3.10 Water Quality and Stormwater Runoff

This section addresses issues related to water quality and stormwater runoff in the corridor. The information below is summarized from the hydrology and water quality technical reports prepared for the proposed action. These reports are incorporated by reference and are available for review at the Solano Transportation Authority's (STA's) and Caltrans' offices.

3.10.1 Regulatory Setting

3.10.1.1 Federal Requirements: Clean Water Act

In 1972, the Federal Water Pollution Control Act was amended, making the discharge of pollutants to the waters of the United States from any point source unlawful, unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The Federal Water Pollution Control Act was subsequently amended in 1977, and was renamed the Clean Water Act (CWA). The CWA, as amended in 1987, directed that storm water discharges are point source discharges. The 1987 CWA amendment established a framework for regulating municipal and industrial storm water discharges under the NPDES program. Important CWA sections are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for any federal project that proposes an activity, which may result in a discharge to waters of the United States to obtain certification from the State that the discharge will comply with other provisions of the act.
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) into waters of the United States. Regional Water Quality Control Boards (RWQCB) administer this permitting program in California. Section 402(p) addresses storm water and non-storm water discharges.
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the United States. This permit program is administered by the U.S. Army Corps of Engineers (Corps).

The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

3.10.1.2 State Requirements: Porter-Cologne Water Quality Control Act (California Water Code)

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the state.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives) required by the CWA, and regulating discharges to ensure that the objectives are met. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. States designate beneficial uses for all water body segments, and then set criteria necessary to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, each state identifies waters failing to meet standards for specific pollutants, which are state listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source controls, the CWA requires establishing Total Maximum Daily Loads (TMDLs). TMDLs establish allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

3.10.1.3 State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB administers water rights, water pollution control, and water quality functions throughout the state. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility. Because stormwater runoff from construction sites and new roadway improvements could contain pollutants that could affect surface or groundwater quality, two provisions of the NPDES program would apply.

- Municipal Separate Storm Sewer System Program

  The U.S. Environmental Protection Agency (EPA) defines a Municipal Separate Storm Sewer System (MS4) as any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over storm water, that are designed or used for collecting or conveying storm water. As part of the NPDES program, EPA initiated a program requiring that entities having MS4s apply to their local RWQCBs for storm water discharge permits. The program proceeded through two phases. Under Phase I, the program initiated permit requirements for designated municipalities with populations of 100,000 or greater. Phase II expanded the program to municipalities with populations less than 100,000.

  For the County of Solano, post-construction stormwater discharges are managed under general permit for the Discharge of Storm Water from Small MS4s (Order No. 2003-0005-DWQ) (Small MS4 General Permit) adopted by the SWRCB in April 2003. The cities of Fairfield and Suisun City have joined together with the Fairfield-Suisun Sewer District to acquire and maintain a single permit in the name of the Fairfield-Suisun Urban Water Management Program (FSURMP) (NPDES Permit No. CAS 612005). These Small MS4 General Permits require permitted entities to implement the following program elements to protect receiving waters from stormwater pollution: public participation/involvement; public education and outreach; construction site runoff control; illicit discharge detection and elimination; pollution prevention/good housekeeping; post-

construction runoff control. To implement these elements, the Small MS4 General Permits require that dischargers develop and implement a Storm Water Management Program (SWMP) that describes the BMPs, measurable goals and time - schedules of implementation, as well as assigns responsibility of each task to reduce the discharge of pollutants through their MS4s to the Maximum Extent Practicable (MEP). The City of Vacaville is included in the Vacaville-Dixon SWMP,[1] which includes BMPs, measureable goals, and an implementation schedule for construction and post-construction stormwater management.

- Construction Activity Permitting

  STA would be subject to the September 2, 2009 NPDES Construction General Permit (Order No. 2009-0009-DWQ) that became effective on July 1, 2010. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least one acre must comply with the provisions of the General Construction Permit.

  The newly adopted permit separates projects into Risk Levels 1 – 3. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory storm water runoff pH and turbidity monitoring. Risk levels are determined during the design phase and are based on potential erosion and transport to receiving waters and dependent upon receiving waters beneficial uses. Applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan (SWPPP).

