing volumetric discharges, and ancillary filtration and infiltration within vegetated conveyances. Final DPP BMPs, slope conditions, and landscape and maintenance plans will be developed at the Plans, Specifications, and Estimates (PS&E) phase.

Downstream Effects Related to Potentially Increased Flow, Checklist DPP-1, Parts 1 and 2

- The stormwater runoff from the project site would marginally increase flow volumes and velocities.
- For the tunnel sections of the project, there is no increase in runoff flow or velocity. For the at-grade sections, the project will widen the outside shoulder at some locations,

resulting in an increase of paved area for the project. All existing inlets and pipes on the shoulder will be abandoned, removed, or adjusted to the new surface elevation.

- The project site drains to the Arroyo Seco, Rio Hondo and Los Angeles River. All channels, to which drainage systems outfall, are concrete-lined.
- Potential increased erosion from higher runoff flows would be minimized using erosion control measures such as rock slope protection (RSP).
- Any adverse impacts to the downstream channel conditions and sediment loading potential are anticipated to be minor.

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

- In the project area, most existing slopes are 2:1 (horizontal to vertical). Only a few areas are flatter than 2:1 (H:V) and vary between 2:1 and 4:1 (H:V). Construction of the project requires the creation of new cut-and-fill slopes, which are proposed to be 2:1 to 4:1 (H:V).
- There is currently no protection provided by hard-surface methods. Existing slopes are covered by vegetation or mulch. Slope surface protection for the new cut-and fill slopes would be provided using either vegetative or hard-surface methods. Retaining walls will be incorporated to reduce steepness of slopes or to shorten slopes. Slopes will be rounded and shaped to reduce concentrated flow.
- The proposed permanent erosion control strategy will be to use vegetative cover to protect new slopes of 2:1 or flatter. Vegetation and landscaping on existing slopes will be preserved to the greatest extent possible.
- The Erosion Prediction Procedure will be used to validate erosion control design at PS&E phase.
- Approval of the Erosion Control Plan by Landscape Architecture and Maintenance will be pursued at PS&E.
- Concrete slopes may be proposed at abutment locations.

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

- Where the cut slopes are steeper than 4:1 or where sheet flow from the roadway is not possible or must be avoided, asphalt concrete dikes, toe of fill ditches, and downdrains/overside drains will be used to control runoff and minimize gullies and scour.

  Where cross-culverts convey onsite and offsite runoff under the highway, flared end sections will be specified at the inlet/outlet of the culverts; and RSP will be provided at the culvert outlets to minimize scour and erosion at cross-culvert transitions.

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

- This portion of SR 710 is classified as “landscaped.” All existing planting that is removed or disturbed due to construction will be replaced to the extent feasible following Caltrans Replacement Planting Policy and Procedure.

- At this phase of the project, no areas have been identified as off-limits to the Contractor.
- Disturbed areas will be minimized to the maximum extent possible.

The cost for DPP BMPs is estimated to be in the range from $ 0.3 million to $9.2 million, which includes flared end sections, rock slope protection, asphalt concrete dike, overside drains, and landscaping. No additional right-of-way is needed for erosion control. The cost summary is presented in the attachments.

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

A short narrative summarizing the responses to Checklist T-1, Parts 1 through 10, is provided below.

Treatment BMP Strategy, Checklist T-1

- A project must consider treatment for a Targeted Design Constituent (TDC) when an affected water body within the project limits is on the 303(d) list for one or more of these constituents. The TDCs identified for this project are ammonia (nitrogen), nutrients (phosphorus), dissolved copper, total copper, total lead, and dissolved zinc.

  The water quality depth and water quality flow (WQF) have been negotiated between the SWRCB and each of the local RWQCBs, and should be used as the basis for designing volume- and flow-based Treatment BMPs, respectively. For the project, Region 4 (Los Angeles) has established a water quality depth for the project site of 0.75 inch, based on Basin Sizer (Caltrans method). The WQF is based on a precipitation rate of 0.20 inch per hour (inch/hr).
- The Treatment BMP strategy is to consider the existing site constraints and determine the feasibility of BMP implementation at the site-specific location. The goal is for the BMPs to retain and treat the paved area runoff to the maximum extent practicable (MEP). Treatment BMPs have been evaluated individually for implementation on the proposed project in accordance with the guidelines provided in the *Project Planning and Design Guide* (PPDG) (Caltrans, 2010) and the Los Angeles County Standard Urban Storm Water Mitigation Plan (SUSMP). According to the current Caltrans NPDES permit, the strategy is to first evaluate Treatment BMPs that infiltrate, harvest and reuse, and/or evapotranspire the stormwater runoff, followed by BMPs that capture and treat the runoff. Where the entire runoff volume from an 85th percentile 24-hour storm event cannot be infiltrated, harvested and reused, or evapotranspired, the excess volume may be treated by Low-Impact Development (LID)-based flow-through treatment devices. Where LID-based flow-through treatment devices are not feasible, the excess volume may be treated through conventional volume-based or flow-based stormwater treatment devices.

  For the project, biofiltration swales are the primary Treatment BMPs proposed within Caltrans right-of-way. Treebox filters, bioretention, catch basin screen and insert and media filters are proposed outside Caltrans right-of-way.

  The individual treatment BMPs proposed and percentage of impervious area treated by the BMPs will be analyzed in the PA/ED phase.

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

Biofiltration swales are feasible Treatment BMPs that can be incorporated into the project. Coordination with the District Landscape Architect will be required to determine which seed mix is preferred for this project. The biofiltration swales will be compost-amended to promote retention and evapotranspiration

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

- Dry weather diversions are not appropriate for this project because dry weather flows generated by Caltrans are not anticipated to be persistent.

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

- Infiltration devices are not appropriate for the project because the project area is located in HSG D, which is not appropriate for infiltration.

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

- Detention devices are not incorporated into the project because adjacent right-of-way areas are too steep and are not feasible for detention devices.

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

Both of the receiving waters, Arroyo Seco Reach 1 and Los Angeles River Reach 2, are impaired for trash. Arroyo Seco Reach 1 has been identified on the 303(d) list for trash. TMDLs for trash have been established for the Los Angeles River. GSRDs can be incorporated into the project, located downstream of the pump stations at both the north and south portals in the freeway tunnel alternative.

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

- The project is not located where sand or other traction-enhancing substances are applied to the roadway at least twice per year. Therefore, Traction Sand Traps are not proposed.

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

- Media filters are not incorporated into the project. Adequate area does not exist within the right-of-way for earthen media filters, and there is no opportunity to purchase additional right-of-way because the adjacent areas are too steep and not appropriate for BMPs. While a concrete-vault Austin filter or Delaware filter is feasible at one location near the south portal, compost-amended biofiltration swales are preferred over concrete-vault media filters.

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

- The project site does not contain a critical pollutant source area, such as vehicle service facilities, parking areas, paved storage areas, and fueling stations. Therefore, MCTTs are not feasible and not recommended for implementation on this project.

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

- The project site does not have a permanent source of water to maintain a pool, and the groundwater is too far below the surface to be considered as a source of water. Therefore, a wet basin is not feasible and is not proposed to be incorporated on this project.

The cost for Treatment BMPs is estimated to be in the range from $0.3 million to $1.4 million. The cost summary is presented in the attachments.

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

A short narrative summarizing the selected Construction Site BMPs is provided in the bullets below.

- The following Construction Site BMPs would be implemented and included as separate Bid Line Items.
    - Move-in/Move-out (Temporary Erosion Control)
    - Temporary Hydraulic Mulch (Bonded Fiber Matrix)
    - Temporary Concrete Washout
    - Temporary Check Dams
    - Temporary Fiber Rolls
    - Temporary Construction Entrance
    - Temporary Drainage Inlet Protection
    - Rain Event Action Plan
    - Storm Water Annual Report
    - Storm Water Sampling and Analysis Day
- The following Job Site Management BMPs would be implemented and incorporated as a lump sum. It is anticipated that the project may employ:
    - Water Pollution Control
        - Storm Water Pollution Prevention Plan (SWPPP) Preparation
        - Construction Site Monitoring Program
        - Storm Water Sampling and Analysis
        - Additional Water Pollution Control
        - Water Pollution Control Maintenance Sharing
    - Construction Site Management
        - Spill Prevention and Control
        - Material Management

        - Material Storage
        - Stockpile Management
        - Waste Management
        - Non-Storm Water Management
        - Dewatering Activities
    - Street Sweeping
- This project is identified as Risk Level 2. Monitoring locations and activities will be identified during the PS&E phase.
- Dewatering will be required to remove accumulated precipitation during storm events, or may be required during excavation of the Freeway Tunnel alternative and LRT alternative. A separate dewatering permit will be issued during the final design stage.
- Active treatment systems (ATS) are not anticipated to be used for the project site.
- On December 18, 2013, Jimmy Chan, Acting District Construction Storm Water Coordinator, agreed to the temporary Construction Site BMP strategy used for the scope of this project. Further coordination will take place as needed. A copy of the Construction Site BMP Consideration Form will be included at PS&E.

An estimate of quantities and costs for Construction Site BMPs will be developed as a part of the Storm Water BMP Cost Summary. This preliminary cost is calculated by assuming 1.25 percent of the total estimated construction cost, based on the PPDG guidelines. The estimated construction cost excludes the tunnel section cost. The cost for Construction Site BMPs for different alternatives varies from 1.3 million to 13.1 million.

7. Maintenance BMPs (Drain Inlet Stenciling)

Drain inlet stenciling will be provided for all storm drains in areas where improvements to local facilities and overcrossings will be accessible to pedestrians.

Required Attachments

- Vicinity Map
- Evaluation Documentation Form (EDF)
- Risk Level Determination Documentation

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.

