Centennial Corridor Project

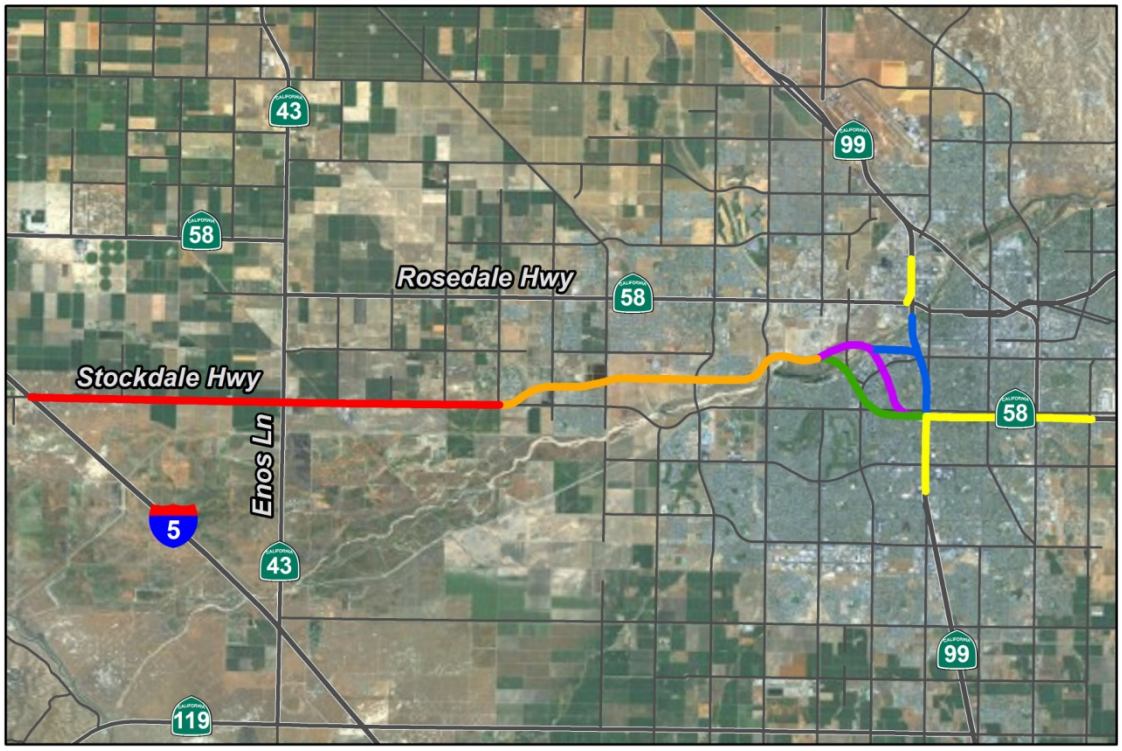
City of Bakersfield and Kern County, CA

District 06 - KER – 58 - PM T31.7 to PM 55.6

District 06 - KER – 99 - PM 21.2 to PM 26.2

Project ID# 06-0000-0484

Water Quality Assessment Report



November 2012

(Revised 2014)

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Water Quality Assessment Report

Centennial Corridor Project

State Route 99 to Interstate 5

Kern County, California

District 06 - KERN – 58 - PM T31.7 to PM 55.6
District 06 - KERN – 99 - PM 21.2 to PM 26.2
Project ID# 06-0000-0484

November 2012

STATE OF CALIFORNIA
Department of Transportation

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The environmental review, certification, and any other action required in accordance with applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327.

Executive Summary

The objectives of the Water Quality Assessment Report are to describe existing water resources, determine if potential project impacts on water resources would be adverse based on preliminary project information, and identify feasible mitigation measures. This report discusses how the project would increase the amount of impervious surface area and potentially increase runoff volumes and the amount of water percolating into the groundwater basin. It also discusses how the project may generate additional vehicle pollutants, such as oil and grease, which could be carried by surface flows into local surface drainages and groundwater basins.

The California Department of Transportation (Caltrans), in cooperation with the City of Bakersfield (City), proposes to establish a new alignment for State Route (SR) 58, which would provide a continuous route along SR 58 from Interstate 5 (I-5) via Westside Parkway to Cottonwood Road on existing SR 58, east of SR 99 (Post Miles T31.7 to R55.6). Improvements to SR 99 (Post Miles 21.2 to 26.2) would also be required to accommodate the connection with SR 58. The project is located at the southern end of the San Joaquin Valley in the city of Bakersfield in Kern County, California. The study site is bounded on the east by Cottonwood Road, on the west by I-5, on the north by Gilmore Avenue, and on the south by Wilson Road. Caltrans is the lead agency for the project pursuant to the California Environmental Quality Act and the National Environmental Policy Act.

The proposed continuous route, known as the Centennial Corridor, has been divided into three distinct segments. Segment 1 is the farthest eastern segment that would connect what is locally known as Westside Parkway to the existing SR 58 (East) freeway. This segment is all new construction, and multiple alignment alternatives are being evaluated.

Segment 2 includes Westside Parkway and extends from approximately Mohawk Street to Heath Road. This segment is currently under construction and will be transferred into the State Highway System. The analysis for Segment 2 evaluates potential new impacts associated with incorporating Westside Parkway as part of the State Highway System rather than it operating as a local roadway.

Segment 3 extends from Heath Road to I-5. In conjunction with construction of Segment 1, improvements to the Stockdale Highway/SR 43 (known locally as Enos Lane) intersection would be constructed. The timing of construction for the remainder of this segment is unknown, but it would not occur until there is sufficient funding and greater traffic demand;

therefore, other than the intersection improvements, the analysis of Segment 3 will be done at a conceptual level (Tier 1).

The project area is within the jurisdiction of the Central Valley Regional Water Quality Control Board. The Central Valley Regional Water Quality Control Board has identified many issues related to surface water quality. These include protecting water resources from agricultural drainage in the San Joaquin Valley, which is high in selenium and trace elements, while at the same time maintaining a viable agricultural industry; ensuring effective controls on storm water runoff from urban and rural areas; and mitigating the effects of abandoned mine discharges of acids and heavy metals to reduce impacts on the Sacramento River system and the Delta. The Central Valley Regional Water Quality Control Board also recognizes that sources of toxicity in surface waters need further identification and control, and to protect aquatic organisms, levels of pesticides reaching surface waters must be reduced (California Department of Water Resources 2005).

The project area is within the South Valley Floor hydrologic unit, which is a sub-basin within the Tulare Lake Hydrologic Region. In general, groundwater quality throughout the Tulare Lake Hydrologic Region is suitable for most urban and agricultural uses with only local impairments. The primary constituents of concern are high total dissolved solids, nitrate, arsenic, and organic compounds (California Department of Water Resources 2003).

A hydrological and/or water quality construction impact would occur if construction activities related to the preferred alternative substantially affected surface water or groundwater quality or altered surface runoff rates, thereby contributing to flooding or erosion hazards.

Construction of the proposed corridor has the potential to contribute pollutants to receiving water bodies. These pollutants include sediment and silt, associated with soil disturbance because of construction of the proposed corridor, and chemical pollutants associated with construction materials that are brought onto the project site.

Soil disturbance activities include earth-moving activities such as excavation and trenching, soil compaction and moving, cut and fill activities, and grading. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport via storm water runoff from the project area. Chemical contaminants, such as oils, fuels, paints, solvents, nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported to downstream drainages and ultimately into collecting waterways, contributing to the chemical degradation of water quality.

Excavation activities may occur that would require removal of groundwater from excavations during construction. Dewatering activities for excavations below the water table could result in the discharge of unsuitable and untreated water if discharged directly to the environment. If temporary excavations require dewatering, there is the potential of discharging pollutants (primarily by entraining silt and clay, but also from encountering chemicals and other contaminants) through release of construction water directly to the environment, which could possibly violate Central Valley Regional Water Quality Control Board Water Quality Objectives.

Operation of the proposed corridor would result in an increase in impervious surface areas, which could potentially increase storm water runoff. Furthermore, potential pollutant sources associated with operation of the proposed project include motor vehicles, highway maintenance, illegal dumping, spills, and landscaping care.

By following the guidelines and regulations established by the National Pollutant Discharge Elimination System (NPDES) permits, which include the Caltrans statewide permit (Order No. 99-06-DWQ, CAS 000003) and compliance with waste discharge requirements for storm water discharges under Order No. 5-01-130, NPDES No. CA00883399 administered by the Central Valley Regional Water Quality Control Board, and with implementation of best management practices, the effects to water quality from construction and operation of the proposed project would be minimized. A Storm Water Pollution Prevention Plan would be prepared and implemented under the State's National Pollutant Discharge Elimination System General Permit for Discharges Associated with Construction Activities, Order No. 2009-0009-DWQ. The Storm Water Pollution Prevention Plan would identify best management practices to minimize erosion and ensure the proper handling and storage of materials that may have the potential to affect water quality. During construction, materials would be stored properly to avoid affecting the receiving waters. During the preliminary project design, various Treatment Best Management Practices would be assessed to determine their applicability to the proposed project based on identified site-specific pollutants, project design features, and site conditions, including available right-of-way. The applicability of all nine Caltrans-approved Treatment Best Management Practices would be analyzed as part of the Project Approval/Environmental Document process, and the identification and applicability of Treatment Best Management Practices would be finalized at various locations throughout the alignment during the Project Specifications and Estimate phase. Preliminary Treatment BMP Design Characteristic tables and a location map for the proposed Treatment BMP strategy have been provided in Appendix D of this report. With the implementation of Treatment Best Management Practices, Design Pollution Prevention Best Management Practices, Maintenance Best Management Practices, and Temporary

Construction Site Best Management Practices, the effects to water quality associated with construction and operation of the proposed project would be minimized. No specific agreements have been negotiated with the Central Valley Regional Water Quality Control Board or any local agency at this time. Additional permits identified and anticipated for this project are a 401 Water Quality Certification from the Central Valley Regional Water Quality Control Board Fresno Office, a Section 404 permit from the United States Army Corps of Engineers, and a 1602 Streambed Alteration Agreement from the Department of Fish and Game, which would be obtained by the end of the plans, specifications, and estimate phase of this project.

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List of Abbreviated Terms

CADD	computer-assisted design and drafting
Caltrans	California Department of Transportation
City	City of Bakersfield
County	County of Kern
HSA	Hydrologic Sub-area
I-5	Interstate 5
ID	Improvement District
KCWA	Kern County Water Agency
SR	State Route
U.S.	United States

Chapter 1 **Introduction**

1.1 Project Description

The California Department of Transportation (Caltrans) proposes to establish a new alignment for State Route 58, which would provide a continuous route along State Route 58 from Cottonwood Road on existing State Route 58, east of State Route 99 (post mile R55.6), to Interstate 5 (I-5) (post mile T31.7). Improvements to State Route 99 (post miles 21.2 to 26.2) and Westside Parkway would also be made to accommodate the connection with State Route 58.

The project is located at the southern end of the San Joaquin Valley in the city of Bakersfield in Kern County, California. The study site is bound on the east by Cottonwood Road, on the west by I-5, on the north by Gilmore Avenue, and on the south by Wilson Road. Caltrans is the lead agency for the project pursuant to the California Environmental Quality Act and the National Environmental Policy Act.

The proposed continuous route, known as the Centennial Corridor, has been divided into three segments, as shown in Figure 1.

Segment 1 is the easternmost segment, which would connect the existing State Route 58 (East) freeway to the Westside Parkway. Multiple alignment alternatives are being evaluated for this segment and are discussed below.

Segment 2 is composed of the Westside Parkway, which extends westerly from Truxtun Avenue to Heath Road. This roadway is a local facility that is currently under construction and would be transferred into the State Highway System. The analysis evaluates potential impacts associated with incorporating the Westside Parkway as part of the State Highway System, as well as improvements to the Westside Parkway from Truxtun Avenue to the Calloway Drive interchange which would be made to facilitate traffic operations between the Westside Parkway and the Centennial Corridor. The analysis reports the relevant results of the Westside Parkway Environmental Assessment/Final Environmental Impact Report and provides updates, as necessary.

Segment 3 would extend from Heath Road to I-5. This segment will need a temporary route adoption for the use of Stockdale Highway between Heath Road and I-5 as an interim alignment for State Route 58. A future new alignment (ultimate) as identified in the 2002 Route 58 Route Adoption Project Tier I Environmental Impact Statement/Environmental Impact Report (EIS/EIR) will be constructed when there is greater traffic demand and

funding is available. Since traffic would use Stockdale Highway between Heath Road and I-5 on an interim basis, the potential impacts will also be evaluated for the interim use of Stockdale Highway. Improvements to the Stockdale Highway/State Route 43 (known locally as Enos Lane) intersection would be made to accommodate the additional traffic.

1.2 Purpose and Need

The purpose of the Centennial Corridor project is to provide route continuity and associated traffic congestion relief along State Route 58 within Metropolitan Bakersfield and Kern County from State Route 58 east (at Cottonwood Road) to I-5.

State Route 58 is a critical link in the state transportation network that is used by interstate travelers, commuters, and a large number of trucks. Under existing conditions, State Route 58 does not meet the capacity needs of the area, and this is expected to get worse as the population grows. State Route 58 lacks continuity in central Bakersfield, which results in severe traffic congestion and reduced levels of service on adjoining highways and local streets. This route is offset by about 1 mile at State Route 43 and by about 2 miles at State Route 99. The merging of two major state routes (58 and 99) into one alignment between the eastern and western legs of State Route 58 degrades the traffic level of service on this segment of freeway. In addition, State Route 99's close spacing for its two interchanges with State Route 58 (East and West), in addition to an interchange at California Avenue, results in vehicles aggressively changing lanes, which adds to the congestion.