During the construction phase, compliance with the permit requires appropriate selection and deployment of structural and/or non-structural BMPs. These BMPs must achieve performance standards of Best Available Technology economically achievable/Best Conventional Pollutant Control Technology (BAT/BCT) to reduce or eliminate storm water pollution.

Typical temporary Construction Site BMPs include soil stabilization practices, sediment control measures, wind erosion control measures, tracking control measures, non-stormwater control measures, and waste-management and materials pollution control practices. In general, the contractor implements an appropriate set of BMPs in the SWPPP that are based on project-specific construction practices. The types of BMPs required depend on many site-specific physical and hydrologic variables, the time of year for construction, and the contractor's unique construction practices and equipment.

Beneficial Uses and Water Quality Objectives. Under authority granted by CWA Section 303 and California Water Code Section 13000, the State RWQCBs designate beneficial uses and establish water quality objectives to protect those beneficial uses in Water Quality Control Plans (Basin Plans) prepared pursuant to the State Porter-Cologne Water Quality Control Act. The San Francisco Bay and Central Valley RWQCBs both have jurisdiction in the study area. The project footprint would touch parts of Horse Creek, Old Ulatis Creek, New Ulatis Creek, Alamo Creek, New Alamo Creek, Union Creek, McCoy Creek, and the Putah South Canal. There are no beneficial uses designated for these

[1] City of Vacaville and City of Dixon Stormwater Management Plan Fiscal Years 2003-2004 through 2007-2008.

creeks in the Basin Plans for either RWQCB (San Francisco Bay Regional Water Quality Control Board 2007; Central Valley Regional Water Quality Control Board 2007). Under such circumstances, the appropriate RWQCB either makes site-specific determinations when reviewing projects that may affect water resources or applies the beneficial uses that are designated for the nearest downstream tributary of the water body in question. However, all creeks within the Central Valley Basin Plan are considered to support the municipal and domestic water supplies beneficial use, except for Old Alamo Creek.

Horse Creek, Ulatis Creek, Old Alamo Creek and New Alamo Creek eventually discharge into the Sacramento-San Joaquin Delta (Delta). The Delta has designated beneficial uses in the Central Valley Basin Plan of municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, water contact and non-contact water recreation, warm and cold freshwater habitat, migration of aquatic organisms, navigation, wildlife habitat, and spawning, reproduction, and/or early development. However, Old Alamo Creek, from its headwaters to the confluence with New Alamo Creek, is specifically exempt from municipal and domestic water supplies, cold freshwater habitat, migration of aquatic organisms, and spawning, reproduction, and/or early development beneficial uses.

Union Creek, Putah South Canal, and McCoy Creek drain to the Suisun Bay. Additionally, the Putah South Canal is used to convey municipal, industrial, and irrigation water supplies. Suisun Bay has designated beneficial uses in the San Francisco Bay Basin Plan of industrial service supply, industrial process supply, estuarine habitat, migration of aquatic organisms, preservation of rare and endangered species, wildlife habitat, water contact and non-contact water recreation, spawning, reproduction, and/or early development, and ocean, commercial, and sport fishing.

Water Quality Objectives (WQOs) in a Basin Plan can be narrative or numerical, and they differ depending on the specific beneficial uses being protected. Narrative WQOs are established for parameters such as color, suspended and settleable material, oil and grease, biostimulatory substances, and toxicity; numeric WQOs can include such parameters as dissolved oxygen, temperature, turbidity, pH, and specific chemical constituents such as trace metals and synthetic organic compounds. In addition to established Basin Plan WQOs, numeric criteria for priority toxic pollutants (i.e., trace metals and organic compounds) are regulated under the California Toxics Rule, which was promulgated in 2000 (65 Federal Register 31681–31719). The RWQCB implements its authority by issuing and enforcing waste discharge requirements, or other permits and authorizations, for waste discharges to land and waters within its jurisdiction.