- Storm Water BMP Cost Summary
- BMP cost information from: Project Planning Cost Estimate (PPCE) during PID phases
- 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]
- Deviation of BMPs from the Corridor Study Recommendation

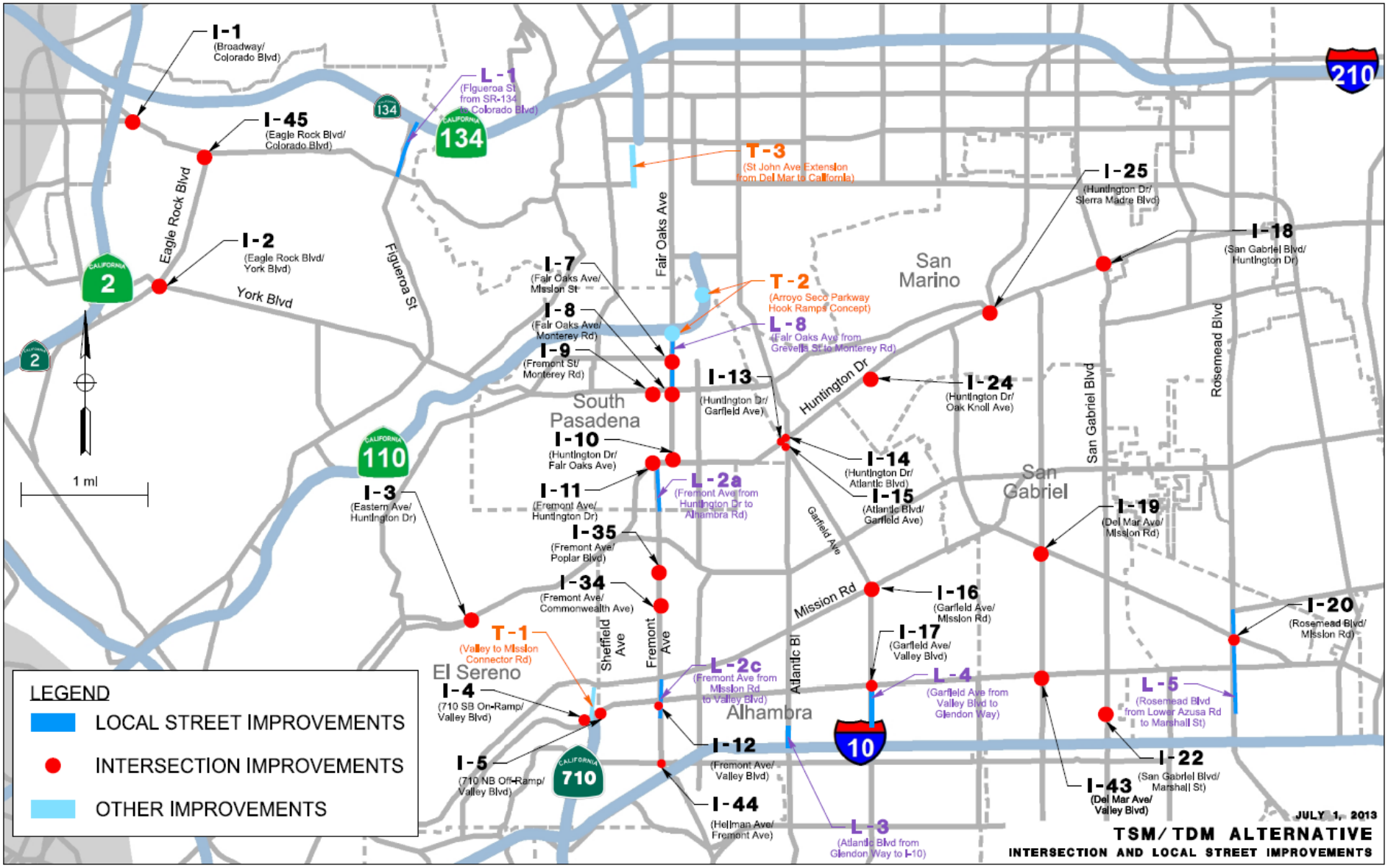


Figure 1 Vicinity Map for TSM/TDM Alternative

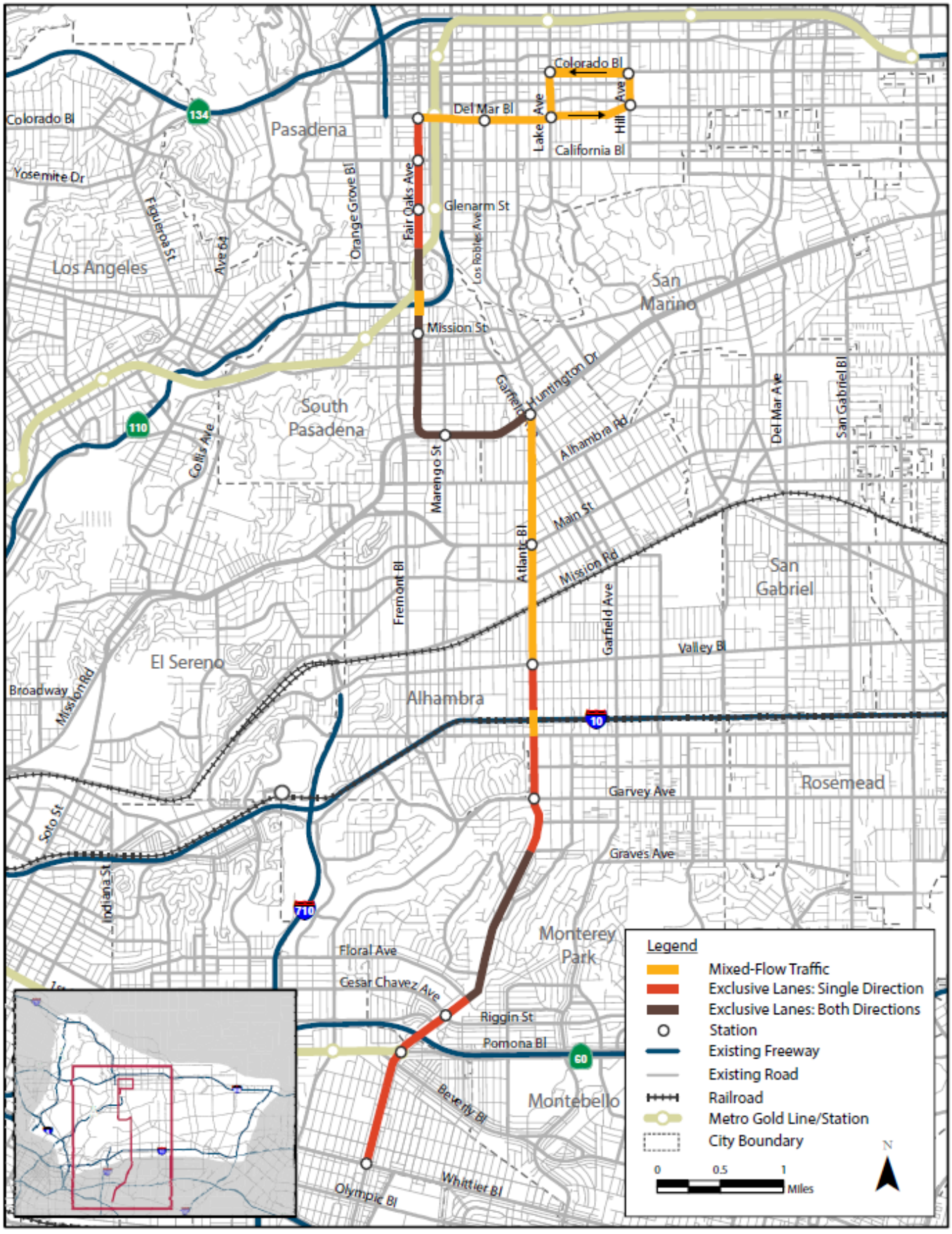


Figure 2 Vicinity Map for BRT Alternative

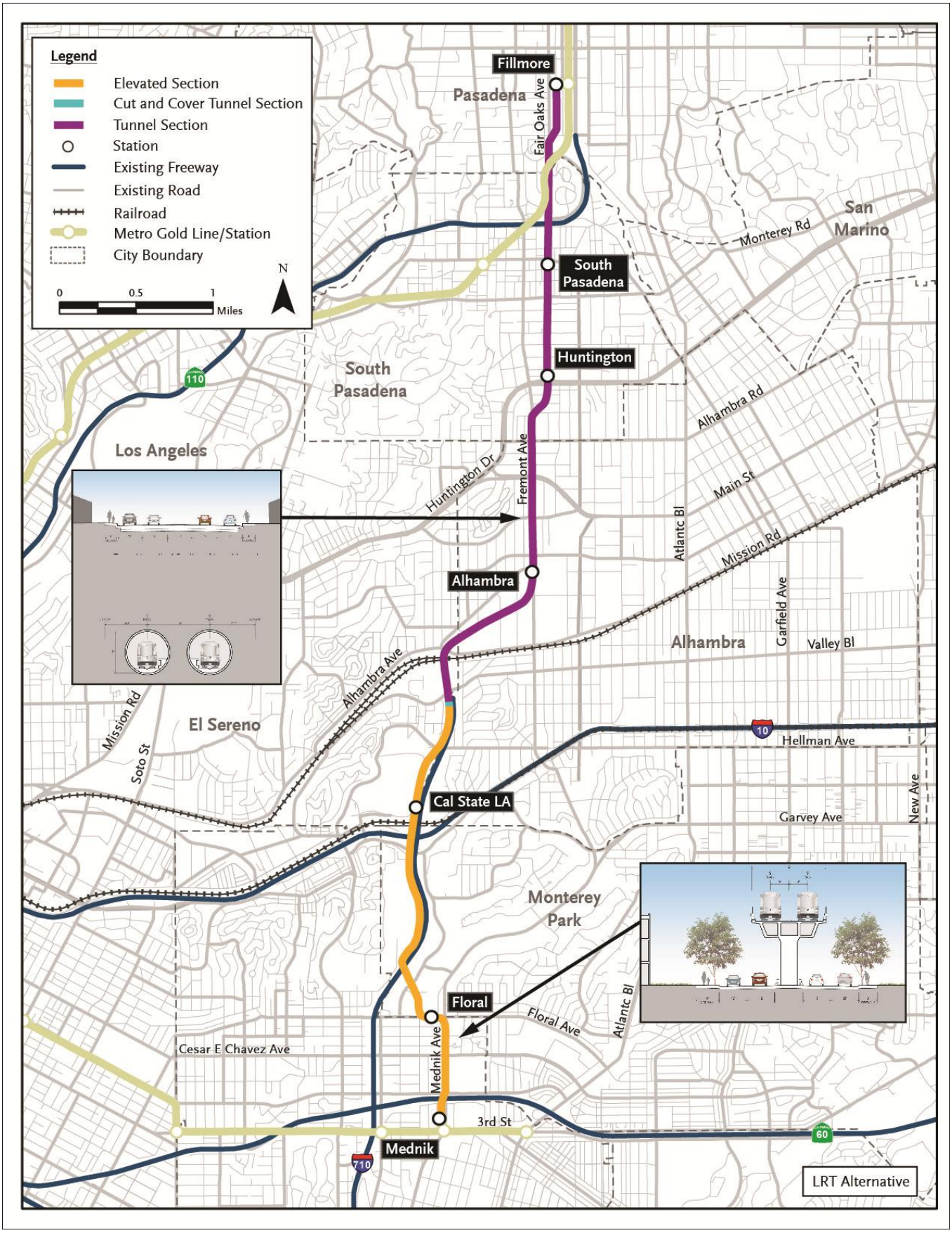


Figure 3 Vicinity Map for LRT Alternative

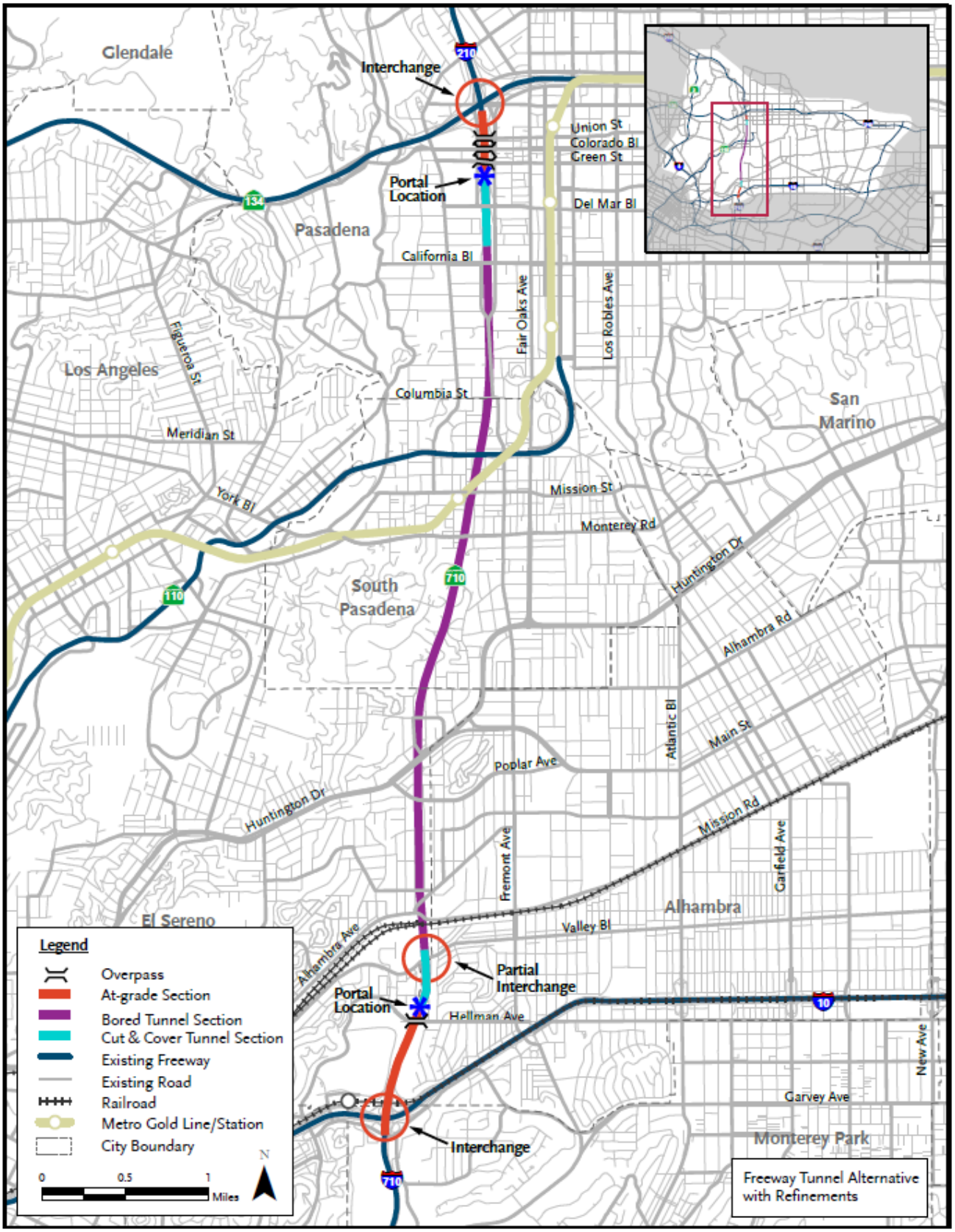


Figure 4 Vicinity Map for Freeway Tunnel Alternative

DATE: _September. 4, 2014_____

Project ID (or EA): __0700000191 _____

NO.	CRITERIA	YES ✓	NO ✓	SUPPLEMENTAL INFORMATION FOR EVALUATION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	✓		See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs. Go to 2
2.	Is this an emergency project?		✓	If **Yes**, go to 10. 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 9 or 4. _____ *(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 MS4)*, 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 10.
6.	Is it 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 10.
8.	Does the project result in a net increase of one acre or more of new impervious surface?	✓		If **Yes**, continue to 9. If **No**, go to 10. *-0.2~13.5 ac (Net Increase New Impervious Surface)*
9.	Project is required to consider approved Treatment BMPs.	✓	See Sections 2.4 and either Section 5.5or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.	