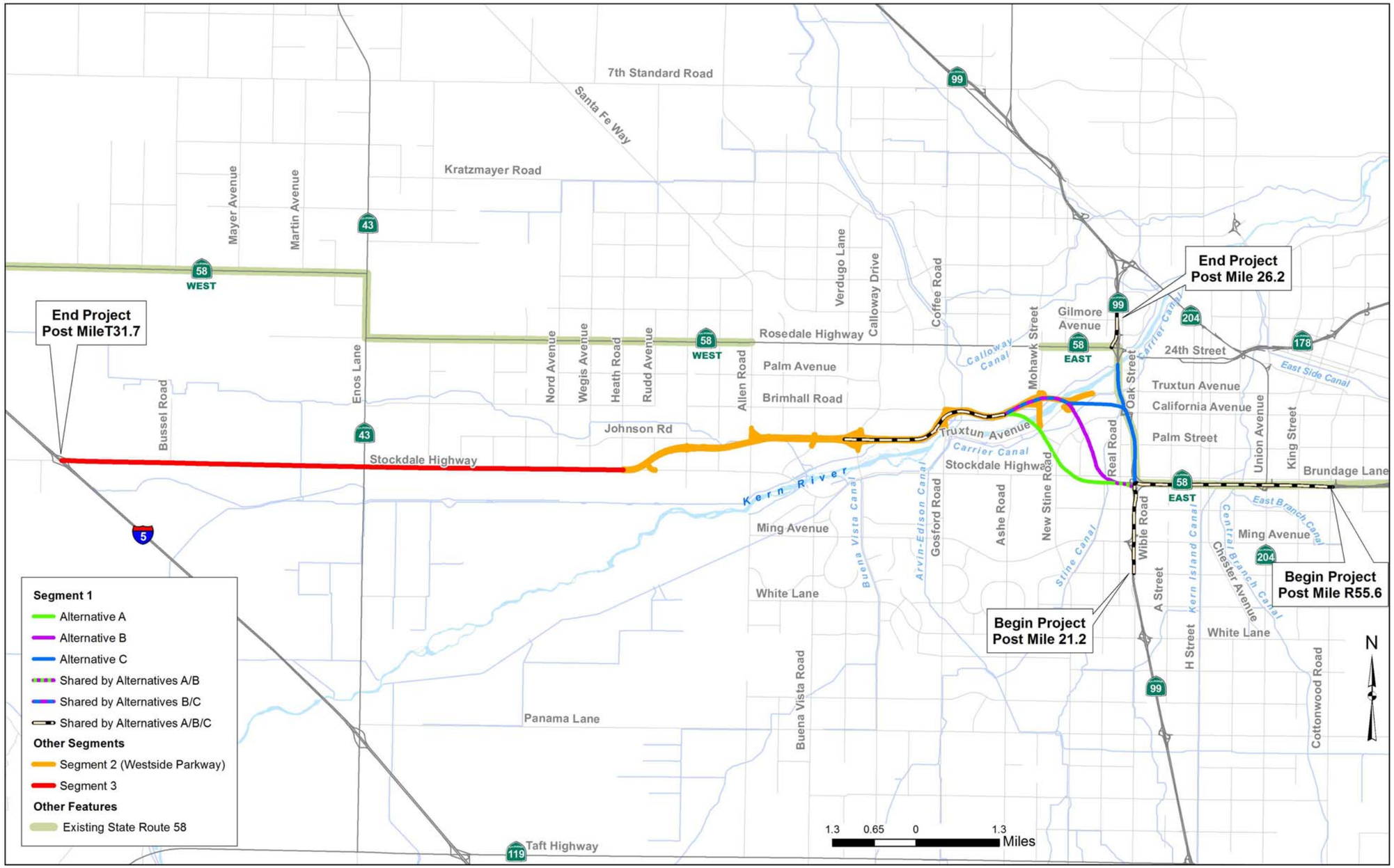


Figure 1 Segments of Centennial Corridor

1.2.1 Existing Drainage Characteristics

The storm water runoff from the proposed roadways would be conveyed through a series of new drainage facilities. In accordance with Caltrans standards (Central Region Hydraulic Design Criteria), proposed drainage facilities would be designed for the 5-minute/25-year storm (2.30 inches per hour), and basins would be designed for two 10-year, 24-hour design storm events. The proposed pavement sections would be designed to drain as sheet flow towards the outside edge of the roadway, except for superelevated sections that would drain toward the median. Storm runoff would then be intercepted by drainage inlets and directed to water quality flow Treatment Best Management Practices or conveyed to proposed Water Quality Volume Treatment Best Management Practices, or through various storm drain facilities before discharging to the Kern River. Flared end sections would be used at the outlets of proposed overside drains or culverts. Because of the project, several existing drainage facilities would be improved or rerouted. Auxiliary lanes would be provided on the northbound side from south of California Avenue to the State Route 58/State Route 99 interchange. Existing cross drains would be extended, and drainage inlets would be relocated along the pavement shoulder (Caltrans 2011).

1.2.2 Project Physical Footprint Description:

Disturbed soil area is based on which alternative is selected. Alternative A is estimated to disturb 1,125 acres; Alternative B is estimated to disturb 1,020 acres; and Alternative C is estimated to disturb 1,124 acres, as shown in Table 4-3 of this report. The existing impervious surface area estimated for Alternative A is 89 acres, 129 acres for Alternative B, and 129 acres for Alternative C (Table 4-6) (Caltrans 2012). Proposed impervious surface area was estimated using computer-assisted design and drafting (CADD) drawings. The proposed increase in impervious surface area within the project limits was estimated at 66 acres for Alternative A, 34 acres for Alternative B, and 99 acres for Alternative C. Therefore, the total proposed impervious surface area for each alternative in the post-project condition was estimated at 155 acres for Alternative A, 163 acres for Alternative B, and 228 acres for Alternative C (Caltrans 2012).

1.2.3 Sediment and Receiving Water Risk Level Determination

A Risk Level Determination was generated for the Centennial Corridor Project during the Project Approval/Environmental Document phase (Appendix A). The construction risk level of a project is based upon the sediment risk factor and the receiving water risk factor. Both of these two factors were determined as low; therefore, the combined risk level for the Centennial Corridor Project is Risk Level 1. As a Risk Level 1 project for disturbed areas within the Kern Delta Watershed, the discharger must comply with the requirements included in Attachment C of the Construction General Permit (SWRCB 2009).

1.3 Build Alternatives

1.3.1 Build Alternatives

Segment1

Segment 1 is the easternmost segment, which would connect the Westside Parkway to the existing State Route 58 (East) freeway. Multiple alignment alternatives are being evaluated for this segment and are discussed below.

As shown in Figure 2, the three build alternatives (Alternatives A, B, and C) within Segment 1 propose new alignments that would extend from Cottonwood Road on the existing State Route 58 (East) and connect I-5 via the Westside Parkway. Alternatives A and B would be west of State Route 99, and Alternative C would parallel State Route 99 to the west. Under Alternative A, the eastern end of the Westside Parkway mainline would be realigned to conform to the Alternative A alignment, and ramp connections would be provided to the Mohawk Street interchange. Under Alternatives B and C, the alignments would connect to the Westside Parkway by extending the mainline lanes built as part of the Westside Parkway project. Detailed descriptions of the alternatives are provided on the following subsections.

1.3.2 Common Design Features of the Build Alternatives

The build alternatives would connect State Route 58 (East) to the east end of the Westside Parkway by means of a six-lane freeway. All the build alternatives would involve a route adoption to include the selected Segment 1 alignment and the Westside Parkway into the State Highway System as State Route 58. In Segment 3, there would be a temporary route adoption of Stockdale Highway as the interim State Route 58 connection to Interstate 5 until the ultimate alignment (the Cross Valley Canal alignment addressed in the 2001 EIS/EIR) is constructed, which would occur at a later date. Though the alignment and design characteristics vary by alternative, the three build alternatives have the following common design features:

Segment 1

All the alternatives would provide the following connections between State Route 58 and State Route 99 using high speed connection ramps:

- Northbound State Route 99 to westbound Centennial Corridor
- Northbound State Route 99 to eastbound State Route 58 (East).
- Southbound State Route 99 to eastbound State Route 58 (East).
- Eastbound Centennial Corridor to southbound State Route 99.
- Westbound State Route 58 (East) to southbound and northbound State Route 99.

Direct connector ramps from southbound State Route 99 to westbound State Route 58 are not being provided as part of this project. However, to accommodate this movement, the southbound State Route 99/Rosedale Highway off-ramp would have two lanes off the freeway and be widened to four lanes at the intersection with Rosedale Highway. Additionally, an auxiliary lane would be provided on State Route 99 from south of Gilmore Avenue to the State Route 58 (Rosedale Highway) off-ramp. Direct connector ramps from eastbound State Route 58 to northbound State Route 99 are not being provided as part of this project.

The project would require the widening of the South P Street Undercrossing and the westbound State Route 58 Grade Separation over State Route 99. In addition, the Stockdale Highway off-ramp from southbound State Route 99 and the Wible Road on- and off-ramps on State Route 99, located just south of the existing State Route 58/State Route 99 interchange, would be removed.

Segment 2

The Westside Parkway would be incorporated into the State Highway System with each of the Build Alternatives. Improvements to connect Centennial Corridor to the Westside Parkway would extend from where each build alternative connects at the eastern end of the Westside Parkway towards the west ending at the Calloway Drive interchange. The proposed improvements would widen the Westside Parkway by constructing one additional lane in the median to provide auxiliary lanes. In the westbound direction, the median widening would extend from east of the Friant-Kern Canal through the Calloway Drive interchange. The limits of the added lane in the eastbound direction would differ between each alternative, as described in the Unique Design Features of the Build Alternatives section below. With each build alternative, modifications to the westbound diamond off-ramp to Calloway Drive and the eastbound loop on-ramp from Coffee Drive would be required.

Though the improvements described above are physically located in Segment 2, construction would be undertaken as part of Segment 1 construction to facilitate traffic operations between the Westside Parkway and the Centennial Corridor.

Segment 3

With each build alternative, the Stockdale Highway/State Route 43 intersection would be widened and traffic signals would be added to control the traffic movements. State Route 43 would be widened to add a dedicated left-turn lane in both directions. Stockdale Highway would be widened to add a dedicated left-turn lane and a shared through/right-turn lane in

both directions. Though physically located in Segment 3, these improvements would be built as part of Segment 1 to ensure adequate traffic operations at this intersection.

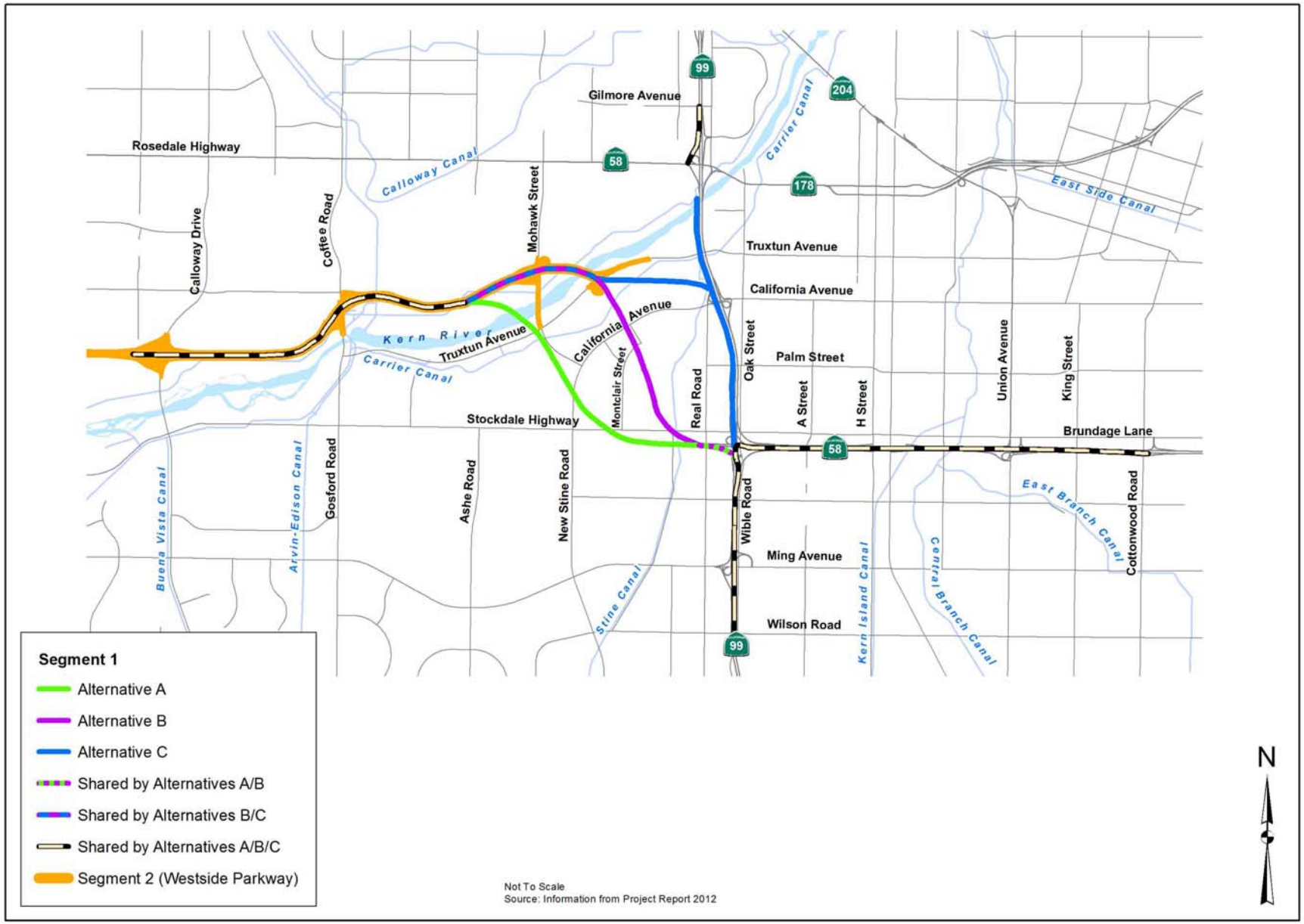


Figure 2 Segment 1 of Centennial Corridor

1.3.3 No-Build Alternative

No construction of Segment 1 would occur under the No-Build Alternative. In addition, no improvements to the Westside Parkway from Truxtun Avenue to the Calloway Drive interchange would be required. There would also be no improvements made to the Stockdale Highway/State Route 43 intersection. The No-Build Alternative would involve the following actions: (1) the Westside Parkway would be route adopted into the State Highway System; (2) the portion of Mohawk Street from the Westside Parkway to Rosedale Highway would be designated as part of State Route 58, which would provide a connection to State Route 99; (3) Stockdale Highway between Heath Road and Interstate 5 would serve as an interim alignment for State Route 58 until ultimate improvements are constructed; and (4) the portion of State Route 58 (West) from Allen Road to Interstate 5 would be relinquished to the local jurisdictions as a local facility.