The RWQCBs also administer the NPDES permit program, which regulates discharges of pollutants into water. Construction projects that disturb more than one acre (including construction staging areas) are required under the RWQCB Statewide NPDES General Construction Permit to submit a Notice of Intent (NOI) to the RWQCB, and prepare and implement a Stormwater Pollution Prevention Plan (SWPPP). A SWPPP describes the location and physical characteristics of the site, identifies construction activities that will occur, and describes Best Management Practices (BMPs) that will be used to prevent soil erosion and discharge of other construction-related contaminants, such as sediment, fuels, oil, grease, solvents, paints, and cement, that could contaminate nearby water resources.

California Fish and Game Code Sections 1600 to 1607

Under California Fish and Game Code Sections 1600 to 1607, the Department and other agencies are required to notify the California Department of Fish and Game (CDFG) prior to any project that would divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review generally occur during the environmental process. When an existing fish or wildlife resource may be substantially adversely affected, CDFG is required to propose reasonable project changes to protect the resource. These modifications are formalized in a "streambed alteration agreement" which becomes part of the plans, specifications and bid documents for the project.

3.10.1.4 Local Requirements

Local regulations within Solano County, and the cities of Vacaville, Fairfield, and Suisun City include requirements for design of roadways and post-construction BMPs to comply with the applicable NPDES permit. Construction within each of these jurisdictions would be required to comply with the local requirements of the respective jurisdiction.

3.10.2 Affected Environment

As noted above, a hydrology and water quality technical report (*Hydrology and Water Quality Technical Report: Jepson Parkway Project*, August 2005 and Addendum, March 2011) was prepared that describes the environmental and regulatory setting of the corridor, the environmental consequences of the alternatives as they pertain to surface water resources, water quality and stormwater runoff, and measures to minimize impacts of the proposed action on water quality.

Surface Water Quality

Surface water quality depends primarily on the mineral composition of the soils, as well as associated parent materials within a watershed, hydrologic characteristics, and sources of contaminants in the watershed. Land in the vicinity of the corridor has residential, commercial, agricultural, and military uses, and includes wetlands and grazing land. Maintaining and enhancing water quality in the corridor streams is important because all runoff and wastewater from the corridor eventually discharges into either Suisun Marsh or the Sacramento River, and ultimately to the Suisun Bay. Suisun Marsh is protected under State law (Suisun Marsh Preservation Act of 1977) in recognition of its irreplaceable value as a wildlife and aquatic habitat. Its water quality is influenced mainly by temperature, turbidity, contamination, and salinity. Currently, Suisun Bay is listed as impaired (not meeting its designated beneficial uses) by legacy pesticides, dioxins, furan, metals, nutrients, organic enrichment, salinity/total dissolved solids (TDS), exotic species, nickel, mercury, polychlorinated biphenyls (PCBs), and selenium (2006 202(d) list). The Sacramento-San Joaquin Delta is listed as impaired by similar pollutants.

Recent water quality information for creeks in the corridor is limited; however, a previous water quality study in the area, the Fairfield Vicinity Streams Project, found high levels of nutrients and

pesticides and low levels of heavy metals in most streams.[2] Nutrient levels were attributable to agricultural runoff, and the presence of pesticides stemmed primarily from urban runoff. Oxygen content and acidity were within acceptable ranges for aquatic life. Total suspended solids were high, possibly indicating upstream erosion problems.

More recently, the Fairfield-Suisun Sewer District (FSSD) has conducted specific monitoring for the Urban Runoff Management Program (URMP), an ongoing program being conducted to comply with the regulatory requirements of Phase II of the NPDES stormwater permit program for urban areas that exceed a population of 100,000.[3] Dry-season monitoring of total and dissolved metals, total suspended solids, coliform bacteria, and two pesticides (diazanon and chlorpyrifos) in area creeks, including McCoy Creek, was conducted on five dates between summer 1997 and summer 2000.[4] The Fairfield-Suisun Urban Runoff Management Program determined that water quality was very good given the urban environment through which the creeks flow.[5] Elevated arsenic levels in McCoy Creek were thought to have resulted from extended detention of the flows in a large upstream detention basin that allowed sufficient time for natural arsenic to leach from the soil into the water. The FSSD is continuing to investigate the arsenic problem with University of California, Davis, staff. Future efforts of the URMP will focus on public education and enforcement to most effectively utilize URMP resources.[6]

3.10.3 Impacts (including Permanent, Temporary, Direct, Indirect, and Cumulative)

Methodology

The key effects of the project were identified and evaluated based on the physical characteristics of the corridor and the anticipated nature, scope, intensity, and duration of proposed activities. The analysis focused on surface water resources because the proposed action is not expected to result in any substantial effect on groundwater resources. No wells would be constructed, and construction activities are not expected to intercept or substantially alter groundwater recharge, discharge, or flow conditions.