10.	Project is not required to consider Treatment BMPs. _____*(Dist./Reg. Design 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

	A	B	C
1	**Sediment Risk Factor Worksheet**		**Entry**
2	**A) R Factor**		
3	Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.		
4	http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm		
5	**R Factor Value**		255
6	**B) K Factor (weighted average, by area, for all site soils)**		
7	The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.		
8	Site-specific K factor guidance		
9	**K Factor Value**		0.32
10	**C) LS Factor (weighted average, by area, for all slopes)**		
11	The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.		
12	LS Table		
13	**LS Factor Value**		1.47
14			
15	**Watershed Erosion Estimate (=RxKxLS) in tons/acre**		120.0
16	**Site Sediment Risk Factor**		**High**
17	Low Sediment Risk: < 15 tons/acre		
18	Medium Sediment Risk: >=15 and <75 tons/acre		
19	High Sediment Risk: >= 75 tons/acre		
20			

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below:	**no**	**Low**
2006 Approved Sediment-impared WBs Worksheet		
http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml		
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY?		
http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp		

Combined Risk Level Matrix

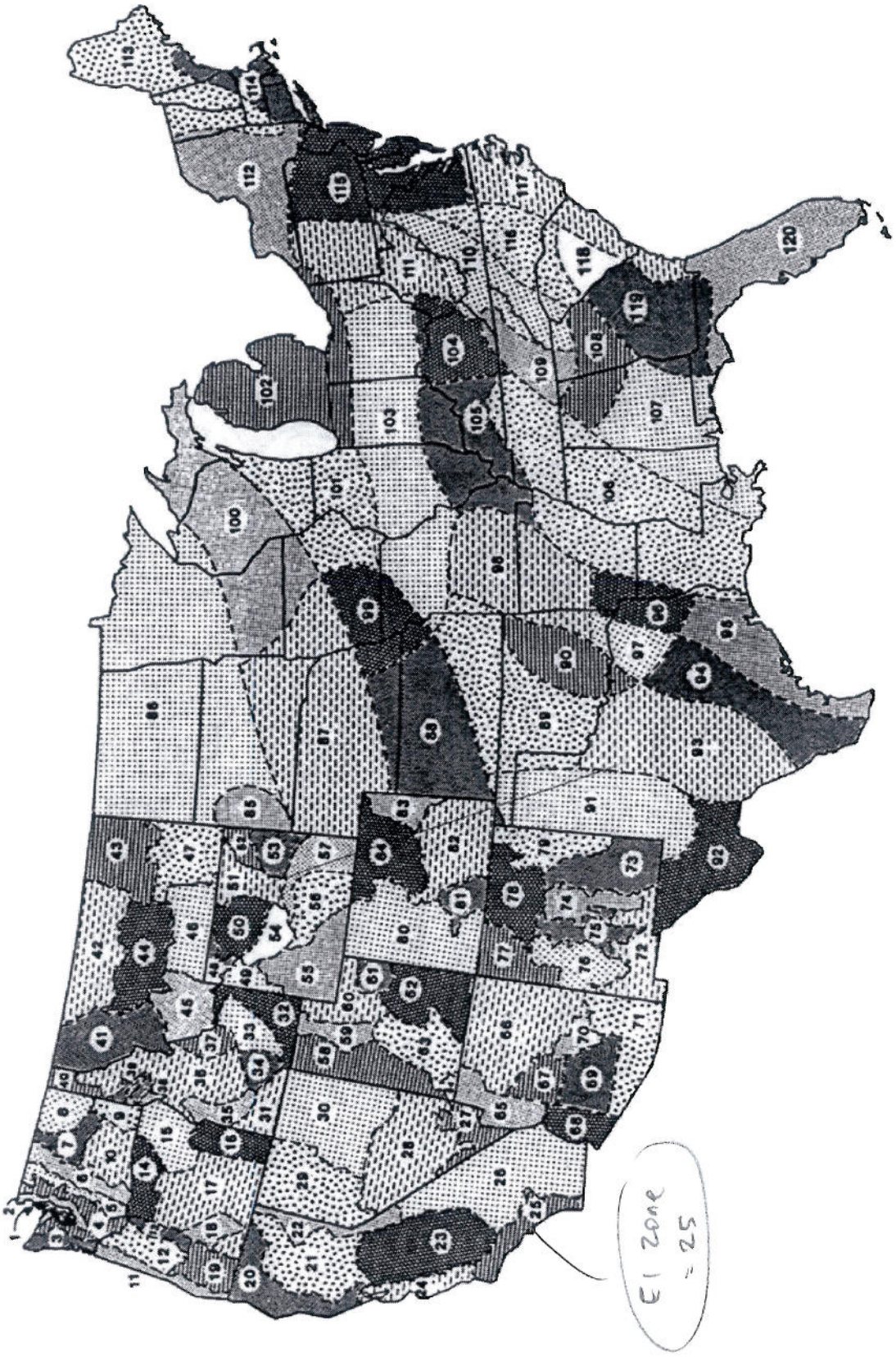
Receiving Water Risk	Sediment Risk: Low	Sediment Risk: Medium	Sediment Risk: High
Low	Level 1	Level 2	
High	Level 2		Level 3