1.3.4 Alternative A

Alternative A would travel westerly from the existing State Route 58/State Route 99 interchange for about 1 mile, south of Stockdale Highway, where it would turn northwesterly and go over Stockdale Highway/Montclair Street, California Avenue/Lennox Avenue, Truxtun Avenue, and the Kern River before joining the eastern end of the Westside Parkway near the Mohawk Street interchange.

A link would be provided from northbound State Route 99 to westbound State Route 58 and from eastbound State Route 58 to southbound State Route 99 via high-speed connectors. No direct connector ramps would be built from southbound State Route 99 to westbound State Route 58 or from eastbound State Route 58 to northbound State Route 99. Southbound State Route 99 would be widened to accommodate the additional traffic from eastbound State Route 58 to the southbound State Route 99 connector. The existing westbound State Route 58 to southbound State Route 99 loop-ramp connector would be realigned and would connect to the proposed eastbound State Route 58 to southbound State Route 99 connector before merging onto southbound State Route 99. The existing southbound State Route 99 to eastbound State Route 58 connector and northbound State Route 99 to eastbound State Route 58 would be preserved with some changes.

The limits of widening on State Route 99 would extend to the Wilson Road overcrossing. On northbound State Route 99, a three-lane exit would be provided just north of Wilson Road to carry the northbound State Route 99 to westbound State Route 58 traffic on two lanes and the Ming Avenue on- and off-ramp traffic on the third lane. All ramps in this area would have to be realigned to provide for the additional lanes. The Wible Road on- and off-ramps just south

of the existing State Route 58/State Route 99 interchange, which is in conflict with the Caltrans standards of interchange spacing, would have to be removed to accommodate this design. The Stockdale Highway off-ramp on the southbound State Route 99 to eastbound State Route 58 connector would be removed as well. Under this concept, State Route 58 would also lose its link with Real Road. Also, Alternative A would provide an auxiliary lane on southbound State Route 99 from south of Gilmore Avenue to the Rosedale Highway off-ramp.

The median widening to provide an auxiliary lane along the Westside Parkway would extend westerly from the connection point with Centennial Corridor between Coffee Road and Mohawk Street to the Coffee Road off-ramp.

Other features with this alternative include (1) the construction of 19 soundwalls; (2) the construction of a park and ride facility off Mohawk Street, between California Avenue and Truxtun Avenue to replace the facility that would be displaced by the project; (3) 7 infiltration basins that would be placed throughout the study area to retain stormwater runoff for water quality improvement purposes; and (4) 48 retaining walls of varying sizes located throughout the study area.

The maximum depth of excavation for Alternative A is 25 feet. This would occur near State Route 58 between Stephens Drive and H Street to accommodate the widened ramps. On State Route 99, the maximum excavation would be about 18.5 feet and would occur between Belle Terrace and Ming Avenue.

1.3.5 Alternative B

Alternative B would run westerly from the existing State Route 58/State Route 99 interchange for about 1,000 feet, south of Stockdale Highway, where it would turn northwesterly and span Stockdale Highway/Stine Road, California Avenue, Commerce Drive, Truxtun Avenue, and the Kern River before joining the east end of the Westside Parkway between the Mohawk Street and Coffee Road interchanges. This alignment would depress State Route 58 between California Avenue and Ford Avenue. Overcrossings are proposed at Marella Way and La Mirada Drive to ease traffic circulation.

Alternative B proposes the same connections to State Route 99 that Alternative A does and would require similar improvements on State Route 99 and existing State Route 58.

The median widening to provide an auxiliary lane along the Westside Parkway would extend westerly from the connection point with Centennial Corridor between Coffee Road and Mohawk Street to the Coffee Road off-ramp. Modifications would be required to the

eastbound Mohawk Street off-ramp, westbound Truxtun Avenue on-ramp, and the eastbound Mohawk Street loop on-ramp. In addition, construction of the proposed westbound Mohawk Street off-ramp and realignment of the Cross Valley Canal maintenance access road from Mohawk Street would be required.

Other features with this alternative include (1) the construction of 24 soundwalls; (2) the construction of a park and ride facility north of California Avenue, next to the Centennial Corridor, to replace the facility that would be displaced by the project; (3) 8 infiltration basins that would be placed throughout the study area to retain stormwater runoff for water quality improvement purposes; and (4) 42 retaining walls of varying sizes located throughout the study area.

The maximum depth of excavation for Alternative B is 25 feet. This would occur near State Route 58 between Stephens Drive and H Street to accommodate the widened ramps and between California Avenue and Ford Avenue, where the freeway would be built below the existing grade. On State Route 99, the maximum excavation would be about 18.5 feet between Belle Terrace and Ming Avenue.

1.3.6 Alternative C

Near the existing State Route 58/State Route 99 interchange, Alternative C would turn north and run parallel to the west of State Route 99 for about 1 mile. The freeway would turn west and span the BNSF Railway rail yard, Truxtun Avenue, and the Kern River. This alternative proposes undercrossings at Brundage Lane, Oak Street, State Route 99, Palm Avenue, and California Avenue.

Connections would be provided from eastbound State Route 58 to southbound State Route 99 and from northbound State Route 99 to westbound State Route 58. The existing westbound State Route 58 to southbound State Route 99 loop-ramp connector would connect to the proposed eastbound State Route 58 to southbound State Route 99 connector before merging onto southbound State Route 99. The southbound State Route 99 Ming Avenue off-ramp would be relocated north of the eastbound State Route 58 to southbound State Route 99 connector to facilitate weaving between the Ming Avenue off-ramp and the eastbound State Route 58 to southbound State Route 99 connector traffic. A connector would be provided east of northbound State Route 99 from Brundage Lane to south of California Avenue to facilitate weaving between westbound State Route 58 to northbound State Route 99 traffic with northbound State Route 99 to westbound State Route 58 traffic.

Improvements on State Route 99 would extend from the Wilson Road overcrossing (south of the State Route 58/State Route 99 interchange) to the Gilmore Avenue overcrossing (north of

the State Route 58/State Route 99 interchange). A collector-distributor (C-D) road system would provide access from westbound State Route 58 to northbound State Route 99, as well as from northbound State Route 99 to westbound State Route 58. The Wible Road on- and off-ramps just south of the existing State Route 58/State Route 99 interchange would have to be removed to accommodate the northbound State Route 99 auxiliary lane. The Stockdale Highway off-ramp on the southbound State Route 99 to eastbound State Route 58 connector would be removed as well. Under this concept, southbound State Route 99 would also lose its link with Real Road.

The median widening to provide an auxiliary lane along Westside Parkway would extend westerly from the connection point with Centennial Corridor between Coffee Road and Mohawk Street to the Coffee Road off-ramp. Modifications would be required to the eastbound Mohawk Street off-ramp, westbound Truxtun Avenue on-ramp, and the eastbound Mohawk Street loop on-ramp. In addition, construction of the proposed westbound Mohawk Street off-ramp and realignment of the Cross Valley Canal maintenance access road from Mohawk Street would be required.

Other features with this alternative include (1) the construction of 17 soundwalls; (2) the construction of a park and ride facility at Real Road and Chester Lane to replace the facility that would be displaced by the project; (3) 11 infiltration basins that would be placed throughout the study area to retain stormwater runoff for water quality improvement purposes; and (4) 42 retaining walls of varying sizes located throughout the study area.

The maximum depth of excavation for Alternative C is 25 feet. This would occur near State Route 58 between Stephens Drive and H Street to accommodate the widened ramps. On State Route 99, the maximum excavation would be about 18.5 feet and be located between Belle Terrace and Brundage Lane.

1.4 Approach to Water Quality Assessment

The purpose of the Water Quality Assessment Report is to fulfill the requirement of the National Environmental Policy Act and the California Environmental Quality Act, and to provide information, to the maximum extent possible, for National Pollutant Discharge Elimination System permitting. The document includes a discussion of the proposed project, the physical setting of the project area, and the regulatory framework with respect to water quality; it also provides data on surface water and groundwater resources within the project area and the water quality of these waters, describes water quality impairments and beneficial uses, and identifies potential water quality impacts/benefits associated with the proposed

project, and recommends avoidance and/or minimization measures for potentially adverse impacts.

This Water Quality Assessment Report is based upon an evaluation of the physical setting of the project area, along with the regulatory framework with respect to water quality. The initial approach entailed an evaluation of water resources based upon their beneficial uses and impairments. Water quality impacts associated with highway runoff were determined by evaluating Caltrans' water quality data and comparing this data with the water quality objectives established by the Central Valley Regional Water Quality Control Board. Impacts associated with storm water erosion were identified by evaluating the proposed disturbed soil area and the proposed impervious surface area within the project area. Project design features were then identified to minimize construction and post construction impacts to the maximum extent practicable.

Each of the build alternatives would include project design features such as the design and installation of Treatment Best Management Practices to the maximum extent practicable. The targeted design constituent approach, outlined in the Caltrans Project Planning and Design Guide (Caltrans 2010), would be used to determine the prioritization for potential Treatment Best Management Practices. The applicability of all nine Caltrans-approved Treatment Best Management Practices would be analyzed for the entirety of the Centennial Corridor Project from a water quality perspective in relation to the receiving water bodies within the proposed project limits. The proposed Treatment Best Management Practice strategy to compensate for potential pollutant sources associated with operation of the Centennial Corridor Project would be developed to treat the water quality volume and/or water quality flow. For each of the build alternatives, the water quality flow and the water quality volume would be routed away from local drainage courses and into the appropriate Treatment Best Management Practice.

Chapter 2 **Regulatory Setting**

2.1 Federal Laws and Requirements

2.1.1 Clean Water Act

In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to waters of the United States (U.S.) from any point source unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System Permit. Known today as the Clean Water Act, Congress has amended it several times. In the 1987 amendments, Congress directed dischargers of storm water from municipal and industrial/ construction point sources to comply with the National Pollutant Discharge Elimination System Permit scheme. Important Clean Water Act sections are:

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the U.S. to obtain certification from the State that the discharge will comply with other provisions of the act. (Most frequently required in tandem with a Section 404 permit request. See below).
- Section 402 establishes the National Pollutant Discharge Elimination System, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Water Quality Control Boards administer this permitting program in California. Section 402(p) requires permits for discharges of storm water from industrial/construction and Municipal Separate Storm Sewer Systems.
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers.

The objective of the Clean Water Act is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

The U.S. Army Corps of Engineers issues two types of 404 permits: Standard and General permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are also two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide permit may be permitted under one of U.S. Army Corps of Engineers' Standard permits. For Standard permits, the U.S. Army Corps of Engineers' decision to approve is based on compliance with U.S. Environmental Protection Agency's Section 404 (b)(1) Guidelines (U.S. Environmental Protection Agency *Code of Federal Regulations* 40 Part 230), and whether permit approval is in the public interest. The 404(b)(1) Guidelines were developed by the U.S. Environmental Protection Agency in conjunction with the U.S. Army Corps of Engineers and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative that would have less adverse effects. The Guidelines state that the U.S. Army Corps of Engineers may not issue a permit if there is a least environmentally damaging practicable alternative to the proposed discharge that would have fewer effects on waters of the U.S. and not have any other significant adverse environmental consequences. Per the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures have been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from the U.S. Army Corps of Engineers, even if not subject to the 404(b)(1) Guidelines, must meet general requirements (see 33 *Code of Federal Regulations* 320.4).

2.2 State Laws and Requirements

2.2.1 Porter-Cologne Water Quality Control Act

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 (i.e., liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the State. It predates the Clean Water Act and regulates discharges to waters of the State. Waters of the State include more than just waters of the U.S., such as groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined, and this definition is broader than the Clean Water Act definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements and may be required even when the discharge is already permitted or exempt under the Clean Water Act.

The State Water Resources Control Board and Regional Water Quality Control Boards are responsible for establishing the water quality standards (i.e., objectives and beneficial uses) required by the Clean Water Act and regulating discharges to ensure compliance with the

water quality standards. Details regarding water quality standards in a project area are contained in the applicable Regional Water Quality Control Board Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions 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, the State Water Resources Control Board identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with Clean Water Act 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 or non-source point controls (National Pollutant Discharge Elimination System permits or Waste Discharge Requirements), the Clean Water Act requires the establishment of Total Maximum Daily Loads, which specify allowable pollutant loads from all sources (i.e., point, non-point, and natural) for a given watershed.

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

The State Water Resources Control Board adjudicates water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and it oversees water quality functions throughout the state by approving Basin Plans, total maximum daily loads, and National Pollutant Discharge Elimination System permits. Regional Water Quality Control Boards are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

National Pollutant Discharge Elimination System Program

Municipal Separate Storm Sewer Systems (MS4)

Section 402(p) of the Clean Water Act requires the issuance of National Pollutant Discharge Elimination System permits for five categories of storm water dischargers, including municipal separate storm sewer systems. The U.S. Environmental Protection Agency defines a municipal separate storm sewer system as “any conveyance or system of conveyances (i.e., 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.” The State Water Resources Control Board has identified Caltrans as an owner/operator of a municipal separate storm sewer system pursuant to federal regulations. Caltrans’ municipal separate storm sewer system permit covers all Caltrans rights-of-way, properties, facilities, and activities in the state. The State Water Resources Control Board or the Regional Water Quality Control Board issues National Pollutant

Discharge Elimination System permits for 5 years, and permit requirements remain active until a new permit has been adopted.

Caltrans' municipal separate storm sewer system permit, which is currently under revision, contains three basic requirements:

- Caltrans must comply with the requirements of the Construction General Permit (see below);
- Caltrans must implement a year-round program in all parts of the state to effectively control storm water and non-storm water discharges; and
- Caltrans' storm water discharges must meet water quality standards through implementation of permanent and temporary (construction) best management practices to the Maximum Extent Practicable, and other measures as the State Water Resources Control Board determines to be necessary to meet the water quality standards.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan to address storm water pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The Storm Water Management Plan assigns responsibilities within Caltrans for implementing storm water management procedures and practices, as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The Storm Water Management Plan describes the minimum procedures and practices Caltrans uses to reduce pollutants in storm water and non-storm water discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of best management practices. The proposed project will be programmed to follow the guidelines and procedures outlined in the latest Storm Water Management Plan to address storm water runoff.