Summary of Water Quality and Stormwater Runoff Impacts

Table 3.10-1 shows the locations where project impacts could occur without implementation of BMPs. As shown, each of the build alternatives may potentially result in temporary construction-related

2 U.S. Army Corps of Engineers. 1973. Fairfield Vicinity Streams, California: Water Quality Study. (Design Memorandum No. 1.) Sacramento, CA.

3 Eisenberg, Olivieri, & Associates, Inc. 2000. Fairfield-Suisun Urban Runoff Management Program, 1999–2000 annual report. Prepared for the Fairfield-Suisun Sewer District, City of Fairfield, and City of Suisun City. Oakland, CA.

4 Eisenberg, Olivieri, & Associates, Inc. 2000. Fairfield-Suisun Urban Runoff Management Program, 1999–2000 annual report. Prepared for the Fairfield-Suisun Sewer District, City of Fairfield, and City of Suisun City. Oakland, CA.

5 Eisenberg, Olivieri, & Associates, Inc. 2000. Fairfield-Suisun Urban Runoff Management Program, 1999–2000 annual report. Prepared for the Fairfield-Suisun Sewer District, City of Fairfield, and City of Suisun City. Oakland, CA.

6 Fairfield-Suisun Sewer District (FSSD). 2004. Urban Runoff Management Program. June 17, 2004—electronic mail communication with Kevin Cullen, Manager.

Table 3.10-1
Summary of Potential Water Quality Impacts by Location and Alternative Without Implementation of Mitigation Measures

Location	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Temporary construction-related water quality impacts Putah South Canal.	No Impact.	No Impact.	No Impact.	No Impact.	The existing bridge will be widened as required. Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the canal. Impacts avoided by implementation of a SWPPP.
Temporary construction-related water quality impacts to Alamo Creek.	No Impact.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek. Impacts avoided by implementation of a SWPPP.
Temporary construction-related water quality impacts to New Alamo Creek.	No Impact.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	No Impact.
Temporary construction-related water quality impacts to McCoy Creek.	No Impact.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	No Impact.	No Impact.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek. Impacts avoided by implementation of a SWPPP.
Temporary construction-related water quality impacts to Union Creek.	No Impact.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek.	Temporary construction-related water quality impacts. Disturbance to soils and channel banks near the creek. Impacts avoided by implementation of a SWPPP.
Permanent changes in local stormwater contaminant loading.	No Impact.	Permanent changes in local stormwater drainage patterns and/or volumes. Permanent changes in local stormwater contaminant loading.	Permanent changes in local stormwater drainage patterns and/or volumes. Permanent changes in local stormwater contaminant loading.	Permanent changes in local stormwater drainage patterns and/or volumes. Permanent changes in local stormwater contaminant loading.	Permanent changes in local stormwater drainage patterns and/or volumes. Permanent changes in local stormwater contaminant loading. Impacts avoided by implementation of a Stormwater Management Plan.

impacts to water channels in the corridor and permanent changes in local stormwater drainage and contaminant loading and could result in changes in sediment and contaminant loading during and after construction. With proper implementation of construction and post-construction BMPs potential impacts to existing water quality would be avoided.

Impact WQ-1: Would the Alternatives Result in Temporary Construction-Related Water Quality Impacts?