Project Sediment Risk: **High**

Project RW Risk: **Low**

Project Combined Risk: **Level 2**

Figure 1. Erosivity Index Zone Map



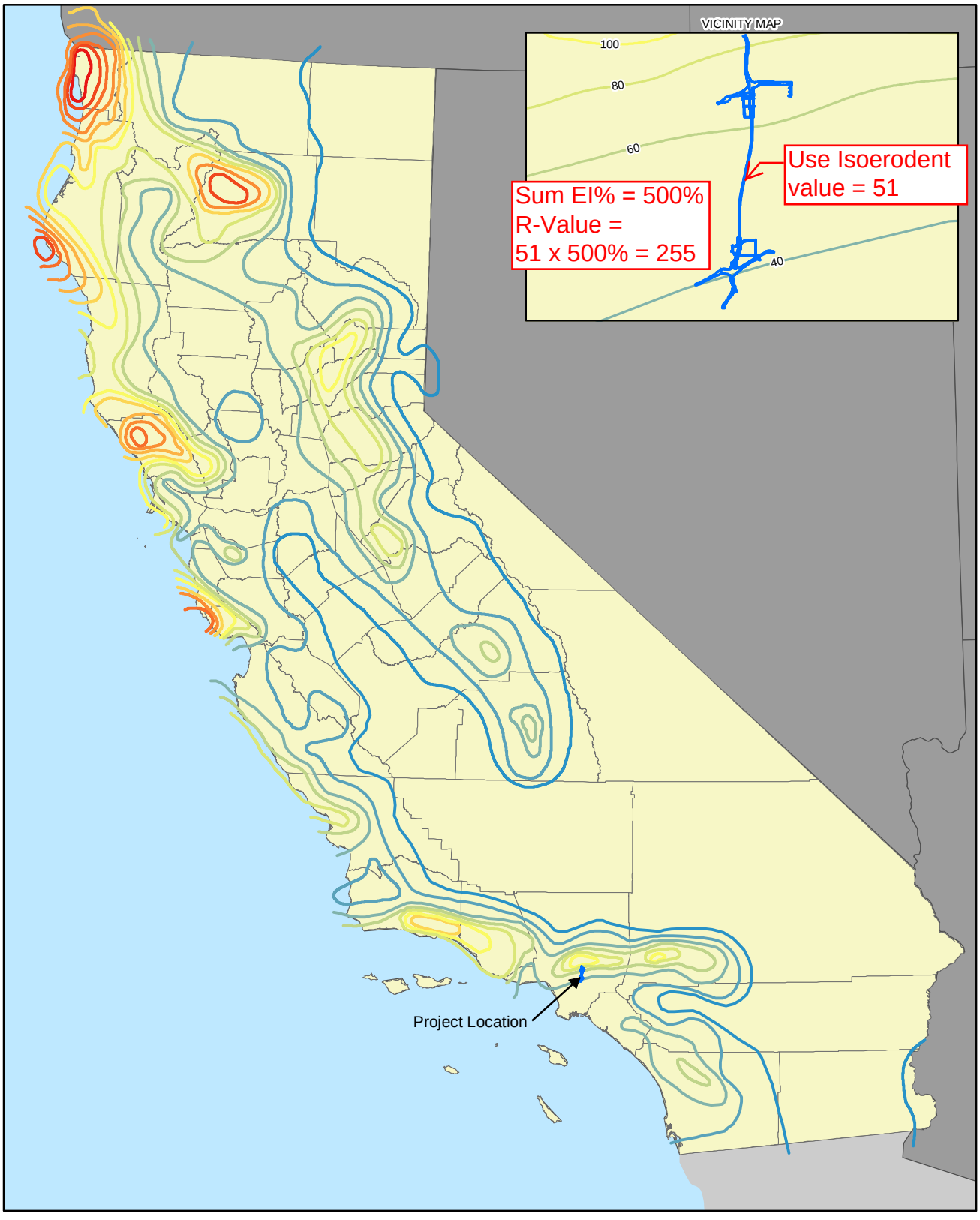
CONSTRUCTION START: JUNE 1, 2019
CONSTRUCTION END: JUNE 1, 2024

2019 EI = 100 - 57.1 = 42.9%.
2020 = 100%.
2021 = 100%
2022 = 100%
2023 = 100%.
2024 = 57.1%.
500%

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

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

Month	Jan	Jan	Jan	Feb	Mar	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sept	Sept	Oct	Oct	Nov	Nov	Dec	Dec
Day	1	16	31	15	1	16	31	15	30	15	30	14	29	14	29	13	28	12	27	12	27	11	26	11	31
EI Zone																									
1	0	4.3	8.3	12.8	17.3	21.6	25.1	28	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53	56	60.8	66.8	71	75.7	82	89.1	95.2	100
2	0	4.3	8.3	12.8	17.3	21.6	25.1	28.0	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53.0	56.0	60.8	66.8	71.0	75.7	82.0	89.1	95.2	100
3	0	7.4	13.8	20.9	26.5	31.8	35.3	38.5	40.2	41.6	42.5	43.6	44.5	45.1	45.7	46.4	47.7	49.4	52.8	57.0	64.5	73.1	83.3	92.3	100
4	0	3.9	7.9	12.6	17.4	21.6	25.2	28.7	31.9	35.1	38.2	42.0	44.9	46.7	48.2	50.1	53.1	56.6	62.2	67.9	75.2	83.5	90.5	96.0	100
5	0	2.3	3.6	4.7	6.0	7.7	10.7	13.9	17.8	21.2	24.5	28.1	31.1	33.1	35.3	38.2	43.2	48.7	57.3	67.8	77.9	86.0	91.3	96.9	100
6	0	0.0	0.0	0.5	2.0	4.1	8.1	12.6	17.6	21.6	25.5	29.6	34.5	40.0	45.7	50.7	55.6	60.2	66.5	75.5	85.6	95.9	99.5	99.9	100
7	0	0.0	0.0	0.0	0.0	1.2	4.9	8.5	13.9	19.0	26.0	35.4	43.9	48.8	53.9	64.5	73.4	77.5	80.4	84.8	89.9	96.6	99.2	99.7	100
8	0	0.0	0.0	0.0	0.0	0.9	3.6	7.8	15.0	20.2	27.4	38.1	49.8	57.9	65.0	75.6	82.7	86.8	89.4	93.4	96.3	99.1	100.0	100.0	100
9	0	0.8	3.1	4.7	7.4	11.7	17.8	22.5	27.0	31.4	36.0	41.6	46.4	50.1	53.4	57.4	61.7	64.9	69.7	79.0	89.6	97.4	100.0	100.0	100
10	0	0.3	0.5	0.9	2.0	4.3	9.2	13.1	18.0	22.7	29.2	39.5	46.3	48.8	51.1	57.2	64.4	67.7	71.1	77.2	85.1	92.5	96.5	99.0	100
11	0	5.4	11.3	18.8	26.3	33.2	37.4	40.7	42.5	44.3	45.4	46.5	47.1	47.4	47.8	48.3	49.4	50.7	53.6	57.5	65.5	76.2	87.4	94.8	100
12	0	3.5	7.8	14.0	21.1	27.4	31.5	35.0	37.3	39.8	41.9	44.3	45.6	46.3	46.8	47.9	50.0	52.9	57.9	62.3	69.3	81.3	91.5	96.7	100
13	0	0.0	0.0	1.8	7.2	11.9	16.7	19.7	24.0	31.2	42.4	55.0	60.0	60.8	61.2	62.6	65.3	67.6	71.6	76.1	83.1	93.3	98.2	99.6	100
14	0	0.7	1.8	3.3	6.9	16.5	26.6	29.9	32.0	35.4	40.2	45.1	51.9	61.1	67.5	70.7	72.8	75.4	78.6	81.9	86.4	93.6	97.7	99.3	100
15	0	0.0	0.0	0.5	2.0	4.4	8.7	12.0	16.6	21.4	29.7	44.5	56.0	60.8	63.9	69.1	74.5	79.1	83.1	87.0	90.9	96.6	99.1	99.8	100
16	0	0.0	0.0	0.5	2.0	5.5	12.3	16.2	20.9	26.4	35.2	48.1	58.1	63.1	66.5	71.9	77.0	81.6	85.1	88.4	91.5	96.3	98.7	99.6	100
17	0	0.0	0.0	0.7	2.8	6.1	10.7	12.9	16.1	21.9	32.8	45.9	55.5	60.3	64.0	71.2	77.2	80.3	83.1	87.7	92.6	97.2	99.1	99.8	100
18	0	0.0	0.0	0.6	2.5	6.2	12.4	16.4	20.2	23.9	29.3	37.7	45.6	49.8	53.3	58.4	64.3	69.0	75.0	86.6	93.9	96.6	98.0	100.0	100
19	0	1.0	2.6	7.4	16.4	23.5	28.0	31.0	33.5	37.0	41.7	48.1	51.1	52.0	52.5	53.6	55.7	57.6	61.1	65.8	74.7	88.0	95.8	98.7	100
20	0	9.8	18.5	25.4	30.2	35.6	38.9	41.5	42.9	44.0	45.2	48.2	50.8	51.7	52.5	54.6	57.4	58.5	60.1	63.2	69.6	76.7	85.4	92.4	100
21	0	7.5	13.6	18.1	21.1	24.4	27.0	29.4	31.7	34.6	37.3	39.6	41.6	43.4	45.4	48.1	51.3	53.3	56.6	62.4	72.4	81.3	88.9	94.7	100
22	0	1.2	1.6	1.6	1.6	1.6	1.6	2.2	3.9	4.6	6.4	14.2	32.8	47.2	58.8	69.1	76.0	82.0	87.1	96.7	99.9	99.9	99.9	99.9	100
23	0	7.9	15.0	20.9	25.7	31.1	35.7	40.2	43.2	46.2	47.7	48.8	49.4	49.9	50.7	51.8	54.1	57.7	62.8	65.9	70.1	77.3	86.8	93.5	100
24	0	12.2	23.6	33.0	39.7	47.1	51.7	55.9	57.7	58.6	58.9	59.1	59.1	59.2	59.2	59.3	59.5	60.0	61.4	63.0	66.5	71.8	81.3	89.6	100
25	0	9.8	20.8	30.2	37.6	45.8	50.6	54.4	56.0	56.8	57.1	57.1	57.2	57.6	58.5	59.8	62.2	65.3	67.5	68.2	69.4	74.8	86.6	93.0	100
26	0	2.0	5.4	9.8	15.6	21.5	24.7	26.6	27.4	28.0	28.7	29.8	32.5	36.6	44.9	55.4	65.7	72.6	77.8	84.4	89.5	93.9	96.5	98.4	100
27	0	0.0	0.0	1.0	4.0	5.9	8.0	11.1	13.0	14.0	14.6	15.3	17.0	23.2	39.1	60.0	76.3	86.1	89.7	90.4	90.9	93.1	96.6	99.1	100
28	0	0.0	0.0	0.0	0.2	0.5	1.5	3.3	7.2	11.9	17.7	21.4	27.0	37.1	51.4	62.3	70.6	78.8	84.6	90.6	94.4	97.9	99.3	100.0	100
29	0	0.6	0.7	0.7	0.7	1.5	3.9	6.0	10.5	17.9	28.8	36.6	43.8	51.5	59.3	68.0	74.8	80.3	84.3	88.8	92.7	98.0	99.8	99.9	100
30	0	0.0	0.0	0.0	0.0	0.2	0.8	2.8	7.9	14.2	24.7	35.6	45.4	52.2	58.7	68.5	77.6	84.5	88.9	93.7	96.2	97.6	98.3	99.6	100
31	0	0.0	0.0	0.0	0.0	0.2	1.0	3.5	9.9	15.7	26.4	47.2	61.4	65.9	69.0	77.2	86.0	91.6	94.8	98.7	100.0	100.0	100.0	100.0	100
32	0	0.1	0.1	0.1	0.1	0.6	2.2	4.3	9.0	14.2	23.3	34.6	46.3	54.2	61.7	72.9	82.5	89.6	93.7	98.2	99.7	99.9	99.9	99.9	100
33	0	0.0	0.0	0.0	0.0	0.6	2.3	4.2	8.8	16.1	30.0	46.9	57.9	62.8	66.2	72.1	79.1	85.9	91.1	97.0	98.9	98.9	98.9	98.9	100
34	0	0.0	0.0	0.0	0.0	1.8	7.3	10.7	15.5	22.0	29.9	35.9	42.0	48.5	56.9	67.0	76.9	85.8	91.2	95.7	97.8	99.6	100.0	100.0	100
35	0	0.0	0.0	0.0	0.0	2.5	10.2	15.9	22.2	27.9	34.7	43.9	51.9	56.9	61.3	67.3	73.9	80.1	85.1	89.6	93.2	98.2	99.8	99.8	100