Construction General Permit

Construction General Permit (Order No. 2009-009-DWQ, as amended by 2010-0014-DWG), adopted on September 2, 2009, became effective on July 1, 2010. The permit regulates storm water discharges from construction sites that result in a disturbed soil area of 1-acre or greater and/or are smaller sites that are part of a larger common plan of development. For all projects subject to the Construction General Permit, applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan. In accordance with Caltrans' Standard Specifications, a Water Pollution Control Plan is necessary for projects with a disturbed soil area less than 1-acre.

By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least 1-acre must comply with the

provisions of the Construction General Permit. Construction activity that results in soil disturbances of less than 1-acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the Regional Water Quality Control Board. Operators of regulated construction sites are required to develop storm water pollution prevention plans; to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and they are based on potential erosion and transport to receiving waters. 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, and preconstruction and postconstruction aquatic biological assessments during specified seasonal windows (SWRCB 2009).

Section 401 Permitting

Under Section 401 of the Clean Water Act, any project requiring a federal license or permit that may result in a discharge to a water of the U.S. must obtain a 401 Certification, which certifies that the project will be in compliance with State water quality standards. The most common federal permit triggering 401 Certification is a Clean Water Act Section 404 permit, issued by the U.S. Army Corps of Engineers. The 401 permit certifications are obtained from the appropriate Regional Water Quality Control Board, dependent on the project location, and are required before the U.S. Army Corps of Engineers issues a 404 permit.

In some cases, the Regional Water Quality Control Board may have specific concerns with discharges associated with a project. As a result, the Regional Water Quality Control Board may issue a set of requirements known as Waste Discharge Requirements under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. Waste Discharge Requirements can be issued to address permanent and temporary discharges of a project.

California Department of Fish and Game Section 1602 Streambed Alteration Agreement

Section 1602 of the California State Department of Fish and Game Code requires a Streambed Alteration Agreement for any alteration to the bank or bed of a stream or lake. Because alteration to the bank or bed of a stream or lake is required for this project, a Section 1602 Streambed Alteration Agreement would be necessary.

2.3 Regional and Local Requirements

This project is located within the Kern River Hydrologic Unit of the Tulare Lake Basin, under the jurisdiction of the Central Valley Region (Region 5) of the California Regional Water Quality Control Board. As such, it would be subject to water quality controls that pertain to the Kern River and tributaries of the Kern River. Many beneficial uses have been identified in the revised Water Quality Control Plan for the Tulare Lake Basin Second Edition (CVRWQCB 2004).

Dewatering Permit

Care is required for the removal of nuisance water from a construction site (known as dewatering) because of the high turbidity and other pollutants associated with this activity. Central Valley Regional Water Quality Control Board's Order No. R5-00-175, General Waste Discharge Requirements for Discharges to Surface Water which Pose an Insignificant *(De Minimus)* Threat to Water Quality covers discharges to surface water from dewatering activities (CVRWQCB 2000).

Municipal Separate Storm Sewer System Permit

The Central Valley Regional Water Quality Control Board has issued a joint National Pollutant Discharge Elimination System permit with the County of Kern (County) and the City to prohibit non-storm water discharges and to reduce pollutants in discharges to the "maximum extent practicable," to maintain and/or attain water quality objectives that are protective of beneficial uses or receiving waters (Order No. 5-01-130, NPDES No. CA00883399). A provision of this permit requires the implementation of a Storm Water Management Plan/Standard Urban Storm Water Mitigation Plan to address storm water runoff quality. The Storm Water Management Plan and Standard Urban Storm Water Mitigation Plan represent best practicable treatment and control of the discharge. In general, Standard Urban Storm Water Mitigation Plans require structural controls to infiltrate or treat runoff from specified storm events, and recommend or require other best management practices (CVRWQCB 2001).

Because of the growth patterns of the Bakersfield area, the County has estimated that more than 90 percent of new development occurs in unsewered areas; therefore, 90 percent of runoff from new development is not discharged to waters of the U.S. Kern County requires that new developments in the Bakersfield metropolitan area that cannot be served by the existing municipal separate storm sewer system include retention basins to contain and infiltrate runoff from the development. New developments that can be served by the existing municipal separate storm sewer system discharge storm water to the existing system.

The City requires that most new developments include retention basins designed to contain runoff produced by the 100-year, 24-hour storm event and capable of draining by percolation or evaporation within 7 days. In cases where retention basins cannot be used, the City requires that developments include detention basins. The retention or detention basins become part of the municipal separate storm sewer system subject to this permit.

During subsequent design phases, the latest version of the Storm Water Management Plan/ Standard Urban Storm Water Mitigation Plan developed and implemented by the County and City shall be evaluated to determine what requirements are applicable to a road and highway project such as the Centennial Corridor.

Flood Protection

As stated in the California Code of Regulations, Title 23, Article 1, Section 2(b), “the area of the Central Valley Flood Protection Board (CVFPB) jurisdiction includes the entire Central Valley, including all tributaries and distributaries of the Sacramento and San Joaquin Rivers, and the Tulare and Buena Vista Basins”. An encroachment permit for this project is required for one or more of the following reasons: (1) project is within federal flood control project levees and within a Board easement, (2) may have an effect on the flood control functions of project levees, (3) Project is within a Board designated floodway, (4) Project is within a regulated Central Valley stream listed in Table 8.1 of Title 23 of the California Code of Regulations.

Chapter 3 **Affected Environment**

3.1 Introduction

This section describes the affected environment for water quality and storm water runoff. This section includes a range of topics related to water resources, including the receiving water bodies and water quality. Surface water resources are important for fish and wildlife habitat, urban and agricultural water supply, and conveying floodwaters. Groundwater is also an important source of urban and agricultural water supply.

3.2 General Setting

The project is located within the South Valley Floor Hydrologic Unit, the Kern Delta Hydrologic Area, and Hydrologic Sub-area (HSA) 557.10, as identified by Caltrans' Water Quality Planning Tool (Caltrans 2006a). This hydrologic sub-area covers approximately 341,000 acres or 532 square miles. Receiving water bodies within the project limits have been identified as the Kern River, Carrier Canal, Stine Canal, and Kern-Island Canal (Caltrans 2006a).

The project area rests above the Southern San Joaquin Groundwater Basin, which is a sub-basin within the Tulare Lake Hydrologic Region. The Tulare Lake Hydrologic Region covers approximately 17,000 square miles and includes all of Kings and Tulare counties and most of Fresno and Kern counties. The region corresponds to approximately the southern one-third of the Central Valley Regional Water Quality Control Board jurisdiction. Significant geographic features include the southern half of the San Joaquin Valley, the Temblor Range to the west, the Tehachapi Mountains to the south, and the southern Sierra Nevada to the east (California Department of Water Resources 2003).

3.2.1 Population and Land Use

Based upon demographic data available on the City's Web site, Bakersfield has been known for being a fast-growing city and has seen its population more than triple over nearly 30 years from approximately 105,000 in 1980 to just below 350,000 in 2010. The population is projected to approach 400,000 by 2015. In 2011, the Bakersfield Metropolitan Statistical Area reported an estimated population of approximately 508,000. Although the city is still growing, its growth rate has slowed in recent years because of the economic recession and high home foreclosure rates (City of Bakersfield 2011).

Bakersfield hosts various amateur sporting events, including shooting, cycling, boat drag races, rugby, water skiing, soccer, youth baseball, tennis, horseshoes, and volleyball

competitions. Other recreational opportunities include whitewater rafting, rock climbing, mountain biking, fossil collecting, and skiing in the southern Sierra. Community parks within the project area include Saunders Park, Centennial Park, the Kern River Parkway, and Quailwood Park (City of Bakersfield 2011b).

3.2.2 Topography

The terrain within the limits of the project area is relatively flat, and based on the topographic information, the average ground elevation in the area of the proposed project is approximately 405 feet above Mean Sea Level. The ground surface elevation varies from 360 to 530 feet within the project site (Caltrans 2012).

3.2.3 Hydrology

The following hydrology features exist in the regional and local project vicinity: major surface water features, including lakes, reservoirs, rivers, canals, and floodplains; and major groundwater aquifers. These features are described in the following subsections.

3.2.3.1 Regional and Local Hydrology

The project site is located in the Kern River watershed. The “upper” Kern River originates in the southern Sierra Nevada Mountains. The watershed runoff flows south through the Sequoia National Forest and enters Lake Isabella Reservoir, created by Lake Isabella Dam. The “lower” Kern River originates from the flows immediately downstream of the dam. The Kern River flows southwest and continues collecting runoff from the Greenhorn Mountains. The Kern River enters the flat land of the San Joaquin Valley 6.5 miles upstream of the project site (WRECO 2010).

Bakersfield receives most of its surface water runoff from the Kern River. The development and use of water from this river has played a major role in the history and economic development of the region. The water districts within the region have developed an extensive network of canals (e.g., Carrier Canal, Stine Canal, and Kern-Island Canal), channels, and pipelines to deliver water supplies to customers. Water storage facilities and conveyance systems control and retain most of the surface water runoff from the watershed, except in extremely wet years. For example, on an occasional basis, floodwater can be diverted from the Kern River intertie into the California Aqueduct for use in other State Water Project service areas (California Department of Water Resources 2005).

Precipitation and Climate

The climate within the project area is characterized by hot, dry summers with long sunny days and cooler nights and wet winters that are often blanketed with dense fog. Nearly all of the annual rainfall occurs in the 6 months from November to April, with an annual average

precipitation of 5.4 inches in HSA 557.10 (Caltrans 2006b). As determined by long-term records of temperature, in the Bakersfield area, the average minimum temperature, for the period from 1971 to 2000, was 38.2 degrees Fahrenheit in December, and the average maximum temperature was 96.9 degrees Fahrenheit in July (California Department of Water Resources 2011).

Floodplains

A Draft Floodplain Evaluation Report (Caltrans 2011) was completed for the proposed project. This section summarizes information provided in that report.

The Federal Emergency Management Agency conducted hydrologic and hydraulic analyses of the Kern River to determine the extent and severity of flooding for the City of Bakersfield. The results are presented in the Federal Emergency Management Agency's 1984 Flood Insurance Study of the City of Bakersfield. The peak flow rates associated with the 10-, 50-, 100-, and 500-year return period events are listed in Table 3-1.

Table 3-1 Kern River Flood Peak Discharges

Return Period (years)	Annual Probability of Exceedance	Peak Discharge Rate (Cubic Feet per Second)	
10	**0.10**		2,790
50	**0.02**		6,992
100	**0.01**		10,206
500	**0.002**		35,048

Source: Caltrans 2011

The 100-year floodplain as developed by the Federal Emergency Management Agency was adopted on the Federal Emergency Management Agency Flood Insurance Rate Map (dated 1985). The floodway limits were developed by artificially encroaching upon the existing 100-year floodplain to cause a 1-foot increase of the water surface.

The Kern River 100-year and 500-year floodplains occur within the project area for all segments of the Centennial Corridor project. Flood control measures currently in place along the Kern River in the project vicinity include flood control levees on both side of the river, the Coffee Road bridge, a diversion structure upstream of Coffee Road, and the Carrier Canal and adjacent levees. All of these improvements are designed to provide flood protection.

The Federal Emergency Management Agency maps display areas within the project limits that cross flood hazard zones designated X and AE. These zones are displayed in Figure 3. Zone X is designated by the Federal Emergency Management Agency for areas protected from the 100-year flood event by levees that prevent overtopping of adjacent flood channels.

Areas identified as Zone AE are designated by the Federal Emergency Management Agency as a flood insurance rate zone having a 1 percent chance of being exceeded in a given year.

Municipal Supply

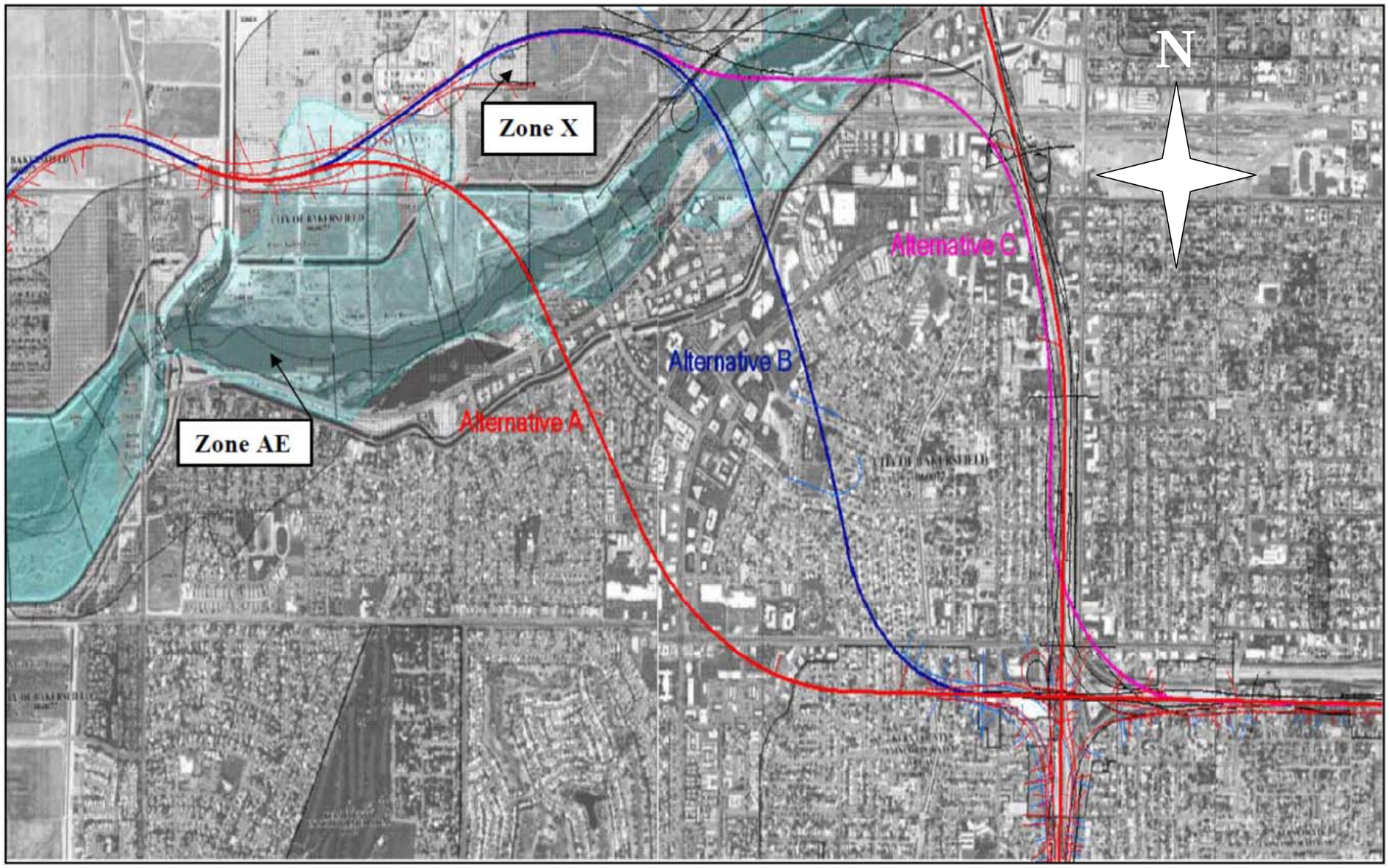
An Urban Water Management Plan (City of Bakersfield 2007) was completed in accordance with the Urban Water Management Plan Act. This section summarizes information provided in that report.