Construction activities can impair water quality temporarily because disturbed and eroded soil, petroleum products, and miscellaneous wastes may be discharged into receiving waters. Soil and associated contaminants that enter stream channels can increase turbidity, stimulate algae growth, increase sedimentation of aquatic habitat, and introduce compounds that are toxic to aquatic organisms. Pollutants, including construction materials such as fuels, oils, paints, and concrete, are potentially harmful to fish and other aquatic life if released into the environment. The extent of potential environmental effects depends on the propensity of erosion of the soil types encountered, the type of construction practices, the extent of disturbed area, the duration of construction activities, the timing of precipitation, the proximity to receiving water bodies, and the sensitivity of those water bodies to contaminants of concern. Accidental spills of construction-related substances such as oils, fuels, and concrete can contaminate both surface water and groundwater. Any construction activities that would involve work within a creek would be subject to a CDFG Streambed Alteration Agreement and Section 401 and 404 permits to prevent damage to habitat. Construction within a canal would be subject to the Solano County Water Agency.

Alternative A. Under Alternative A, the proposed roadway improvements and widening would not be constructed. Because there would be no project-related construction, no impact on water would occur.

Alternative B. The project would not require temporary or permanent dewatering or waste discharges. Surface water quality could be affected by construction grading, earthmoving, and facility construction activities that would occur over several months. The construction activities resulting from implementation of Alternative B would directly disturb soils and channel banks near Alamo Creek, New Alamo Creek, Union Creek, and McCoy Creek. Preparation of a SWPPP, as required by the NPDES permit, would minimize water quality impacts during construction and beneficial uses of downstream receiving waters would not be substantially altered. The SWPPP requirements are described in detail in Section 3.10.4, Avoidance, Minimization, and/or Mitigation.

Alternative C. Impacts are similar to that under Alternative B. Construction activities would directly disturb soils and channel banks near Alamo Creek, New Alamo Creek, and Union Creek. However, this alternative would not affect McCoy Creek. Compliance with regulations would minimize this effect and beneficial uses of downstream receiving waters would not be substantially altered.

Alternative D. Impacts are similar to that under Alternative C. Construction activities would directly disturb soils and channel banks near Alamo Creek, New Alamo Creek, and Union Creek. Compliance with regulations would minimize this effect and beneficial uses of downstream receiving waters would not be substantially altered.

Alternative E. This impact is similar to that under Alternative B. Construction activities would directly disturb soils and channel banks near Alamo Creek, Union Creek, McCoy Creek, and the Putah South Canal. Compliance with regulations would minimize this effect and beneficial uses of downstream receiving waters would not be substantially altered.

Impact WQ-2: Would the Alternatives Result in Permanent Changes in Local Stormwater Contaminant Loading?

Alternative A. Under Alternative A, the proposed roadway improvements and widening would not be constructed. Therefore, no changes in existing local stormwater loading would occur.

Alternatives B, C, D, and E. These alternatives may result in additional impervious surfaces that may contribute to an increase in the transport of pollutants to waterways. Greater quantities of contaminants, such as petroleum products and other substances (e.g., trace metals, hazardous materials, and litter), could be deposited on these new surfaces and added to stormwater runoff, increasing the contaminant loading potential of the roadways. Contaminants in roadway runoff, if discharged untreated into receiving water bodies, could be toxic to fish and other aquatic organisms. Preparation of permanent post-construction BMPs, as required by the NPDES permit, would avoid any permanent impacts to water and beneficial uses of downstream receiving waters would not be substantially altered.

Impact WQ-3: Would the Alternatives Result in Cumulative Water Quality Effects?

The project would introduce new impervious surfaces that would result in an incremental reduction in the amount of natural soil surfaces available for infiltration of rainfall and runoff, potentially generating additional runoff during storm events. Additional runoff can contribute to the flood potential of natural stream channels, and accelerate soil erosion and stream channel scour. Compliance with the avoidance and minimization measures listed in Section 3.10.4 will ensure that the project will not result in a cumulatively considerable contribution to regional increases in runoff volumes and flooding.

In addition, the project could potentially contribute to a cumulative increase in stormwater contaminants due to the incremental increase in roadway surface area, increased transport of pollutants to waterways, and increased use of the roadway over time as future development occurs in the corridor. As development in the surrounding urban areas and use of the proposed roadway improvements increase, greater quantities of contaminants could be deposited on the road surfaces, which could contribute to a cumulative increase in stormwater contaminant loading. However, compliance with the avoidance and minimization measures listed in Section 3.10.4 will ensure that the project itself will not have a cumulatively considerable contribution to a regional increase in stormwater contaminants during construction or operation. Compliance with these measures will ensure that beneficial uses of downstream receiving waters would not be substantially altered by the proposed project.