LEGEND

Freeway Tunnel

Isoerodent R Value

10
20
40
50
60
80
100
120
140
160
180
200
220

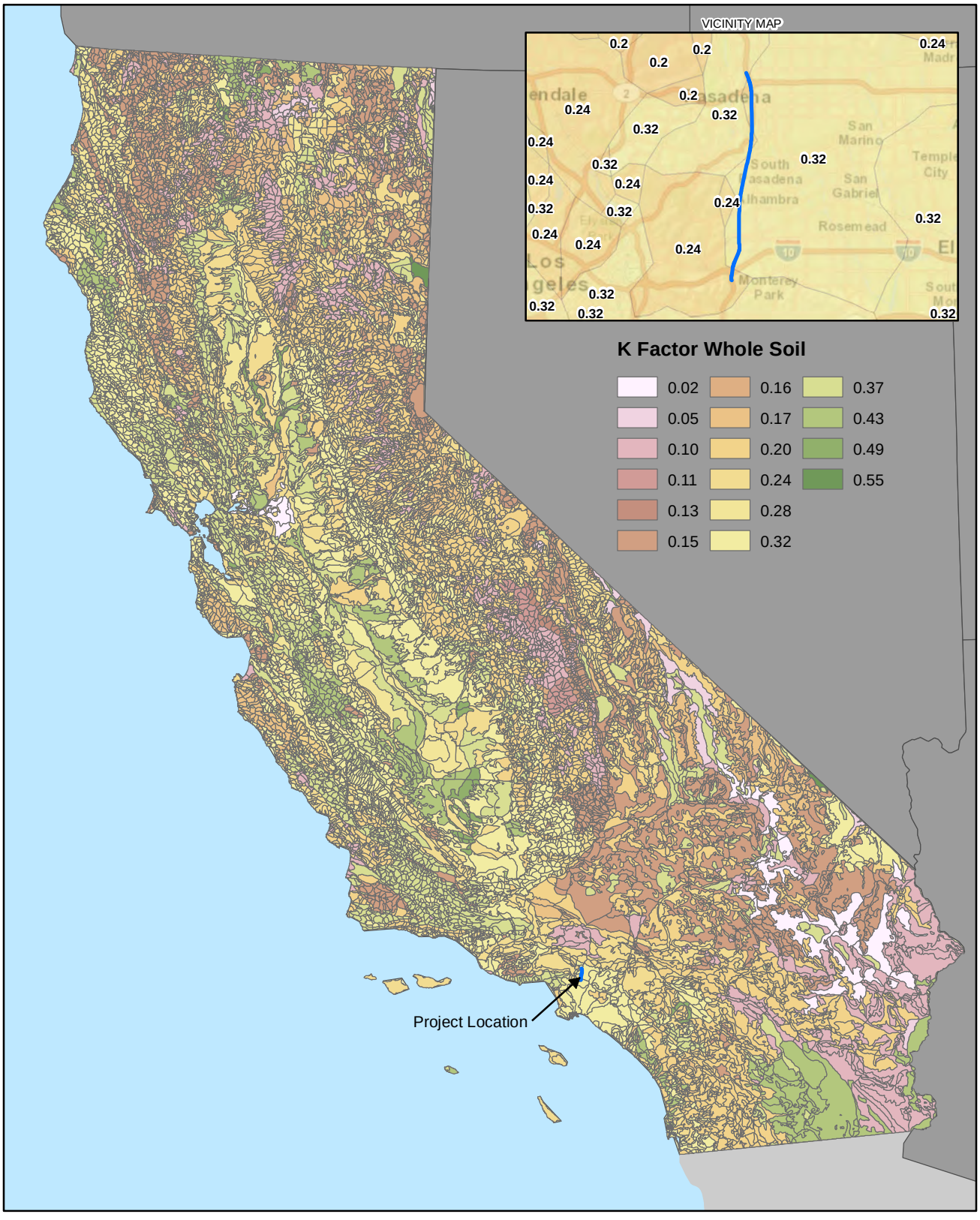
Data Source: State Water Resources Control Board

N

0 25 50 100
Miles

FIGURE 2
RUSLE R
Isoerodent Values

CH2MHILL



LEGEND

Project Corridor

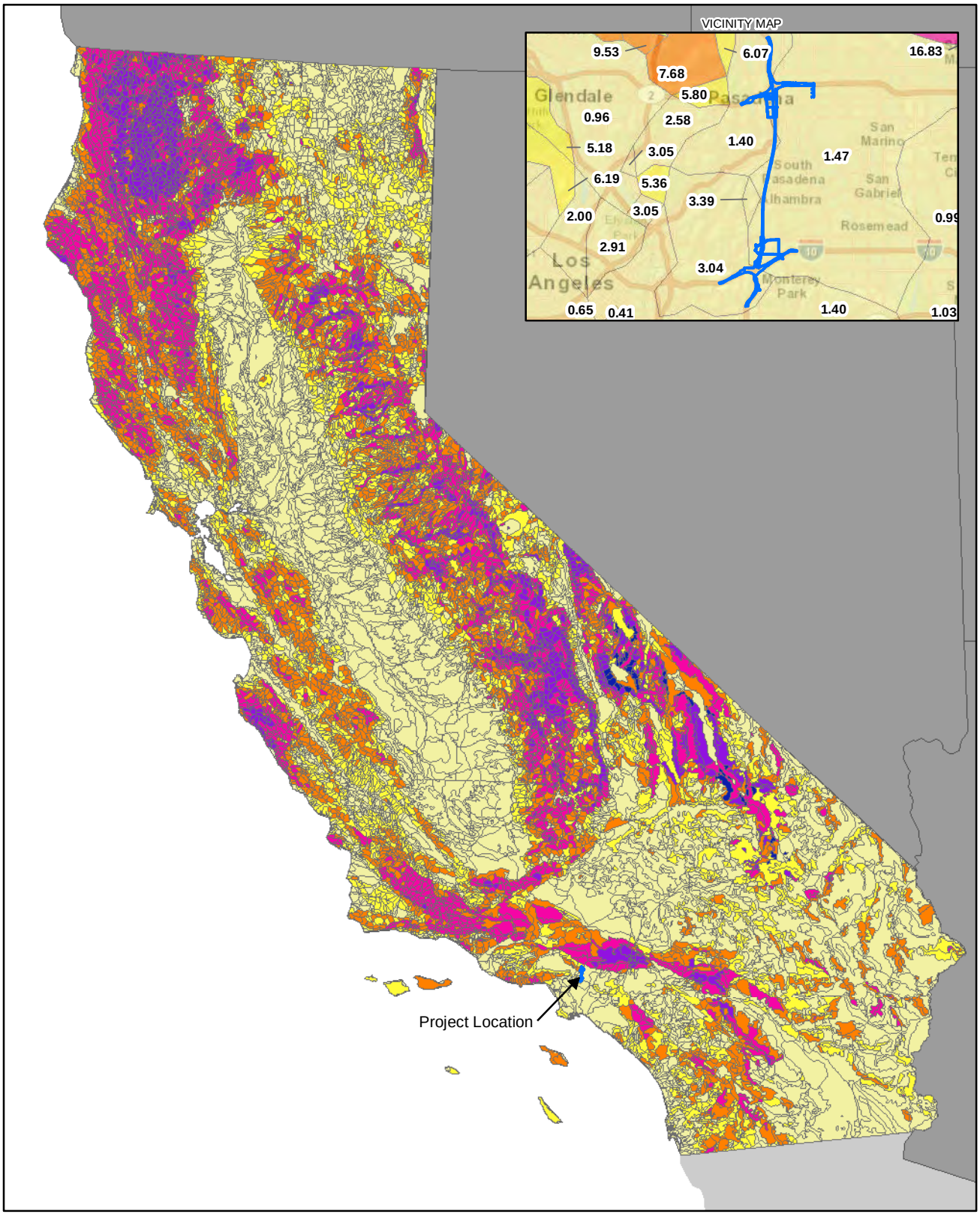
Data Source: Natural Resources Conservation Service, U.S. Dept. of Agriculture and State Water Resources Control Board

N

0 25 50 100

Miles

FIGURE 3
RUSLE K Values



LEGEND

- Freeway Tunnel
- 0.09 - 3.62
- 3.621 - 7.38
- 7.381 - 11.57
- 11.571 - 17.33
- 17.331 - 30.83
- 30.831 - 60.66

Data Source: State Water Resources Control Board

N

0 25 50 100

Miles

FIGURE 4
RUSLE LS Values

CH2MHILL

CH2MHILL

Sheet No. 1

Calculcation No. 1

PROJECT TITLE : SR-710 North Study

Project No. 700000191

Calc By TG Date 9/4/2014 Rev

SUBJECT / FEATUTRE: Summary of BMPs Cost Estimate for Each Alternative

Checked By GH Date

Alternative	DPP BMPs [1]	Treatment BMPs [2]	Construction Site BMPs [3]
	$ Million	$ Million	$ Million
TSM/TDM	0.7	0.4	1.3
BRT	9.2	1.2	1.7
LRT	0.3	0.3	12.0
Freeway Tunnel:			
Dual-bore	1.1	1.4	13.1
Single-bore	1.1	1.4	9.0

Note: 1. DDP cost includes landscaping, dikes, RSP and other relative items.