The Bakersfield water supply currently is from groundwater sources. The city's groundwater wells and distribution system are maintained and operated under contract by California Water Service Company (Cal Water). Cal Water is an investor-owned public utility company that serves portions of Bakersfield and unincorporated areas adjacent to Bakersfield.

The City Water System is owned by the City of Bakersfield, but it is operated by Cal Water and serves retail customers within its service area. This system provides water primarily for residential users and also for business, commercial, industrial, and public customers in and adjacent to the westerly portion of the Bakersfield area. The City Water System is comprised of 50 active groundwater production wells and 6 booster stations located throughout Bakersfield's Water System's service area. In addition, the City owns and operates the river channels through Bakersfield, as well as 2,800 acres of recharge ponds along the Kern River.

The City Water System's existing distribution system consists of one pressure zone and approximately 345 miles of distribution pipeline. Operating with only one pressure zone allows the water to move freely throughout the distribution system. The City Water System's water supply is currently obtained from groundwater wells, which on average exist as four wells per section (640 acres). The groundwater is pumped directly into the City Water System's distribution system and sometimes to storage, utilizing the City Water System's six storage tanks. The groundwater is not treated, with the exception of some of the wells that have passive treatment for taste and odor. All water is disinfected with chlorine.

The City Water System supplies water to approximately 35 percent of Bakersfield. The remaining 65 percent of residents within Bakersfield are supplied from other retail water companies, including Cal Water, East Niles Community Service District (East Niles), and Vaughn Mutual Water Company. The wholesale water entity that supplies imported water to the metropolitan area of Bakersfield is Kern County Water Agency (KCWA) Improvement District No. 4 (ID No. 4). In addition, there are agricultural water districts within the City of Bakersfield limits.



Source: Caltrans 2011.

Figure 3 Kern River Flood Hazard Zones Across Alignment Alternatives A, B and C

As previously mentioned, Cal Water maintains and operates the City Water System under contract; however, Cal Water also supplies water to its own customers within Bakersfield. Cal Water is currently the largest municipal water supplier in the Bakersfield area. Cal Water's supply is a combination of groundwater supply (approximately 65 percent), Kern River water (approximately 18 percent), and purchased water from KCWA (approximately 17 percent). Cal Water pumps its groundwater supply from approximately 187 wells located within and outside Bakersfield. Kern River water is purchased from the City of Bakersfield and is then treated at Cal Water's Northeast Bakersfield Water Treatment Plant. Cal Water's supply from the Kern County Water Agency is treated Kern River water and State Water Project water from ID No. 4, which is described in greater detail below.

Vaughn Mutual Water Company is a smaller water company that provides water to the northwest portion of Bakersfield. Vaughn Mutual Water Company water supplies consist of groundwater only. Vaughn Mutual Water Company owns and operates 11 production wells within its service area.

Several agricultural water districts had a contract with the City of Bakersfield. Through these contracts, the agricultural water districts received approximately 70,000 acre-feet annually of Kern River water for irrigation purposes through 2011. Most of the water provided to the agricultural districts was transported through a series of canals throughout Bakersfield. These canals play an important role in the City of Bakersfield's groundwater replenishment activities by way of percolation.

Once the contract expired in 2011, the City anticipates, by 2013 or 2014, it will have fulfilled its' obligations to the previous contract by providing "make-up" water as a result of periods during the contract term when minimum water deliveries were not maintained and fell short of their contract obligations. Currently, there is not a new contract in place. Following the provision of the necessary "make-up" water, there would be approximately 70,000 acre-feet available for City use or the City may enter into a new contract to provide water to either Irrigation Districts, Wholesale Water Providers or Retail Water Providers. Even an EIR is to be written to disclose the potential Environmental Impacts this amount of water would have on the Kern River and Kern River Riparian Corridor if this water was to remain in the River or be sold to Irrigation Districts, Wholesale Water Providers or Retail Water Providers (City of Bakersfield 2011a).

KCWA ID No. 4 is a wholesale water district that was formed to secure and administer a water supply contract with the State of California for State Water Project water resources. KCWA ID No. 4 water sources include a State Water Project entitlement, the Kern River

through exchange, the Central Valley Project, and groundwater banking projects. Within the Bakersfield area, KCWA ID No. 4 treats and conveys water to retail suppliers. KCWA ID No. 4 owns and operates the Henry Garnett Treatment Plant, which has the ability to treat State Water Project water, Kern River water, and Central Valley Project water. KCWA ID No. 4, however, uses and treats Kern River water by exchange only.

3.2.3.2 Groundwater Hydrology

The project area rests above the Southern San Joaquin Groundwater Basin, and several groundwater percolation facilities are located near the project site. The sources of groundwater recharge include Kern River, 2,800 acres of recharge ponds along the Kern River, Kern Delta Canal Percolation Program, KCWA ID No.4, and Rosedale Rio Bravo Water Storage District. Other groundwater recharge sources include storm runoff, canal seepage, spreading/banking, and wastewater reclamation.

The average depth to groundwater within the project area ranges from 80 to 120 feet below ground surface; however, the Department of Water Resources has reported that at some locations near the project area the depth to groundwater may be greater than 200 feet below ground surface. This variation in depth to groundwater may be attributed to seasonal groundwater fluctuations, weather conditions, surface runoff, and other factors (Caltrans 2011).

Sources of Groundwater Recharge

Bakersfield has a stable extensive water supply allowing the City to be a leader in groundwater banking/groundwater replenishment.

The Kern River provides drainage for the southern Sierra Nevada Mountains and flows through the middle of Bakersfield. The City owns pre-1914 appropriative water rights to the Kern River that yield a usable average annual supply of approximately 160,000 acre-feet. The allocation of Kern River water rights are shown in Table 3-2 (City of Bakersfield 2007). As shown in Table 3-2, there is an availability of up to 43,200 acre-feet of Kern River water that can be used to replenish the groundwater basin.

Table 3-2 Kern River Diversions and Use within Bakersfield (acre-feet)

Current Diversion and Use Quantities	
Kern River Entitlement	160,000
Agricultural District Contracts	-70,000
Northeast Treatment Plant	-22,400
2800 Acre Banking*	-18,200
River Channel/Carrier Canal Recharge*	-15,000
Isabella Evap./Kern County Parks	-8,700
Rosedale Rio Bravo Water Storage District*	-10,000
Available Supply for Other Uses	15,700

Source: City of Bakersfield 2007.
Note:
*Amount of Kern River Water that can be used to replenish the groundwater basin.

Currently, the City Water System uses an available groundwater supply of approximately 38,679 acre-feet, as shown on Table 3-3 (City of Bakersfield 2007). The City Water System pumps groundwater from its production wells and delivers the water directly into its distribution system.

Table 3-3 Historic and Current Water Supply (acre-feet)

	Year				
	1985	1990	1995	2000	2006
Water Pumped (Supply)	12,615	16,141	21,575	27,816	38,679
Available Well Capacity	---	---	---	---	96,645

Source: City of Bakersfield 2007.

The City owns and operates a groundwater recharge facility known as “2800 Acres.” Kern River water, State Water Project water, and some federal water are percolated into the groundwater basin and stored for later well extraction and use. This replenishment program has a balance of almost 200,000 acre-feet of water available for extraction and use by the City Water System. In addition, the groundwater aquifers underlying Bakersfield can readily be replenished through percolation operations. The City Water System and Cal Water Service have a canal percolation program with Kern Delta Water District in which the City Water System’s portion amounts to more than 6,900 acre-feet per year. This amounts to approximately 6,500 acre-feet per year of percolation, after accounting for a 6 percent loss.

KCWA ID No. 4 has implemented programs to bring imported California Aqueduct (State Water Project) water to the Bakersfield area. This project is based on a fundamental concept of operation in which imported water is introduced annually in the underground aquifers for groundwater replenishment and, in addition, a portion is treated and distributed. KCWA ID No. 4 has an annual State Water Project entitlement of approximately 82,594 acre-feet, of which approximately

74 percent (approximately 61,120 acre-feet) has been determined to be the long-term annual reliable supply. Approximately 25 percent of KCWA ID No. 4 is within the City Water System's service area. As a result, KCWA ID No. 4 can provide the City Water System with approximately 15,280 acre-feet of State Water Project water supply each year for groundwater recharge.

The Rosedale Rio Bravo Water Storage District is located on the northwest side of Bakersfield and encompasses 46,000 acres of which approximately 1,100 acres are within the City Water System's limits and approximately 16,930 acres are within the City Water System's sphere of influence. The Rosedale Rio Bravo Water Storage District has an annual State Water Project supply of 29,000 acre-feet per year. Currently, the Rosedale Rio Bravo Water Storage District allocates approximately 415 acre-feet per year of water to the City Water System. The remainder of the 29,000 acre-feet is used by the district for irrigation purposes.

Although the City Water System's water supply historically has been based on groundwater only, groundwater replenishment plays a vital role in the reliability of the City Water System's current supply. The different agencies within Bakersfield work in conjunction to promote a positive groundwater balance to ensure the reliability of its water supply.

3.2.4 Geology/Soils

3.2.4.1 Soil Erosion Potential

Hydrologic Soil Groups are based on the rate of water infiltration, with Group A having the highest rates and Group D having the lowest rates. Per the National Resources Conservation Service website soil survey module, the project area contains four general soil types with Hydrologic Soil Groups ranging from A to B. Soils underlying most of the project area consist of loamy sand and sandy loam (Caltrans 2012). The soil data, along with potential for surface runoff and erosion hazards, are shown in Table 3-4.

Table 3-4 Project Site Soil Data

Soil Type	Hydrologic Soil Group	Surface Runoff	Erosion Hazard
Cajon loamy sand; 0 to 2% slopes	A	Negligible	Slight
Excelsior sandy loam	B	Medium	Slight
Kimberlina	B	Very Low	Slight
Urban Land	A	-	-
Cajon Complex; 0 to 2% slopes	A	Negligible	Slight
Riverwash	-	-	-
Urban Land	-	-	-
Water	-	-	-

Source: Caltrans 2012.
Notes:
Hydrologic Soil Group A: Soils have a high infiltration rate even when thoroughly wetted. Chiefly consist of deep, well-drained to excessively drained sands or gravels with a high rate of water transmission (low runoff potential).
Hydrologic Soil Group B: Soils have a moderate infiltration rate when thoroughly wetted. Chiefly are moderately deep to deep, moderately well-drained to well-drained soils that have moderately fine to moderately coarse textures with a moderate rate of water transmission.

3.2.5 Biological Communities

A Draft Natural Environment Study (Caltrans 2011a) was completed for the proposed project. This section summarizes information provided in that report.

3.2.5.1 Aquatic Habitat

The Kern River is the only significant river in the Bakersfield area with a watershed that covers more than 2,400 square miles of Kern and Tulare counties. Most of the water from the Kern River watershed is fully diverted and used in an average year; however, the river does reach the valley floor during wet years.

The Kern River channel is approximately 390 feet wide at the location where the alignment would span the river. The channel at that point is relatively flat with a sandy bottom and confined on both the north and south banks by flood control levees. The banks of the levees are reinforced with rip-rap and debris.

The flood control levees confine the river to the low-flow channel and the vegetation that border the toe of the levees. The former floodplain outboard of the levees is extensively developed and does not currently function as a floodplain. This is due in part to the construction of Isabella Dam in 1953, which significantly reduced the flood potential along the lower Kern River. The remaining river channel offers very little capacity to maintain adequate flood flow; however, maintenance of the channel would have a negative effect on its capacity for stabilization of sediment and removal of toxicants.

The coarse textured sediments that compose the channel bottom make the Kern River and adjacent basins excellent for groundwater recharge. This characteristic is exploited by the

local water resource agencies that have constructed groundwater recharge basins to replenish groundwater resources. The Kern River channel has a low capacity of effectiveness for groundwater discharge because of the low regional water table.

The Kern River channel and adjacent floodplain have moderate wildlife habitat values. Revegetation efforts have established riparian trees and shrubs on the banks of the levees and floodplain terraces (Caltrans 2006).

Special-Status Plant and Wildlife Species

The Draft Natural Environment Study prepared for the Centennial Corridor Project (Caltrans 2011a) evaluated three segments of which Segment 1 extends from SR 58 (east) to Westside Parkway. The biological study area included the proposed alignment and alternatives plus a 500-foot buffer area on either side of the project right-of-way. The study indicated that the only special-status plant species observed in Segment 1 was Ferris' goldfields (*Lasthenia ferrisiae*), a California Native Plant Society List 4.2 species. Specifically, two large populations totaling 3,500 individuals were observed in a flood control basin within oil refinery lands just north of the Kern River.

The San Joaquin kit fox (*Vulpes macrotis mutica*), a federally Endangered and State Threatened species, was observed in Segment 1. Although the burrowing owl (*Athene cunicularia*) a California Department of Fish and Game Species of Special Concern, and Swainson's hawk (*Buteo swainsoni*), a California Department of Fish and Game threatened species were not observed during the focused surveys, both have the potential to occur in the biological study area. The burrowing owl has the potential to occupy burrows in the biological study area in the future and the Swainson's hawk has a limited potential to nest along the Kern River in the future.