3.10.4 Avoidance, Minimization, and/or Mitigation Measures

Avoidance and minimization measures have been identified to address the potential for adverse effects to water quality. The local lead agency is required to prepare the necessary plans, in compliance with applicable NPDES stormwater quality protection requirements.

Construction Activities

The contractor shall prepare and submit a Notice of Intent (NOI) in accordance with NPDES General Permit for Storm Water Discharges Associated with Construction Activity [Order No. 2009-0009-DWQ, NPDES No. CAS000002] requirements, or the adopted order in effect at the time project construction begins. A Risk Level Assessment must be conducted to determine the project's potential for sediment risk to receiving waters. The project contractor is required to prepare and implement a project construction SWPPP before implementation of the proposed action, as a condition of the Construction General Permit. The SWPPP must contain specific minimum BMPs, including sampling, monitoring, and reporting requirements, in accordance with the project's identified Risk Level. This SWPPP must identify pollution prevention measures (e.g., erosion and sediment control measures, and measures to control non-stormwater discharges and hazardous spills), demonstration of compliance with all applicable RWQCB standards, local and regional erosion and sediment control standards, identification of responsible parties, a detailed construction timeline, and a BMPs monitoring and maintenance schedule.

The objectives of the SWPPP will be to identify pollutant sources that could affect the quality of stormwater, to implement practices to reduce pollutants in stormwater runoff, and to protect receiving water quality. Additional BMP strategies may be required on a project-specific basis. The SWPPP shall include the following BMPs in accordance with the General Construction Permit, and consistent with the identified Risk Level:

- Employment of soil stabilization control measures. Construction scheduling, preservation of existing vegetation, streambank stabilization, and either hydraulic mulch, hydroseed, soil binders, straw mulch, geotextiles, plastic sheeting, erosion control blankets/mats, or a combination of these shall be implemented as part of the project SWPPP.

  Additional BMPs shall include outlet protection/velocity dissipation devices to prevent erosion caused by concentrated flows. If necessary, earth dikes, drainage swales, and lined ditches may be required for conveyance of surface runoff down sloping land, for interception and diversion of runoff on sloped surfaces, to direct runoff to a stable watercourse or other stable conveyance, to prevent runoff from accumulating at the base of a grade, or to avoid flood damage along roadways and facilities.

- Employment of temporary sediment control measures. Minimum requirements shall include silt fences or fiber rolls and street sweeping or vacuuming to be implemented as part of the project construction SWPPP in accordance with the General Construction Permit.

  Additional BMPs may be required such as sediment/desilting basins, sediment traps, check dams, gravel bag berms, sandbag berms, strawbale barriers, and stormdrain inlet protection.

- Employment of wind erosion control measures. Temporary ground covers and mulches or approved dust palliatives shall be used during the dry season to control wind erosion.
- Employment of tracking control measures. Tracking control measures will be implemented as part of the SWPPP in accordance with BMPs when and if necessary. These measures may include stabilized construction entrances, stabilized construction roadways, and entrance/outlet tire washing (wet soils).
- Employment of non-stormwater management BMPs. Minimal BMPs requirements shall include water conservation practices, paving and grinding operations, temporary stream crossings, clear water diversions, illicit connection/illegal discharger detection and reporting, portable water/irrigation, vehicle and equipment cleaning, vehicle and equipment fueling, vehicle and equipment maintenance, pile driving operations, concrete curing, material and equipment use over water, concrete finishing, structure demolition/removal over or adjacent to water, dewatering operations. BMPs for these activities must be implemented as part of the SWPPP unless they are determined to be unnecessary (e.g., equipment maintenance off-site at a permitted facility, no material and equipment use over water, no dewatering of trenches, and others). The project SWPPP shall include clear water diversion BMPs for implementation of any alternatives requiring work within the creek or streams.
- Employment of waste management and materials pollution control BMPs. Minimal required BMPs include material delivery and storage, material use, stockpile management, spill prevention and control, solid waste management, hazardous waste management, contaminated soil management, concrete waste management, sanitary/septic waste management, and liquid waste management. These BMPs shall be implemented as part of the project SWPPP.