2. Treatment BMPs cost for TSM/TDM alternative was estiamted based on the simliar size projects;
   cost for BRT and LRT alternative was estimated based on $100,000 per lane mile;
   cost for Freeway tunnel alternative was estimated based on $250,000 per lane mile.

3. Construction Site BMPs cost was estimated based on 1.25% of project cost. For Freeway Tunnel and LRT alternative, cost relatived to tunnel construction was excluded.

PRELIMINARY COST ESTIMATE SUMMARY FOR TSM/TDM ALTERNATIVE

Contract PS4710-2755
9/9/2014 3:51 PM

PROJECT DESCRIPTION

STATE ROUTE 710 NORTH STUDY

TSM/TDM ALTERNATIVE
DRAFT

	Cost in 2014 $
ROADWAY ITEMS	**$85,000,000**
STRUCTURE ITEMS	**$11,000,000**
SUBTOTAL CONSTRUCTION	**$96,000,000**
RIGHT OF WAY	**$9,000,000**
TOTAL COST	**$105,000,000**

*Total cost to be escalated at the start of construction.

PRELIMINARY COST ESTIMATE SUMMARY FOR BRT ALTERNATIVE

Contract PS4710-2755
9/9/2014 3:47 PM

PROJECT DESCRIPTION

STATE ROUTE 710 NORTHY STUDY

BUS RAPID TRANSIT ALTERNATIVE
DRAFT

	Cost in 2014 $
ROADWAY ITEMS	**$75,000,000**
STRUCTURE ITEMS	**$0**
BRT ITEMS	**$49,000,000**
SUBTOTAL CONSTRUCTION	**$124,000,000**
RIGHT OF WAY	**$11,000,000**
TOTAL COST (BRT ALT.)	**$135,000,000**
TSM COMPONENTS	**$105,000,000**
TOTAL COST* (BRT + TSM)	**$240,000,000**

*Total cost to be escalated at the start of construction.

PRELIMINARY CONCEPTUAL COST ESTIMATE SUMMARY FOR LIGHT RAIL TRANSIT ALTERNATIVE

Contract PS4710-2755
9/9/2014 3:48 PM

PROJECT DESCRIPTION

STATE ROUTE 710 STUDY

LIGHT RAIL TRANSIT ALTERNATIVE

DRAFT

	Cost in 2014 $
AERIAL STRUCTURES ITEMS	$414,000,000
AT GRADE ITEMS	$50,000,000
DRAINAGE ITEMS	$10,000,000
LRT TUNNEL & VENTILATION ITEMS	$1,197,000,000
PARKING LOTS	$13,000,000
UNDERGROUND STRUCTURE ITEMS	$309,000,000
YARD AND SHOP ITEMS	$302,000,000
SUBTOTAL CONSTRUCTION	$2,295,000,000
RIGHT OF WAY	$120,000,000
TOTAL COST (LRT ALT.)	$2,415,000,000
TSM/TDM COMPONENTS	$60,000,000
TOTAL COST* (LRT + TSM)	$2,475,000,000

*Total cost to be escalated at the start of construction.

PRELIMINARY COST ESTIMATE SUMMARY FOR FREEWAY TUNNEL ALTERNATIVE - DUAL BORE OPTION

Contract PS4710-2755
9/9/2014 3:49 PM

PROJECT DESCRIPTION

STATE ROUTE 710 NORTH STUDY

FREEWAY TUNNEL ALTERNATIVE - DUAL BORE OPTION
DRAFT

	Cost in 2014 $
ROADWAY ITEMS	**$370,000,000**
STRUCTURE ITEMS	**$620,000,000**
FREEWAY TUNNEL & VENTILATION ITEMS	**$4,580,000,000**
SUBTOTAL CONSTRUCTION	**$5,570,000,000**
RIGHT OF WAY	**$30,000,000**
TOTAL COST* (FREEWAY DUAL BORE ALT.)	**$5,600,000,000**
TSM/TDM COMPONENTS	**$50,000,000**
TOTAL COST* (FREEWAY DUAL BORE + TSM/TDM)	**$5,650,000,000**

*Total cost to be escalated at the start of construction.

PRELIMINARY COST ESTIMATE SUMMARY FOR FREEWAY TUNNEL ALTERNATIVE - SINGLE BORE OPTION

Contract PS4710-2755
9/9/2014 3:50 PM

PROJECT DESCRIPTION

STATE ROUTE 710 NORTH STUDY

FREEWAY TUNNEL ALTERNATIVE - SINGLE BORE OPTION

DRAFT

	Cost in 2014 $
ROADWAY ITEMS	$310,000,000
STRUCTURE ITEMS	$320,000,000
FREEWAY TUNNEL & VENTILATION ITEMS	$2,440,000,000
SUBTOTAL CONSTRUCTION	$3,070,000,000
RIGHT OF WAY	$30,000,000
TOTAL COST* (FREEWAY SINGLE BORE ALT.)	$3,100,000,000
TSM/TDM COMPONENTS	$50,000,000
TOTAL COST* (FREEWAY SINGLE BORE + TSM/TDM)	$3,150,000,000

*Total cost to be escalated at the start of construction.

Checklist SW-1, Site Data Sources

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

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	
• Final Geotechnical Summary Report, SR 710 Tunnel Technical Study, Los Angeles County, California	April 2010
•	
Hydraulic	
• Water Quality Planning Tool http://svctenvims.dot.ca.gov/wqpt/wqpt.aspx	June 5, 2013
•	
Soils	
• LA County Hydrology Manual (2006)	January, 2006
• Final Geotechnical Summary Report, SR 710 Tunnel Technical Study, Los Angeles County, California	April 2010
• California Division of Mines and Geology, Seismic Hazard Evaluation of the Los Angeles 7.5-Minute Quadrangle, Los Angeles, California. Open-File Report 98-20.	1998
Climatic	
• LA County Hydrology Manual (2006)	January 2006
• Water Quality Planning Tool http://svctenvims.dot.ca.gov/wqpt/wqpt.aspx	June 5, 2013
Water Quality	
• Water Quality Planning Tool http://svctenvims.dot.ca.gov/wqpt/wqpt.aspx	June 5, 2013
•	
Other Data Categories	
• Caltrans Project Planning and Design Guide	July 2010
•	

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

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 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: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

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: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

Consideration of Design Pollution Prevention BMPs

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

Will project increase velocity or volume of downstream flow?	☒Yes	☐No	☐NA
Will the project discharge to unlined channels?	☐Yes	☒No	☐NA
Will project increase potential sediment load of downstream flow?	☒Yes	☐No	☐NA
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.

Slope/Surface Protection Systems

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.

Concentrated Flow Conveyance Systems

Will the project create or modify ditches, dikes, berms, or swales?	☒Yes	☐No	☐NA
Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA
Will it be necessary to direct or intercept surface runoff?	☒Yes	☐No	☐NA
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.

Preservation of Existing Vegetation

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: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

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 or devices to reduce peak discharges.	
6.	Calculate the water quality volume infiltrated by DPP BMPs within the project limits. Include the percentage of the water quality volume for each BMP and subwatershed, as appropriate, for site conditions. These calculations will be used later in the T-1 checklist.	☒Complete

Design Pollution Prevention BMPs

Checklist DPP-1, Part 3

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

Slope / Surface Protection Systems

1. What are the proposed areas of cut and fill? (attach plan or map) ☒Complete
   These areas will be shown during the final design phase.
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 new or disturbed slopes > 4:1 horizontal:vertical (h:v)? ☒Yes ☐No

   If Yes, District Landscape Architect must prepare or approve an erosion control plan, at the District's discretion.
6. Are new or disturbed slopes > 2:1 (h:v)? ☐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 2:1 (h:v).
7. Estimate the net new impervious area that will result from this project. -0.2~13.5 acres ☒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: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

Concentrated Flow Conveyance Systems

Ditches, Berms, Dikes and Swales

1. Consider Ditches, Berms, Dikes, and Swales as per Topics 813, 834.3, and 835, and Chapter 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 4:1 h:v. ☒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: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

Preservation of Existing Vegetation

1. Review Preservation of Property, (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
   These areas will be coordinated with Environmental during the final design phase.

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
   These areas will be delineated during the final design phase.

Treatment BMPs

Checklist T-1, Part 1

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

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-watershed 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. Questions 14 through 16 should be answered after all subwatershed (drainages) are considered using this checklist.

1. Is the project in a watershed with prescriptive TMDL treatment BMP requirements in an adopted TMDL implementation plan or does the project have a dual purpose facility requirement (e.g. flood control and water quality treatment or Design Pollution Prevention BMPs that provide infiltration and treatment)? ☒Yes ☐No

   If Yes, consult the District/Regional Storm Water Coordinator to determine whether the T-1 checklist should be used to propose alternative BMPs because the prescribed BMPs may not be feasible or other BMPs may be more cost-effective. Special documentation and regulatory response may be necessary.

2. 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

   If Yes to both 2 (a) and (b), continue to (c). If No to either, skip to question 3.

   (c) Is 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 all of these questions consider ***Dry Weather Flow Diversion***, complete and attach **Part 3** of this checklist.

3. 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: Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins also can capture litter. Before considering GSRDs for stand-alone installation or in sequence with other BMPs, consult with District/Regional NPDES Storm Water Coordinator to determine whether Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins should be considered instead of GSRDs to meet litter/trash TMDL.

4. Is the project located in an area (e.g., mountain regions) where traction sand is applied more than twice a year? ☐Yes ☒No

   If Yes, consider ***Traction Sand Traps*** Complete and attach **Part 7** of this checklist.