Stream/Riparian Habitats

Riparian woodland/Great Valley cottonwood riparian forest occurs along the banks of the Kern River in Segment 1. This vegetation type consists of an overstory of willows (*Salix* spp.) with occasional Fremont cottonwood (Populus *fremontii* ssp. *fremontii*). The understory consists of mule fat (*Baccharis salicifolia*), salt grass (*Distichlis spicata*), curly dock (*Rumex crispus*), and non-native annual grasses (Caltrans 2011a). Most of Segment 1 is highly urbanized. Biological resources are generally found along the Kern River or in undeveloped areas interspersed within or on the edge(s) of development, such as the canals, oil refinery lands, and vacant lots. Vegetation types within the project area include non-native grassland, riparian woodland/Great Valley cottonwood riparian forest, waterways, detention basin, disturbed/ruderal, agriculture, and developed/ornamental. A total of 141.68 acres of U.S. Army Corps of Engineers jurisdiction occur in Segment 1. Of this, 0.19-acre is wetland

Waters of the U.S. and the remaining 141.49 acres are U.S. Army Corps of Engineers jurisdictional non-wetland Waters of the U.S. Given that the Regional Water Quality Control Board takes jurisdiction over both connected and isolated waters and that there are no isolated waters in Segment 1, a total of approximately 141.68 acres under jurisdiction of the Regional Water Quality Control Board are present in Segment 1. A total of 81.55 acres of California Department of Fish and Game[1] jurisdiction occur in Segment 1 (Caltrans 2011a).

3.3 Water Quality Objectives and Beneficial Uses

3.3.1 Surface Water Quality Objectives and Beneficial Uses

Surface water quality in the Tulare Lake Basin is generally good, with excellent quality exhibited by most eastside streams. The Central Valley Regional Water Quality Control Board intends to maintain this quality with enforcement of the Water Quality Objectives, which are summarized in Tables 3-5 through 3-8 (CVRWQCB 2004).

[1] The California Department of Fish and Game's jurisdiction is defined by the outer edge of adjacent riparian vegetation. In areas lacking adjacent vegetation, California Department of Fish and Game jurisdiction was defined by the top of the river, canal, or detention basin bank (Caltrans 2011a).

Table 3-5 Central Valley Regional Water Quality Control Board Water Quality Objectives for Inland Surface Waters

Constituent	Unit	Water Quality Objective
Ammonia	mg/L	0.025
Bacteria	MPN/100 mL	In waters designated REC-1, the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 mL, nor shall more than 10 percent of the total number of samples taken during any 30-day period exceed 400/100 mL.
Biostimulatory Substances	mg/L	Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.
Chemical Constituents		Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At a minimum, water designated MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels specified in the following provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449 (see below)
Inorganic Chemicals		
Lead	µg/L	150
Aluminum	µg/L	1,000
Antimony	µg/L	6
Arsenic	µg/L	10
Asbestos	MFL	7
Barium	µg/L	1,000
Beryllium	µg/L	4
Cadmium	µg/L	5
Chromium	µg/L	50
Cyanide	µg/L	150
Fluoride	µg/L	2,000
Mercury	µg/L	2
Nickel	µg/L	100
Nitrate (NO_3)	mg/L	45
Nitrate + Nitrite sum as nitrogen	mg/L	10
Nitrite (as nitrogen)	mg/L	1
Perchlorate	mg/L	0.006
Selenium	µg/L	0.05
Thallium	µg/L	0.002
Color	NA	Waters shall be free of discoloration that causes nuisance or adversely affects beneficial uses.
Dissolved Oxygen	mg/L	8
Floating Material	lb/acre	Waters shall not contain floating material, including, but not limited to, solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
Oil and Grease	NA	Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.

Table 3-5 Central Valley Regional Water Quality Control Board Water Quality Objectives for Inland Surface Waters

Constituent	Unit	Water Quality Objective
pH	pH Units	The pH of water shall not be depressed below 6.5, raised above 8.3, or changed at anytime more than 0.3 units from normal ambient pH.
Pesticides	µg/L	Waters shall not contain pesticides in concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.
Radioactivity	NA	Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life, nor which result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. At a minimum, waters designated MUN shall not contain concentrations of radionuclides in excess of the maximum contaminant levels specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22, California Code of Regulations.
Salinity	µmhos/cm	158
Sediment	mg/L	The suspended sediment load and suspended sediment discharge rate of waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
Settleable Material	mg/L	Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.
Suspended Material	mg/L	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Tastes and Odors	NA	Waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance, adversely affect beneficial uses, or impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin or to domestic or municipal water supplies.
Temperature	°C	Elevated temperature wastes shall not cause the temperature of waters designated COLD or WARM to increase by more than 5 degrees Fahrenheit above natural receiving water temperature. In determining compliance with the above limits, the Central Valley Regional Water Quality Control Board may prescribe appropriate averaging periods provided that beneficial uses will be fully protected.
Toxicity	NA	All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, biotoxicity tests of appropriate duration, or other methods as specified by the Central Valley Regional Water Quality Control Board.
Turbidity	NTU	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: • Where natural turbidity is between 0 and 5 NTUs, increases shall not exceed 1 NTU. • Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent. • Where natural turbidity is equal to or between 50 and 100 NTUs, increases shall not exceed 10 NTUs. • Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

Source: CVRWQCB 2004.
Notes:
°C – degrees Celsius; lb/acre – pounds per acre; MFL - million fibers per liter (for fibers greater than 10 microns long); mg/L – milligrams per liter; mL – milliliters; MPN – most probable number; NTU – Nephelometric Turbidity Unit; µg/L – micrograms per liter; µmhos/cm – micromhos per centimeter

Table 3-6 Tulare Lake Basin Specific Dissolved Oxygen Water Quality Objective

Stream	Location	Minimum DO (mg/L)
Kern River		
Reach III	Lake Isabella to Southern California Edison Powerhouse (KR-1)	8

Source: CVRWQCB 2004.
Note:
mg/L – milligrams per liter
DO – dissolved oxygen

Table 3-7 Tulare Lake Basin Maximum Electrical Conductivity Levels

Stream	Location	Maximum Electrical Conductivity (µmhos/cm)
Kings River		
Reach I	Above Kirch Flat	100
Reach II	Kirch Flat to Pine Flat Dam	100[a]
Reach III	Pine Flat Dam to Friant-Kern	100
Reach IV	Friant-Kern to Peoples Weir	200
Reach V	Peoples Weir to Island Weir	300[b]
Reach VI	Island Weir to Stinson Weir on North Fork and Empire Weir No. 2 on South Fork	300[b]
Kaweah River		
Reach 1	Above Lake Kaweah	175
Reach II	Lake Kaweah	175[c]
Reach III	Below Lake Kaweah	[d]
Tule River		
Reach I	Above Lake Success	450
Reach II	Lake Success	450[e]
Reach III	Below Lake Success	[d]
Kern River		
Reach I	Above Lake Isabella	200
Reach II	Lake Isabella	300
Reach III	Lake Isabella to Southern California Edison Power House (KR-1)	300
Reach IV	KR-1 to Bakersfield	300[f]
Reach V	Below Bakersfield	[d]

Source: CVRWQCB 2004
Notes:
µmhos/cm – micromhos per centimeter
[a] Maximum 10-year average - 50 µmhos
[b] During the period of irrigation deliveries. Providing, further, that for 10 percent of the time (period of low flow) the fallowing shall apply to the following reaches of the Kings River:
Reach V - 400 µmhos
Reach VI - 600 µmhos
[c] Maximum 10-year average - 100 µmhos
[d] During the irrigation season, releases should meet the levels shown in the preceding reach. At other times, they will be dry or controlled by storm flows.
[e] Maximum 10-year average - 250 µmhos
[f] Maximum 10-year average - 175 µmhos

Table 3-8 Tulare Lake Basin Electrical Conductivity Objectives at Selected Streamflow Stations

Streamflow Station Number		Location	Electrical Conductivity (µmhos/cm)		
USGS	DWR		90-Percentile	Median	Mean
--	C01140.00	Kings River below Peoples Weir	198	81	102
11-2185	C11460.00	Kings River below North Ford	68	48	47
11-2215	C11140.00	Kings River below Pine Flat Dam	54	36	42
11-2105	C21250.00	Kaweah River near Three Rivers	154	96	94
11-2032	C31150.00	Tule River near Springville	429	278	367
11-2049	C03195.00	Tule River below Success Dam	368	244	235
11-1870	C51500.00	Kern River at Kernville	177	116	118
11-1910	C5135.00	Kern River below Isabella Dam	278	141	165
11-1940	C05150.00	Kern River near Bakersfield	233	158	167

Source: CVRWQCB 2004.
Note: µmhos/cm – micromhos per centimeter

The main receiving water body within the project limits is the Kern River. Beneficial uses for this stretch of the Kern River are Municipal and Domestic Supply (MUN), Agriculture Supply (AGR), Industrial Process Supply (IND), Industrial Service Supply (PRO), Hydropower Generation (POW), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Warm Freshwater Habitat (WARM), Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE), and Groundwater Recharge (GWR).

3.3.2 Groundwater Water Quality Objectives and Beneficial Uses

The following water quality objectives shown in Table 3-9 and Table 3-10 apply to all groundwaters in the Tulare Lake Basin (CVRWQCB 2004). Beneficial uses for groundwater in the Kern County Basin are Municipal and Domestic Supply (MUN), Agriculture Supply (AGR), Industrial Process Supply (IND), Industrial Service Supply (PRO), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), and Wildlife Habitat (WILD). A discussion regarding groundwater water quality is provided in Section 3.4.1.

Table 3-9 Water Quality Objectives for Groundwater for Tulare Lake Basin

Constituent	Unit	Water Quality Objectives for Groundwater
Bacteria	MPN/100/mL	In waters designated as MUN, the concentration of total coliform organisms over any 7-day period shall be less than 2.2/100 mL.
Chemical Constituents	mg/L	Groundwaters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At a minimum, water designated MUN shall not contain lead in excess of 0.015 mg/L.
pH	pH Units	The pH of water shall not be depressed below 6.5, raised above 8.3, or changed at any time more than 0.3 units from normal ambient pH.
Pesticides	µg/L	No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. At a minimum, waters designated MUN shall not contain concentrations of pesticide constituents in excess of the maximum contaminant levels specified in Table 64444-A (Organic Chemicals) of Section 64444 of Title 22 of the California Code of Regulations.
Radioactivity	NA	Radionuclides shall not be present in groundwaters in concentrations that are deleterious to human, plant, animal, or aquatic life, or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life. At a minimum, groundwaters designated MUN shall not contain concentrations of radionuclides in excess of the maximum contaminant levels specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22, California Code of Regulations.
Salinity	µmhos/cm	All groundwaters shall be maintained as close to natural concentrations of dissolved matter as is reasonable considering careful use and management of water resources. No proven means exist at present that will allow ongoing human activity in the Basin and maintain groundwater salinity at current levels throughout the Basin. Accordingly, the water quality objectives for groundwater salinity control the rate of increase. The maximum average annual increase in salinity measured as electrical conductivity shall not exceed the values specified in Table 3-11.
Tastes and Odors	NA	Groundwaters shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.
Toxicity	NA	Groundwaters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with the designated beneficial use(s). This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances.

Source: CVRWQCB 2004.
Notes:
mg/L – milligrams per liter; mL – milliliters; µg/L – micrograms per liter; µmhos/cm – micromhos per centimeter

Table 3-10 Tulare Lake Basin Groundwater Water Quality Objectives for Salinity

Hydrographic Unit	Maximum Average Annual Increase in Electrical Conductivity (µmhos/cm)
Westside (North and South)	1
Kings River	4
Tulare Lake and Kaweah River	3
Tule River and Poso	6
Kern River	5

Source: CVRWQCB 2004.
Note: µmhos/cm – micromhos per centimeter

3.4 Existing Water Quality

Under the Clean Water Act, the U.S. Environmental Protection Agency requires states to adopt water quality standards necessary to attain or continue to achieve the designated uses of surface waters. The California State Water Resources Control Board develops guidance for complying with the Clean Water Act. This guidance is used by the nine Regional Water Quality Control Boards to prepare Water Quality Control Plans (commonly referred to as Basin Plans), which designate the beneficial uses of regional receiving waters, set water quality objectives, and formulate regional water quality management programs for surface waters and groundwaters. The Central Valley Regional Water Quality Control Board issued a Water Quality Control Plan for the Tulare Lake Basin (CVRWQCB 2004) that identified beneficial uses for the Kern River. The beneficial uses for the Kern River within the project area include:

- Agricultural Supply
- Industrial Process Supply
- Warm Freshwater Habitat
- Municipal and Domestic Supply
- Groundwater Recharge
- Rare, Threatened or Endangered Species
- Hydropower Generation
- Water Contact Recreation
- Industrial Service Supply
- Wildlife Habitat
- Non-Contact Water Recreation

During the year, three sources of raw water are delivered to the Henry C. Garnett Water Purification Plant for treatment: Kern River water, State Water Project water, and groundwater. The ID No. 4 Water Quality Laboratory tests for inorganics, organics, minerals, radioactive species, asbestos, metals, and microbiologicals in both the source and treated water. Testing is done continuously and includes daily, weekly, monthly, quarterly, and annual testing. The water quality data provided in the 2010 Annual Water Quality Report for source water (KCWA 2010) indicates that surface water quality meets California's maximum contaminant levels[2].

[2] The Maximum Contaminant Level is the maximum concentration of a chemical that is allowed in public drinking water systems. The Maximum Contaminant Level is established by the U.S. Environmental Protection Agency. U.S. Environmental Protection Agency guidance states that "Maximum Contaminant Levels are enforceable standards and are to be set as close to the maximum contaminant level goals (Health Goals) as is feasible and are based upon treatment technologies, costs (affordability) and other feasibility factors, such as availability of analytical methods, treatment technology and costs for achieving various levels of removal."