  The spill prevention and control plan shall be prepared and implemented to minimize the potential for and effects of spills of hazardous substances during construction. In the event of a spill, the contractor's superintendent will notify the applicable Solano County emergency services office and the California Department of Toxic Substances Control; their spill response and cleanup protocols shall be followed. A written description of the reportable releases that have occurred shall be submitted to the applicable RWQCB, including a description of the spill that indicates the type of material, an estimate of the amount spilled, the date of the spill, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future spills. Spills shall be documented on a spill report form.

A construction schedule shall be included in the SWPPP and effective dates included on the WPC Plans. The construction schedule shall be implemented to coordinate the timing of land-disturbing activities with installation of soil stabilization and sediment and erosion control measures to reduce potential for sediment erosion and transport. A phased approach should be implemented for construction activities to minimize the amount of disturbed soil areas exposed at any given time. Because of the site-specific conditions of the corridor, nature of the build alternatives, area of the proposed action, and duration of the proposed construction activities, the SWPPP will generally include limiting soil disturbances during the designated winter rainfall season (October 15 to April 15). If construction is expected to occur during the rainy season, a winterization erosion and sediment control plan shall also be prepared to prevent soil and sediment transport during the rainy season and BMPs

shall be installed prior to the beginning of the rainy season. For completed sections, permanent soil stabilization and sediment controls shall be implemented according to the post-construction storm water management plan.

Erosion in disturbed areas shall also be controlled through the use of grading operations to minimize direct routes for conveying runoff to drainage channels, and the use of soil stabilization BMPs such as mulching, erosion control fabrics, or reseeding with grass or other plants where necessary. Standard staging-area practices for sediment-tracking reduction will also be identified where necessary, including vehicle washing and street sweeping. Temporary concentrated flow conveyance systems, such as berms, ditches, and outlet flow velocity dissipation devices, will also be considered to reduce erosion from newly disturbed slopes.

Work conducted within the Alamo, New Alamo, and McCoy Creek channels shall include particular BMPs, such as placement of staging areas and potential stockpiles away from stream banks, conducting all in-water work behind cofferdams, sheet piling, or use of other containment facilities to control discharges of contaminated runoff and use of clear-water diversions around the active work site. Monitoring and inspection shall be conducted for identifying increases in downstream turbidity that would exceed applicable RWQCB water quality objectives and any other request from the 404 permit or a 1600-1616 Streambed Alteration Agreement.

Under the direction of STA or the appropriate local agency engineering staff, the general contractor and subcontractor conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the BMPs in good working order. They shall also be required to implement appropriate hazardous materials management practices to reduce the possibility of chemical spill or release of contaminants, including any non-stormwater discharge to drainage channels. Standard hazardous materials management and spill control and response measures will minimize the potential for surface and groundwater contamination. The construction general permit (NPDES General Permit for Storm Water Discharges Associated with Construction Activity [Order No. 2009-0009-DWQ, NPDES No. CAS000002], adopted September 2, 2009, and effective July 1, 2010) requires that, for regulated projects (project disturbing one or more acres of land surface), a Risk Level Assessment must be conducted to determine the project's potential for sediment risk to receiving waters. The SWPPP must contain specific minimum BMPs, including sampling, monitoring, and reporting requirements, in accordance with the project's identified Risk Level.

Post Construction

The project sponsor is also required to comply with local regulations for design of roadways and implementation of BMPs to comply with the applicable NPDES permit in each jurisdiction. Development and implementation of coordinated drainage features with permanent post-construction BMPs will minimize potential water quality impacts associated with roadway runoff. The contractor for the proposed action shall be responsible for determining the appropriate features and constructing permanent post-construction stormwater BMPs. The permanent post-construction BMPs shall accommodate the additional drainage discharges generated by the proposed action, as determined in the

associated Master Drainage Plan to be prepared in conformance with Mitigation Measure HYD-1 (see Section 3.9, Hydrology and Floodplains), and avoid adverse effects such as offsite erosion, sedimentation, or water quality impairment.