5. Maximizing Biofiltration Strips and Swales

   Objectives:

   1) Quantify infiltration from biofiltration alone
   2) Identify highly infiltrating biofiltration (i.e. > 90%) and skip further BMP consideration.
   3) Identify whether amendments can substantially improve infiltration.

   (a) Have biofiltration strips and swales been designed for runoff from all project areas, including sheet flow and concentrated flow conveyance? If no, document justification in Section 5 of the SWDR. ☒Yes ☐No

   (b) Based on existing site conditions, estimate what percentage of the WQV[1] can be infiltrated. When calculating the WQV, use a drawdown time appropriate for the site conditions.

   _✓_ < 20%
   ___ 20 % - 50%
   ___ 50% - 90%
   ___ > 90%

   ☒Complete

   (c) Is infiltration greater than 90 percent? If Yes, skip to question 13. ☐Yes ☒No

   If No, Continue to 5 (d).

[1] A complete methodology for determining WQV infiltration is available at: http://www.dot.ca.gov/hq/oppd/stormwtr/index.htm

(d) Can the infiltration ranking in question 5(b) above be increased by using soil amendments? ☒Yes ☐No

If Yes, consider including soil amendments (increasing the infiltration ranking of strips and swales shows performance comparable to other BMPs). Record the new infiltration estimate below. If No, continue to 5 (e).

___ < 20% (skip to 6)
___ 20 % - 50% (skip to 6)
___ 50% - 90% (skip to 6)
_✓_ >90% ☒Complete

(e) Is infiltration greater than 90 percent? If Yes, skip to question 13. If No, continue to 5 (f). ☒Yes ☐No

(f) Is infiltration greater than 50 percent and is biofiltration preferred? If yes to both, skip to question 13. ☒Yes ☐No

6. Biofiltration in Rural Areas

Is the project in a rural area (outside of urban areas that is covered under an NPDES Municipal Stormwater Permit[2])? If Yes, proceed to question 13. ☐Yes ☐No

7. Estimating Infiltration for BMP Combinations

Objectives:

1) Identify high-infiltration biofiltration or biofiltration and infiltration BMP combinations and skip further BMP consideration.

2) If high infiltration is infeasible, then identify the infiltration level of all feasible BMP combinations for use in the subsequent BMP selection matrices.

(a) Has concentrated infiltration (i.e., via earthen basins) been prohibited? Consult your District/Regional Storm Water Coordinator and/or environmental documents. ☐Yes ☐No

If No, continue to 7 (b); if Yes, skip to question 8 and do not consider earthen basin-type BMPs

[2] See pages 39 and 40 of the Fact Sheets for the CGP.
http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_factsheet.pdf

(b) Can the infiltration ranking be increased by infiltrating the un-infiltrated remaining WQV from question 5, with an infiltration BMP[1]? If yes, record the new infiltration estimate below. If no, proceed to 7(c). ☐Yes ☐No

___ < 20% (do not consider this BMP combination)
___ 20% - 50%
___ 50% - 90%
___ >90%

Is at least 90 percent infiltration estimated? If Yes, proceed to 13. If No, proceed to 7(c). ☐Yes ☐No

(c) Assess infiltration of biofiltration combined with an approved earthen BMP. This assessment will be used in subsequent BMP selection matrices.

Earthen Detention Basin

___ < 20% ☐Complete
___ 20% - 50%
___ > 50%

Continue to Question 8

8. Identifying BMPs based on the Target Design Constituents

(a) Does the project discharge to a 303(d) impaired water body or a water body that has a TMDL adopted? If "No," use Matrix A to select BMPs, consider designing to treat 100% of the WQV, then skip to question 12. ☐Yes ☐No

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

☐ sediments
☐ phosphorus
☐ nitrogen
☐ copper (dissolved or total)
☐ lead (dissolved or total)
☐ zinc (dissolved or total)
☐ general metals (dissolved or total)[2]

(b) Treating Sediment. Is sediment a TDC? If Yes, use Matrix A to select BMPs, then skip to question 12. Otherwise, proceed to question 9. ☐Yes ☐No

[1] Assess the combined infiltration of the WQV by both biofiltration and infiltration BMPs. As site constraints allow, size the infiltration BMP up to the un-infiltrated WQV remaining after the biofiltration BMP.

[2] General metals is a designation used by Regional Water Boards when specific metals have not yet been identified as causing the impairment.

BMP Selection Matrix A: General Purpose Pollutant Removal			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Strip: HRT > 5 Austin filter (concrete) Austin filter (earthen) Delaware filter MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Swale MCTT Wet basin	Austin filter (concrete) Delaware filter MCTT Wet basin
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

9. Treating both Metals and Nutrients.

   Is copper, lead, zinc, or general metals *AND* nitrogen or phosphorous a TDC? If Yes, use Matrix D to select BMPs, then skip to question 12. Otherwise, proceed to question 10. ☐Yes ☐No

10. Treating Only Metals.

    Are copper, lead, zinc, or general metals listed TDCs? If Yes, use Matrix B below to select BMPs, and skip to question 12. Otherwise, proceed to question 11. ☐Yes ☐No

BMP Selection Matrix B: Any metal is the TDC, but not nitrogen or phosphorous			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	MCTT Wet basin Austin filter (earthen) Austin filter (concrete) Delaware filter	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Biofiltration Strip Biofiltration Swale Wet basin
Tier 2	Strip: HRT > 5 Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

11. Treating Only Nutrients.
    Are nitrogen and/or phosphorus listed TDCs? If "Yes," use Matrix C to select BMPs. If "No", please check your answer to 8(a). At this point one of the matrices should have been used for BMP selection for the TDC in question, unless no BMPs are feasible. ☐Yes ☐No

BMP Selection Matrix C: Phosphorous and / or nitrogen is the TDC, but no metals are the TDC			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Austin filter (earthen) Austin filter (concrete) Delaware filter**	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches*	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Wet basin Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale Wet basin	Austin filter (concrete) Delaware filter Wet basin
* Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			
** Delaware filters would be ranked in Tier 2 if the TDC is nitrogen only, as opposed to phosphorous only or both nitrogen and phosphorous.			

BMP Selection Matrix D: Any metal, plus phosphorous and / or nitrogen are the TDCs			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Wet basin* Austin filter (earthen) Austin filter (concrete) Delaware filter**	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches***	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches*** Biofiltration Strip Biofiltration Swale
Tier 2	Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter
* The wet basin should only be considered for phosphorus			
** In cases where earthen BMPs can infiltrate, Delaware filters are ranked in Tier 2 if the TDC is nitrogen only, but they are Tier 1 for phosphorous only or both nitrogen and phosphorous.			
*** Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

12. Does the project discharge to a 303(d) waterbody that is listed for mercury or low dissolved oxygen? ☐Yes ☐No

    If Yes, contact the District/Regional NPDES Storm Water Coordinator to determine if standing water in a Delaware filter, wet basin, or MCTT would be a risk to downstream water quality.

13. After completing the above, identify and attach the checklists shown below for every Treatment BMP under consideration. (use one checklist every time the BMP is considered for a different drainage within the project) ☒Complete

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

14. Estimate what percentage of the net WQV (for all new impervious surfaces within the project) or WQF (depending upon the Treatment BMP selected) will be treated by the preferred Treatment BMP(s): N/A%* ☒Complete

15. Estimate what percentage of the net WQV (for all new impervious surfaces within the project) that will be infiltrated by the preferred treatment BMP(s): N/A%** ☒Complete

16. Prepare cost estimate, including right-of-way, and site specific determination of feasibility (Section 2.4.2.1) for selected Treatment BMPs and include as supplemental information for SWDR approval. ☒Complete

*Note: The amount of treatment should be calculated for each BMP and each subwatershed, unless all BMPs within a project are the same. Document in SWDR.

**Note: The Water Quality Volume infiltrated should be documented for the entire project and also for each subwatershed. Document in SWDR.

Treatment BMPs

Checklist T-1, Part 2

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

Biofiltration Swales / Biofiltration Strips

Feasibility

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

2. Are flow velocities from a peak drainage facility design event < 4 fps (i.e. low enough to prevent scour of the vegetated biofiltration swale 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 contaminated soils or 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 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

   Vegetation mixes will be provided by the District Landscape Architect during final design.

2.	Can the biofiltration swale be designed as a conveyance system under any expected flows > the WQF event, as per HDM Chapter 800? * (e.g. freeboard, minimum slope, etc.)	☒Yes	☐No
3.	Can the biofiltration swale be designed as a water quality treatment device under the WQF while meeting the required HRT, depth, and velocity criteria? (Reference Appendix B, Section B.2.3.1)*	☒Yes	☐No
4.	Is the maximum length of a biofiltration strip ≤ 100 ft? Strips > 100 ft. may still be considered as long as potential erosion issues have been addressed.**	☐Yes	☐No
5.	Has the minimum width (perpendicular to flow) of the invert of the biofiltration swale received the concurrence of Maintenance? *	☒Yes	☐No
6.	Can biofiltration swales be located in natural or low cut sections to reduce maintenance problems caused by animals burrowing through the berm of the swale? **	☒Yes	☐No
7.	Has the infiltration rate of the bio-filtration device been calculated and maximized through amendments where appropriate. **	☒Yes	☐No
8.	Have Biofiltration Systems been considered for locations upstream of other Treatment BMPs, as part of a treatment train? **	☒Yes	☐No

Treatment BMPs

Checklist T-1, Part 3

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

Dry Weather Flow Diversion ***NOT APPLICABLE TO THIS PROJECT***

Feasibility

1.	Is a Dry-Weather Flow Diversion acceptable to a Publicly Owned Treatment Works (POTW)?	☐Yes	☒No
2.	Would a connection require ordinary (i.e., not extraordinary) plumbing, features or construction methods to implement?	☐Yes	☒No
	If "No" to either question above, Dry Weather Flow Diversion is not feasible.		
3.	Does adequate area exist within the right-of-way to place Dry Weather Flow Diversion devices? If "Yes", continue to Design Elements sections. If "No", continue to Question 4.	☐Yes	☐No
4.	If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Dry Weather Flow Diversion devices and how much right-of-way would be needed? _____ (acres) If "Yes", continue to the Design Elements section. If "No", continue to Question 5.	☐Yes	☐No
5.	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.	Does the existing sanitary sewer pipeline have adequate capacity to accept project dry weather flows, or can an upgrade be implemented to handle the anticipated dry weather flows within the project's budget and objectives? *	☐Yes	☐No
2.	Can the connection be designed to allow for Maintenance vehicle access? *	☐Yes	☐No
3.	Can gate, weir, or valve be designed to stop diversion during storm events? *	☐Yes	☐No
4.	Can the inlet be designed to reduce chances of clogging the diversion pipe or channel? *	☐Yes	☐No
5.	Can a back flow prevention device be designed to prevent sanitary sewage from entering storm drain? *	☐Yes	☐No

Treatment BMPs

Checklist T-1, Part 4

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

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?	☐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? For Design Pollution Prevention BMPs, can the soil be amended to provide an adequate infiltration rate and void space.	☒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.