3.4.1 Regional Water Quality

Surface Water

The project area is within the jurisdiction of the Central Valley Regional Water Quality Control Board. The Central Valley Regional Water Quality Control Board has identified many issues related to surface water quality. These include protecting water resources from agricultural drainage in the San Joaquin Valley, which is high in selenium and trace elements, while at the same time maintaining a viable agricultural industry; ensuring effective controls on storm water runoff from urban and rural areas; and mitigating the effects of abandoned mine discharges of acids and heavy metals to reduce impacts on the Sacramento River system and the Delta. The Central Valley Regional Water Quality Control Board also recognizes that sources of toxicity in surface waters need further identification and control, and to protect aquatic organisms, levels of pesticides reaching surface waters must be reduced (California Department of Water Resources 2005).

Groundwater

The project area is within the South Valley Floor hydrologic unit which is a sub-basin within the Tulare Lake Hydrologic Region. In general, groundwater quality throughout the Tulare Lake Hydrologic Region is suitable for most urban and agricultural uses with only local impairments. The primary constituents of concern are high total dissolved solids, nitrate, arsenic, and organic compounds. The areas of high total dissolved solids content are primarily along the west side of the San Joaquin Valley and in the trough of the valley. Nitrates may occur naturally or as a result of disposal of human and animal waste products and fertilizer. Areas of high nitrate concentrations are known to exist near the town of Shafter and other isolated areas in the San Joaquin Valley. High levels of arsenic occur locally and appear to be associated with lakebed areas. Elevated arsenic levels have been reported in the Tulare Lake, Kern Lake, and Buena Vista Lake bed areas. Organic contaminants are associated with two general categories: agricultural and industrial. Agricultural pesticides and herbicides have been detected throughout the valley, but primarily along the east side where soil permeability is higher and depth to groundwater is shallower. The most notable agricultural contaminant is 1,2-Dibromo-3-chloropropane, a now-banned soil fumigant and known carcinogen once used extensively on grapes. Industrial organic contaminants include trichloroethylene, dichloroethylene, and other solvents. These chemical contaminants are found in groundwater near airports, industrial areas, and landfills (California Department of Water Resources 2003).

3.4.2 List of Impaired Waters

The Clean Water Act requires States to identify water bodies that are considered *impaired*, which means the water body does not meet water quality standards. States must then place

these water bodies onto a list, referred to as the "Clean Water Act Section 303(d) List of Water Quality Limited Segments." On October 11, 2011, the U.S. Environmental Protection Agency issued its final decision regarding the water bodies and pollutants added to California's 303(d) List. This list, referred to as the California 2010 Integrated Report, replaces the 2006 California Clean Water Act 303(d) List. The 2010 Integrated Report includes a combined list of Clean Water Act Section 303(d) water bodies that are listed as not meeting water quality standards and Section 305(b) water bodies that identifies water bodies still requiring the development of a Total Maximum Daily Load, those that have a completed Total Maximum Daily Load approved by the U.S. Environmental Protection Agency, and those that are being addressed by actions other than a Total Maximum Daily Load (SWRCB 2011).

As part of their runoff and characterization monitoring studies, Caltrans identified pollutants that were discharged from Caltrans facilities with a load or concentration that commonly exceeded allowable standards and were still considered treatable by currently available Caltrans-approved Treatment Best Management Practices. These pollutants, designated as Targeted Design Constituents, include sediment; metals (i.e., total and dissolved fractions of zinc, lead and copper); nitrogen; phosphorus, and general metals (Caltrans 2010).

None of the receiving water bodies within the project limits are listed as impaired on the California 2010 Integrated Report list; therefore, no Targeted Design Constituents are associated with these water bodies (SWRCB 2011).

Once a water body is listed as impaired, the State is required to develop a Total Maximum Daily Load to address each pollutant causing the impairment. A Total Maximum Daily Load defines how much of a pollutant load a water body can tolerate and still meet water quality standards. The Total Maximum Daily Load is required to account for contributions from point sources (i.e., permitted discharges), as well as contributions from nonpoint sources, including natural background. Total Maximum Daily Loads allocate allowable pollutant loads for each source and identify management measures that, when implemented, will assure that water quality standards are attained. Total Maximum Daily Loads, along with their associated implementation plans, are adopted into a Regional Water Quality Control Board's Basin Plan through the Basin Planning process.

Water bodies within the project limits are not listed in the 2010 Integrated Report as requiring the development of a Total Maximum Daily Load, or that have a completed Total Maximum Daily Load approved by U.S. Environmental Protection Agency, or that are being addressed by actions other than a Total Maximum Daily Load (SWRCB 2011a).

3.4.3 Areas of Special Biological Significance

In an effort to protect and restore ecologically sensitive ecosystems along the coast, California created 34 Areas of Special Biological Significance spanning the length of the coast. This designation was intended to bring special protection to fragile coastal biological communities by strictly limiting or prohibiting discharges of point source waste and requiring non-point source pollution to be controlled to the "extent practicable" before it reaches an Area of Special Biological Significance to preserve natural water quality conditions. According to the map provided by the State Water Resources Control Board (SWRCB 2011b), there are no Areas of Special Biological Significance sites within the project limits.

Chapter 4 Environmental Consequences

4.1 Introduction

Construction and operation of the Centennial Corridor has the potential to affect water quality. Best management practices would be evaluated and implemented to address potential impacts during the construction and operational phases. A discussion regarding the potential impacts to water quality, along with the implementation of temporary (i.e., construction phase) and project design features, such as permanent (postconstruction) best management practices, is provided in the following sections.

4.2 Potential Impacts to Water Quality

This discussion examines the biological, physical/chemical, and human use constituents to determine whether the discharge of storm water from the proposed project would cause or contribute to the violation of water quality objectives and if the proposed project would have the potential to affect the beneficial use of the water bodies within the project limits. Construction activities were evaluated for the potential to affect surface water quality because of uncontrolled runoff and discharges. These included accidental releases of construction-related hazardous materials, ground disturbance and associated erosion and sedimentation, storm water discharges, and dewatering discharges, particularly in locations within or close to a surface water body. Project maintenance and operation activities were reviewed for the potential to introduce pollutants into the environment, with a particular focus on storm water runoff.

4.2.1 Expected Changes to the Chemical Characteristics of the Aquatic Environment

Construction of the proposed corridor has the potential to contribute pollutants to receiving water bodies. These pollutants include sediment and silt, associated with soil disturbance because of construction of the proposed corridor, and chemical pollutants associated with the construction materials that are brought onto the project site.

Soil disturbance activities include earth-moving activities such as excavation and trenching, soil compaction and moving, cut and fill activities, and grading. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport via storm water runoff from the project area. Chemical contaminants, such as oils, fuels, paints, solvents, nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported to downstream drainages and ultimately into collecting waterways contributing to the chemical degradation of water quality.

Some pollutants can create turbidity in water bodies, which blocks light transmission and penetration, reduces oxygen levels, affects the food chain, and creates changes in water temperature.

Construction materials, waste handling, and the use of construction equipment could also result in storm water contamination and affect water quality. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination. The removal of waste materials during construction could also result in tracking of dust and debris. Staging areas can also be sources of pollutants because of the use of paints, solvents, cleaning agents, and metals during construction. Pesticide use, including herbicides, fungicides, and rodenticides, associated with site preparation is another potential source of storm water contamination. Larger pollutants, such as trash, debris, and organic matter, could also be associated with construction activities. As such, the discharge of storm water may cause or threaten to cause violations of water quality objectives. These pollutants would occur in both the storm water discharges and non-storm water discharges and could potentially cause chemical degradation and aquatic toxicity in the receiving waters.

Operation of the proposed corridor would result in an increase in impervious surface areas, which could potentially increase storm water runoff. Potential pollutants associated with the operation of transportation facilities include sediment from natural erosion; nutrients, such as phosphorus and nitrogen, associated with freeway landscaping; mineralized organic matter in soils; nitrite discharges from automobile exhausts and atmospheric fallout; litter; and metals from the combustion of fossil fuels, the wearing of brake pads, and corrosion of galvanized structures (Caltrans 2010).

4.2.2 Expected Changes to the Biological Characteristics of the Aquatic Environment

Erosion and sedimentation could affect the biological characteristics of the aquatic environment through interference with photosynthesis; oxygen exchange; and the respiration, growth, and reproduction of aquatic species. Sediment transport to receiving water bodies could decrease water clarity, which causes a decrease in aquatic plant production, and obscures sources of food, habitats, refuges, and nesting sites of fish. The deposition of sediment or silt in a water body can fill gravel spaces in stream bottoms, smothering fish eggs and juvenile fish. Sediment can also carry nutrients, such as nitrogen and phosphorus, which may cause algal blooms. Pesticides that attach to soil particles and enter waterways have the potential to bioaccumulate within the food chain, which ultimately could affect the aquatic ecosystems. The transport of other toxic pollutants into receiving water bodies may introduce subtle, sublethal changes in plant and wildlife gene structure, nervous system function, immune response, and reproductive rates, which ultimately affects species survival, population, and ecosystem structure (California Department of Water Resources 2005).

4.2.3 Expected Changes to the Human Use Characteristics of the Aquatic Environment

Sediment or silt in a water body can decrease recreational, commercial, and aesthetic values of water bodies, as well as decrease the drinking water quality. Receiving water bodies polluted with chemical contaminants are unsuitable for drinking, recreation, agriculture, and industry. Chemical pollutants in a water body also diminish the aesthetic quality of lakes and rivers. Pollutants can also seep down and affect groundwater and ultimately degrade drinking water supplies.

4.2.4 Short-Term Impacts during Construction

Construction of the Centennial Corridor Project has the potential to affect water quality. Potential pollutant sources associated with the construction phase of the proposed project include construction activities and materials expected at the project site. Table 4-1 displays potential pollutant sources, along with their associated pollutant typical for transportation infrastructure construction sites such as the Centennial Corridor Project.

Table 4-1 Construction Site Activities, Materials, and Associated Pollutants

Construction Site Activity	Construction Site Materials	Pollutant
Vehicle and Equipment Cleaning, Fueling, and Maintenance	Vehicle Fluids	Oil Grease Petroleum Coolants
Concrete Cement Operations and Concrete Waste Management	Portland Concrete Cement and Masonry Products	Portland Concrete Cement
		Masonry Products
		Sealant (Methyl Methacrylate)
		Incinerator Bottom Ash Bottom Ash Steel Slag Foundry Sand Fly Ash
		Mortar Concrete Rinse Water
	Curing Compounds	Non-Pigmented Curing Compounds
Landscaping	Landscaping and Other Products	Aluminum Sulfate
		Sulfur-Elemental
		Fertilizers-Inorganic
		Fertilizers-Organic
		Natural Earth (Sand Gravel and Topsoil)
		Herbicide
		Pesticide
		Lime
Excavation and Grading	Contaminated Soil	Aerially Deposited Lead
		Petroleum

Source: California Department of Transportation 2003a.

4.2.5 Long-Term Impacts during Operation and Maintenance

Operation of the Centennial Corridor Project has the potential to affect water quality. Potential pollutant sources associated with operation of the proposed project include motor vehicles, highway maintenance, illegal dumping, spills, and landscaping care. Table 4-2 displays potential pollutant sources, along with their associated pollutant typically associated with transportation infrastructure operations.

Table 4-2 Transportation Infrastructure Operation Pollutant Sources and Pollutants

Pollutant Source	Pollutant
Motor Vehicles	Oil
	Grease
	Petroleum
	Coolants
	Nitrite
	Metals
Highway Maintenance	Asphalt
	Sediment
	Mineralized Organic Matter
	Thermoplastics
	Treated Wood
	Tree/Shrub Clippings
Landscaping	Aluminum Sulfate
	Sulfur-Elemental
	Fertilizers-Inorganic
	Fertilizers-Organic
	Natural Earth (Sand Gravel and Topsoil)
	Herbicide
	Pesticide
	Lime
Illegal Dumping	Trash
	Oil/Grease
Spills	Includes Hazardous and Non-Hazardous Chemicals

Source: Caltrans 2003a.

4.3 Impact Assessment Methodology

Potential short-term impacts were analyzed by determining the amount of disturbed soil area for each of the build alternatives. Potential long-term impacts were analyzed by determining the proposed additional impervious surface area for each of the build alternatives, as well as comparing the existing tributary area and the proposed total impervious surface area within the project area with the total watershed area. Impacts to surface and groundwater quality from the discharge of highway runoff were analyzed by comparing water quality objectives

with average storm water runoff concentration from Caltrans highways. Both qualitative and quantitative measures that describe the short-term and long-term impacts of each of the build alternatives are summarized in tabular format and discussed in the following sections.

4.4 Alternative-Specific Impact Analysis

4.4.1 Storm Water Erosion

Table 4-3 displays the temporary disturbed soil area for each build alternative within HSA 557.10 (Caltrans 2012). Implementation of the Storm Water Pollution Prevention Plan is expected to attenuate and minimize the amount of soil released from the construction site. Short-term impacts caused by each of the build alternatives include potential increases in sediment loads because of removal of existing groundcover and disturbance of soil during grading. The temporary residual increase in sediment loads from construction areas is unlikely to alter the hydrologic response (i.e., erosion and deposition) downstream in the hydrologic sub-area and, subsequently, the sediment processes in these areas would be reduced because all disturbed soil areas would be stabilized before completion of the construction project with permanent landscaping and/or permanent erosion control measures; therefore, with incorporation of temporary and permanent best management practices, no adverse impacts are expected with implementation of the Centennial Corridor Project.

Table 4-3 Temporary Disturbed Soil Area per Build Alternative

Disturbed Soil Area (acres)		
Build Alternative A	**Build Alternative B**	**Build Alternative C**
1,125	1,020	1,124

Source: Caltrans 2012.

Table 4-4 lists the watershed area for HSA 557.10 that would be potentially affected by the proposed Centennial Corridor Project. The area represented by HSA 557.10 is compared to the area of existing Caltrans right-of-way within the Centennial Corridor Project limits. Based on the three alternatives proposed for the Centennial Corridor Project, the maximum Caltrans tributary area to HSA 557.10 is less than 1 percent.