Although complete removal of all contaminants is not feasible, BMPs shall be selected, designed, and sited to remove the Maximum Extent Practicable (MEP) using the Best Available and Conventional Technologies (BAT and BCT, respectively) that is economically feasible. The expected pollutant removal success rates listed in Table 3.10-2 suggest that single or multiple BMPs, when properly designed, installed and maintained, can achieve the pollutant removal efficiencies shown in the table. Single BMPs or a group of BMPs can be used to achieve the targeting removal rates.

Three broad categories of permanent post-construction BMPs and several specific types of BMPs shall be implemented. The first will consist of erosion and sediment control measures, such as preservation of existing vegetation, establishment of stabilized concentrated flow conveyance systems (e.g., ditches, berms, drains, flared culvert end sections, outlet protection, and flow velocity dissipation), slope protection measures, settling basins, grassy swales, and others. Offsite discharges of particulate-associated pollutants are controlled by controlling erosion and sediment transport. The second category shall consist of stormwater flow control management measures that will result in runoff peak flows and volumes similar to those under existing conditions. These flow controls shall be designed and implemented to manage runoff volumes and peak flows to within 10 percent of existing conditions for the 2-year 24-hour storm event up to the 10-year 24-hour storm event. By controlling storm flow rates and volumes to be similar to existing conditions, changes in drainage and drainage patterns will be minimized, along with their potential effects on water quality and erosion. Consequently, on- and off-site erosion and sediment transport may be mitigated. Finally, permanent post-construction BMPs shall include measures to capture and treat the first flush of stormwater runoff (0.5 inches) and to allow for infiltration and uptake of pollutants not associated with particulate material such as nutrients, oils and greases, salts, and others. All BMPs shall be designed according to Caltrans or CASQA (California Stormwater Quality Association) guidelines and design standards, or other methods approved by STA or the Solano County District Engineer and approval of the Water Board.

Solano County shall be responsible for long-term inspection and maintenance of the permanent BMPs within its jurisdictional right-of-way to ensure that the BMPs are maintained in good working order. The Cities of Vacaville, Fairfield, and Suisun City shall be responsible for long-term inspection and maintenance within their rights-of way.

Table 3.10-2
Potential Pollutant Removal Efficiency of
Pre- and Post-construction Best Management Practices

BMP Type	Typical Pollutant Removal (Percent)				
	Suspended Solids	Total Nitrogen	Total Phosphorus	Pathogens	Total Metals
Structural					
Dry extended detention basins	40 to 72	14	15 to 39	-12 to -122	27 to 73
Wet basins	94	51	5	99	91to 98
Constructed wetlands (vegetated rock filter)[a]	81 to 88	63	82.5	N/A	21 to 80
Infiltration basins[b]	50 to 80	50 to 80	50 to 80	65 to 100	50 to 80
Infiltration trenches, dry wells[b]	50 to 80	50 to 80	15 to 45	65 to 100	50 to 80
Porous pavement[b]	65 to 100	65 to 100	30 to 65	65 to 100	65 to 100
Biofiltration swale	49	30	-106	-30	65 to 72
Biofiltration strip	69	-10	-46	92	65 to 72
Surface sand filters	81 to 90	9 to 32	39 to 44	72 to 79	50 to 92
Storm Filter	44	13	17	47	51 to 53
MCCT	75	0	18	14	35 to 75
CDS	0	5	15	-121	8 to 17
Construction Site					
Silt fence	50 to 80	–	–	–	–
Sediment basin	55 to 100	–	–	–	–
Sediment trap	60	–	–	–	–

Source: Caltrans, 2004[7] except where noted.

Notes:

a. Caltrans, 2007. p. B-247.[8]

b. EPA 1993, 1999.

[7] Caltrans. BMP Retrofit Pilot Program. Final Report. Report ID CTSW-RT-01-050. January 2004.

[8] Caltrans. Caltrans Treatment BMP Technology Report: BMP Fact Sheet Wetland Systems – Vegetated Rock Filter (Subsurface Flow Wetland). April 2007. p. B-247.