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? If the BMP is used in series with a biofiltration device, then does the total upstream infiltration plus the Infiltration Basin volume at least equal the WQV. *	☐Yes	☐No
4.	Can access be placed to the invert of the Infiltration Basin? *	☐Yes	☐No
5.	Can the Infiltration Basin accommodate the freeboard above the overflow event elevation (reference Appendix B.1.3.1)? *	☐Yes	☐No
6.	Can the Infiltration Basin be designed with interior side slopes no steeper than 4:1 (h:v) (may be 3:1 [h:v] 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 Drain be placed? **	☐Yes	☐No

Design Elements – Infiltration Trench

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.	Since this BMP is used in series with a pretreatment (see No. 7 below), then does the total upstream infiltration by the pretreatment plus the void space volume of the Infiltration Trench at least equal the WQV, while maintaining a drawdown time of ≤ 72 hours? **	☐Yes	☐No
4.	Is the depth of the Infiltration Trench ≤ 13 ft? *	☐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 vegetation)? *	☐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

Design Elements and Feasibility – Infiltration-DPP BMPs

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

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

1. Has a detailed soil investigation been conducted, to assure stability of the slope? ** ☐Yes ☐No
2. Does the soil have adequate infiltration rates or can the soil be amended to increase its infiltrating properties? ** ☐Yes ☐No
3. Are flow velocities from a peak drainage facility design event < 4 fps (i.e. low enough to prevent scour or erosion of DPP (swale or conveyance) as per HDM Table 873.3E)? Or has the BMP been designed to prevent scour or erosion for higher velocities (e.g. rock lined ditch). * ☐Yes ☐No

Treatment BMPs

Checklist T-1, Part 5

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

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]). If the BMP is used in series with a biofiltration device, then does the total upstream infiltration plus the Detention Device volume at least equal the WQV? ☐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 plus 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)? ☐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 Detention Device(s) 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 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 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 overflow event elevation? *	☐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 basin 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 4:1 (h:v) or flatter for interior slopes? ** (Note: Side slopes up to 3:1 (h:v) 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 ($\geq$ 2:1 length to width ratio at WQV elevation is recommended)? **	☐Yes	☐No

Treatment BMPs

Checklist T-1, Part 6

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

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? If "Yes", continue to Design Elements section. 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 Gross Solids Removal Devices and how much right-of-way would be needed? _____ 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 – 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? ** ☒Yes ☐No
   If No, consult with Headquarters Office of Storm Water Management and District/Regional NPDES.
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? ** ☐Yes ☐No
   If No, consult with Headquarters Office of Storm Water Management and District NPDES.
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 7

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

Traction Sand Traps *NOT APPLICABLE TO THIS PROJECT*

Feasibility

1.	Can a Detention Device be sized to capture the estimated traction sand and the WQV from the tributary area? If Yes, then a separate Traction Sand Trap may not be necessary. Coordinate with the District/Regional Design Storm Water Coordinator and also complete Checklist T-1, Part 5.	☐Yes	☐No
2.	Is the Traction Sand Trap proposed for a site where sand or other traction enhancing substances are applied to the roadway at least twice per year?	☐Yes	☒No
3.	Is adequate space provided for Maintenance staff and equipment access for annual cleanout?	☐Yes	☐No
	If the answer to any one of Questions 2 or 3 is No, then a Traction Sand Trap is not feasible.		
4.	Does adequate area exist within the right-of-way to place Traction Sand Traps? If Yes, continue to 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 Traction Sand Traps and how much right-of-way would be needed? _____ acres If Yes, continue to the Design Elements section. If No, continue to Question 7.	☐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.	Was the local Caltrans Maintenance Station contracted to provide the amount of traction sand used annually at the location? * (Detention Device or CMP type) List application rate reported. _____ yd^3	☐Yes	☐No
2.	Does the Traction Sand Trap have enough volume to store settled sand over the winter using the formula presented in Appendix B, Section B.5? * (Detention Device or CMP type)	☐Yes	☐No
3.	Is the invert of the Traction Sand Trap a minimum of 3 ft above seasonally high groundwater? * (CMP type)	☐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? * (CMP type)	☐Yes	☐No
5.	Can peak flow be diverted around the device? ** (CMP type)	☐Yes	☐No
6.	Can peak flow be diverted around the device? ** (CMP type)	☐Yes	☐No
7.	Is 6 inches separation provided between the top of the captured traction sand and the outlet from the device, in order to minimize re-suspension of the solids? ** (CMP type)	☐Yes	☐No

Treatment BMPs

Checklist T-1, Part 8

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

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 24 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 48 hour drawdown? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet], consult with District/Regional Design Storm Water Coordinator 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? Confirm that check valves and vector proof lid as shown on standard detail sheets will be allowed, is used. ☐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)? ☒Yes ☐No
   If Yes, continue to Design Elements sections. 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 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 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 this Treatment BMP into the project. ☐Complete

7. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, or low dissolved oxygen? ☒Yes ☐No

   If yes, contact the Regional/District NPDES Storm Water Coordinator to determine if standing water in this treatment BMP would be a risk to downstream water quality. If standing water is a potential issue, consider use of another treatment BMP.

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

Design Elements – Austin Sand Filter

While a concrete-vault Austin filter is feasible at one location near the south portal, compost-amended biofiltration swales are preferred over concrete-vault media filters.

* **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 vegetation)? **	☐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)? * If No, design with an impermeable liner.	☒Yes	☐No
8.	Are side slopes of the earthen chamber 3:1 (h:v) 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.	Is the drawdown time of the 2nd chamber between 40 and 48 hours, typically 40-hrs? *	☐Yes ☐No
2.	Is access for Maintenance vehicles provided to the Delaware Filter? *	☐Yes ☐No
3.	Is a bypass/overflow provided for storms > WQV? **	☐Yes ☐No
4.	Can pretreatment be provided to capture sediment and litter in the runoff (such as using vegetation)? **	☐Yes ☐No
5.	Is maximum depth ≤ 13 ft below ground surface? *	☐Yes ☐No

Treatment BMPs

Checklist T-1, Part 9

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

MCTT (Multi-chambered Treatment Train) ***NOT APPLICABLE TO THIS PROJECT***

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 ≥ 4,346 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? Confirm that check valves and vector proof lid as shown on standard detail sheets be allowed.	☐Yes	☐No
	If No to any question above, then an MCTT is not feasible.		
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	
8.	Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, low dissolved oxygen, or odors?	☐Yes	☐No
	If yes, contact the Regional/District NPDES Storm Water Coordinator to determine if standing water in this treatment BMP would be a risk to downstream water quality. If standing water is a potential issue, consider use of another treatment BMP.		

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, typically designed for 24-hrs? *	☐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 vegetation)? **	☐Yes	☐No

Treatment BMPs

Checklist T-1, Part 10

Prepared by: T. Guo Date: September 4, 2014 District-Co-Route: 07-LA-710

PM : PM 26.7/32.1T Project ID (or EA): 0700000191 RWQCB: Los Angeles Region 4

Wet Basin ***NOT APPLICABLE TO THIS PROJECT***

Feasibility

1.	Is the volume of the Wet Basin above the permanent pool equal to at least the WQV using a 24 to 96 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 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? ☐Yes ☐No
    If Yes, continue to Design Elements sections.

    If No, continue to Question 11.

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
    If Yes, continue to Design Elements section.

    If No, continue to Question 12.

12. Have the appropriate state and federal regulatory agencies been contacted to discuss location and potential to attract and harbor sensitive or endangered species? ☐Yes ☐No

    If No, contact the Regional/District NPDES Coordinator

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

14. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, low dissolved oxygen, or odors? ☐Yes ☐No

    If yes, contact the Regional/District NPDES Storm Water Coordinator to determine if standing water in this treatment BMP would be a risk to downstream water quality. If standing water is a potential issue, consider use of another treatment BMP.

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 96 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 vegetation, 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

Deviation of BMPs from the Corridor Study Recommendation
(supplemental attachment to SWDR)

Date: 7/28/2014
District-County-Route: 07-LA-710
EA 0700000191
SWDR Phase: PID

Treatment BMPs Recommended by the Corridor Storm Water Management Study				Proposed Treatment BMPs outlined in the Storm Water Data Report (SWDR)									Watershed	Comments
Site No.	BMP Type	Paved Tributary Area (acres)	Unpaved Tributary Area (Acres)	Site No.	County	Route	Post mile	Dir	BMP Type	Paved Tributary Area treated (acres)	Unpaved Tributary Area (Acres)	Total Area treated (Acres)		
N/A	N/A	N/A	N/A	BSW403	LA	710	26.54	SB	Bioswale	1.64	0.00	1.64	Los Angeles River	No Corridor Study prepared
N/A	N/A	N/A	N/A	BSW1407	LA	710	26.65	NB	Bioswale	0.91	0.00	0.91	Los Angeles River	No Corridor Study prepared
N/A	N/A	N/A	N/A	BSW449	LA	710	27.41	SB	Bioswale	8.75	4.01	12.76	Los Angeles River	No Corridor Study prepared
N/A	N/A	N/A	N/A	BSW1737	LA	710	31.91	NB	Bioswale	208.67	116.08	324.75	Los Angeles River	No Corridor Study prepared
N/A	N/A	N/A	N/A	BSW34	LA	110	31.68	SB	Bioswale	0.99	0.09	1.08	Los Angeles River	No Corridor Study prepared
N/A	N/A	N/A	N/A	GSRD1149	LA	710	27.45	SB	GSRD	8.75	4.01	12.76	Los Angeles River	No Corridor Study prepared
N/A	N/A	N/A	N/A	GSRD1739	LA	710	32.19	NB	GSRD	208.67	116.08	324.75	Los Angeles River	No Corridor Study prepared
Total										**438.38**	**240.27**	**678.65**		

Note: water quality volume (WQV) = (Acres) X (43560) X (0.75 inch/12)

I have reviewed and concur with the contents of the above table.

Print name: Signature: Date:

Timothy H Tieu, District 7 Corridor Study Manager or designated representative (signature required at PS&E only)