Table 4-4 Centennial Corridor Contribution to the Watershed within the Project Limits

HSA Number	HSA Area (acres)	Existing Tributary Area (acres)			Existing Contribution to HSA (%)		
		Alternative A	Alternative B	Alternative C	Alternative A	Alternative B	Alternative C
557.10	341,000	89	129	129	0.026	0.038	0.038

Source: Caltrans 2012.
Note: HSA – Hydrologic Sub-area

Table 4-5 lists the watershed area for HSA 557.10 that would be potentially affected by the proposed Centennial Corridor Project. The area represented by HSA 557.10 is compared to the area of proposed total impervious surface area within the Centennial Corridor Project limits. Based on the three alternatives proposed for the Centennial Corridor Project, the maximum proposed impervious surface area contribution to HSA 557.10 is less than 1 percent.

Table 4-5 Centennial Corridor Contribution to the Watershed within the Project Limits

HSA Number	HSA Area (acres)	Proposed Total Impervious Surface Area (acres)			Proposed Contribution to HSA (%)		
		Alternative A	Alternative B	Alternative C	Alternative A	Alternative B	Alternative C
557.10	341,000	155	163	228	0.045	0.048	0.067

Source: Caltrans 2012.
Note: HSA – Hydrologic Sub-area

Table 4-6 compares the existing and proposed impervious surface area for each of the build alternatives. Alternative C has the highest percentage of additional impervious surface area, followed by Alternative A and then Alternative B.

Table 4-6 Comparison of Existing and Proposed Impervious Surface Area per Build Alternative

Alternatives	Existing Impervious Surface Area (acres)	Proposed Additional Impervious Surface Area (acres)	Total Impervious Surface Area (acres)	Percentage of Additional Impervious Surface Area
A	89	66	155	74
B	129	34	163	26
C	129	99	228	77

Source: Caltrans 2012.

No Build Alternative

The No Build Alternative would not construct the Centennial Corridor Project, but it would construct many improvements that have been defined in Section 4.5. Like the build alternatives, these other improvements would require implementing temporary and permanent best management practices to address potential pollutants during construction and operation of the transportation facility. The amount of disturbed soil area during construction of the improvements has not been determined for comparison to the build alternative because some of the proposed improvements for the selected alternative are in the early planning

phase and such information is not available at this time. Likewise, the tributary areas associated with these improvements is not available at this time for the same reasons. Regardless, the improvements would include the implementation of Caltrans-approved best management practices to the maximum extent practicable.

4.4.2 Discharge of Highway Runoff on Surface and Groundwater Quality

Caltrans has conducted runoff monitoring and characterization studies from a range of transportation facilities throughout California. The monitoring has various objectives, such as complying with the National Pollutant Discharge Elimination System permit requirements; producing representative and scientifically credible runoff data from Caltrans facilities; and providing useful information to facilitate Caltrans' storm water management strategies. Tables 4-7 and 4-8 display data from highway runoff studies conducted by Caltrans (Caltrans 2003b). In considering potential impacts of highway runoff on surface water and groundwater quality, these data are assumed to reflect water quality similar to the quality of runoff from the proposed project. Table 4-7 compares highway runoff water quality with the water quality objectives for inland surface waters within the Tulare Lake Basin (CVRWQCB 2004). Table 4-8 compares highway runoff water quality with the water quality objectives for groundwaters within the Tulare Lake Basin (CVRWQCB 2004). Of the water quality objectives where a numeric comparison is possible, the quality of highway runoff falls within the water quality objectives set forth in the Central Valley Regional Water Quality Control Board Basin Plan for most of the constituents listed in Tables 4-7 and 4-8, except ammonia.

Table 4-7 Highway Runoff Storm Water Quality and Water Quality Objectives

Constituent	Unit	Water Quality Objectives for Inland Surface Waters	Average Storm Water Runoff Concentration from Caltrans Highways	Is Caltrans Average Storm Water Runoff Concentration Greater than the WQO?
Ammonia	mg/L	0.025	1.8	Yes
Bacteria	MPN/100 mL	In waters designated REC-1, the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 mL, nor shall more than 10 percent of the total number of samples taken during any 30-day period exceed 400/100 mL.	8,170	Numerical comparison is not possible
Biostimulatory Substances	mg/L	Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.	473	Numerical comparison is not possible

Table 4-7 Highway Runoff Storm Water Quality and Water Quality Objectives

Constituent	Unit	Water Quality Objectives for Inland Surface Waters	Average Storm Water Runoff Concentration from Caltrans Highways	Is Caltrans Average Storm Water Runoff Concentration Greater than the WQO?
Lead	µg/L	150	7.3	No
Aluminum	µg/L	1,000	155	No
Antimony	µg/L	6	No Data	Numerical comparison is not possible
Arsenic	µg/L	10	2.8	No
Asbestos	MFL	7	No Data	Numerical comparison is not possible
Barium	µg/L	1,000	No Data	Numerical comparison is not possible
Beryllium	µg/L	4	No Data	Numerical comparison is not possible
Cadmium	µg/L	5	0.6	No
Chromium	µg/L	50	3.1	No
Cyanide	µg/L	150	No Data	Numerical comparison is not possible
Fluoride	µg/L	2,000	No Data	Numerical comparison is not possible
Mercury	µg/L	2	No Data	Numerical comparison is not possible
Nickel	µg/L	100	6.3	No
Nitrate (NO_3)	mg/L	45	1.6	No
Nitrate + Nitrite sum as nitrogen	mg/L	10	1.8	No
Nitrite (as nitrogen)	mg/L	1	0.2	No
Perchlorate	mg/L	0.006	No Data	Numerical comparison is not possible
Selenium	µg/L	0.05	No Data	Numerical comparison is not possible
Thallium	µg/L	0.002	No Data	Numerical comparison is not possible
Color	NA	Waters shall be free of discoloration that causes nuisance or adversely affects beneficial uses.	No Data	Numerical comparison is not possible

Table 4-7 Highway Runoff Storm Water Quality and Water Quality Objectives

Constituent	Unit	Water Quality Objectives for Inland Surface Waters	Average Storm Water Runoff Concentration from Caltrans Highways	Is Caltrans Average Storm Water Runoff Concentration Greater than the WQO?
Dissolved Oxygen	mg/L	8	No Data	Numerical comparison is not possible
Floating Material	lb/acre	Waters shall not contain floating material, including, but not limited to, solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.	20.5	Numerical comparison is not possible
Oil and Grease	mg/L	Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.	14.5	Numerical comparison is not possible
pH	pH Units	The pH of water shall not be depressed below 6.5, raised above 8.3, or changed at any time more than 0.3 units from normal ambient pH.	7.4	Numerical comparison is not possible
Pesticides	µg/L	Waters shall not contain pesticides in concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.	No Data	Numerical comparison is not possible
Radioactivity	NA	Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life, nor which result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. At a minimum, waters designated MUN shall not contain concentrations of radionuclides in excess of the maximum contaminant levels specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22, California Code of Regulations.	No Data	Numerical comparison is not possible
Salinity	µmhos/ cm	158	No Data	Numerical comparison is not possible
Sediment	mg/L	The suspended sediment load and suspended sediment discharge rate of waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.	No Data	Numerical comparison is not possible

Table 4-7 Highway Runoff Storm Water Quality and Water Quality Objectives

Constituent	Unit	Water Quality Objectives for Inland Surface Waters	Average Storm Water Runoff Concentration from Caltrans Highways	Is Caltrans Average Storm Water Runoff Concentration Greater than the WQO?
Settleable Material	mg/L	Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.	118	Numerical comparison is not possible
Suspended Material	mg/L	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.	160	Numerical comparison is not possible
Tastes and Odors	NA	Waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance, adversely affect beneficial uses, or impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin or to domestic or municipal water supplies.	No Data	Numerical comparison is not possible
Temperature	°C	Elevated temperature wastes shall not cause the temperature of waters designated COLD or WARM to increase by more than 5 degrees Fahrenheit above natural receiving water temperature. In determining compliance with the above limits, the Regional Water Board may prescribe appropriate averaging periods provided that beneficial uses will be fully protected.	14	Numerical comparison is not possible
Toxicity	NA	All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, biotoxicity tests of appropriate duration, or other methods as specified by the Central Valley Regional Water Quality Control Board.	No Data	Numerical comparison is not possible

Table 4-7 Highway Runoff Storm Water Quality and Water Quality Objectives

Constituent	Unit	Water Quality Objectives for Inland Surface Waters	Average Storm Water Runoff Concentration from Caltrans Highways	Is Caltrans Average Storm Water Runoff Concentration Greater than the WQO?
Turbidity	NTU	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: • Where natural turbidity is between 0 and 5, increases shall not exceed 1 NTU. • Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent. • Where natural turbidity is equal to or between 50 and 100 NTUs, increases shall not exceed 10 NTUs. • Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.	60	Numerical comparison is not possible

Source: CVRWQCB 2004 and Caltrans 2003b
Notes:
°C – degrees Celsius; lb/acre – pounds per acre; MFL – million fibers per liter (for fibers greater than 10 microns long); mg/L – milligrams per liter; mL – milliliters; MPN – most probable number; NTU – Nephelometric Turbidity Unit; µg/L – micrograms per liter; µmhos/cm – micromhos per centimeter; WQO – water quality objective

Table 4-8 Highway Runoff Storm Water Quality and Water Quality Objectives for Groundwater

Constituent	Unit	Water Quality Objectives for Groundwater	Average Storm Water Runoff Concentration from Caltrans [1]	Is Caltrans Average Storm Water Runoff Concentration Greater than the WQO?
Bacteria	MPN/100 mL	In waters designated as MUN, the concentration of total coliform organisms over any 7-day period shall be less than 2.2/100 mL.	30,500	Numeric comparison is not possible
Chemical Constituents	µg/L	Groundwaters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At a minimum, water designated MUN shall not contain lead in excess of 150 µg/L.	7.3	No

Table 4-8 Highway Runoff Storm Water Quality and Water Quality Objectives for Groundwater

Constituent	Unit	Water Quality Objectives for Groundwater	Average Storm Water Runoff Concentration from Caltrans [1]	Is Caltrans Average Storm Water Runoff Concentration Greater than the WQO?
pH	pH Units	The pH of water shall not be depressed below 6.5, raised above 8.3, or changed at any time more than 0.3 units from normal ambient pH.	7.4	No
Pesticides	µg/L	No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. At a minimum, waters designated MUN shall not contain concentrations of pesticide constituents in excess of the maximum contaminant levels specified in Table 64444-A (Organic Chemicals) of Section 64444 of Title 22 of the California Code of Regulations.	No Data	Numeric comparison is not possible
Radioactivity	NA	Radionuclides shall not be present in groundwaters in concentrations that are deleterious to human, plant, animal, or aquatic life, or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.	No Data	Numeric comparison is not possible
Salinity	µmhos/cm	All groundwaters shall be maintained as close to natural concentrations of dissolved matter as is reasonable considering careful use and management of water resources (see Table 3-10).	No Data	Numeric comparison is not possible
Tastes and Odors	NA	Groundwaters shall not contain taste- or odor-producing substances in concentrations that cause nuisance, adversely affect beneficial uses.	No Data	Numeric comparison is not possible
Toxicity	NA	Groundwaters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with the designated beneficial use(s). This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances.	No Data	Numeric comparison is not possible

Source: CVRWQCB 2004 and Caltrans 2003b
Notes:
mL – milliliters; µg/L – micrograms per liter; µmhos/cm – micromhos per centimeter; MPN – Most Probable Number; WQO – water quality objective

Table 4-8 Highway Runoff Storm Water Quality and Water Quality Objectives for Groundwater

Constituent	Unit	Water Quality Objectives for Groundwater	Average Storm Water Runoff Concentration from Caltrans [1]	Is Caltrans Average Storm Water Runoff Concentration Greater than the WQO?

As part of their runoff and characterization monitoring studies, Caltrans identified pollutants that were discharged from Caltrans facilities with a load or concentration that commonly exceeded allowable standards and were still considered treatable by currently available Caltrans-approved Treatment Best Management Practices. These pollutants, designated as Targeted Design Constituents, include sediment; metals (i.e., total and dissolved fractions of zinc, lead, and copper); nitrogen (e.g., ammonia); phosphorus; and general metals. Although ammonia exceeds the water quality objective, this chemical is considered a targeted design constituent and treatable by Caltrans-approved Treatment Best Management Practices[3]; therefore, highway runoff conveyed to Caltrans-approved Treatment Best Management Practices would be treated to the maximum extent practicable and not create any surface water or groundwater quality impacts.

4.5 Project Design Features

Project design features for the selected alternative include Construction Site, Maintenance, Design Pollution Prevention, and Treatment Best Management Practices. These best management practices would be implemented to improve storm water quality during the construction and operation of the transportation facility to minimize potential storm water and non-storm water impacts to water quality. Caltrans' Statewide Storm Water Management Plan (Caltrans 2003b) describes how Caltrans would comply with their Statewide National Pollutant Discharge Elimination System Permit. The Storm Water Management Plan characterizes the program that Caltrans would implement to minimize the discharge of pollutants associated with storm drainage systems that serve highways, highway-related properties, facilities, and activities. Specifically, the Storm Water Management Plan identifies best management practices that shall be considered to meet the maximum extent practicable and the best available technology economically achievable/best conventional

[3] Department-approved Treatment Best Management Practices include Biofiltration Systems, Infiltration Devices, Detention Devices, Dry Weather Flow Diversions, Gross Solid Removal Devices, Multi-Chambered Treatment Trains, Wet Basins, Traction Sand Traps, and Media Filters.

pollutant control technology requirements and to address compliance with water quality standards. The best management practices are organized into four categories, as shown in Table 4-9.

Table 4-9 Caltrans Best Management Practices Categories

Best Management Practice	Description	Responsible Division for Best Management Practice Implementation
Construction Site Best Management Practices	Temporary soil stabilization and sediment control, non-storm water management, and waste management	Division of Construction
Design Pollution Prevention Best Management Practices	Permanent soil stabilization and concentrated flow controls and slope protection systems, etc.	Division of Design
Treatment Best Management Practices	Permanent treatment devices and facilities	Divisions of Design, Construction, and Maintenance
Maintenance Best Management Practices	Litter pickup, toxics control, street sweeping, etc.	Division of Maintenance

Source: Caltrans 2010.

Potential short-term water quality impacts associated with the construction phase would be minimized with the implementation of Construction Site Best Management Practices. Potential long-term water quality impacts associated with the operation and maintenance of the transportation facility would be minimized with the implementation of Maintenance, Design Pollution Prevention, and Treatment Best Management Practices. Overall, with incorporation of Temporary and Permanent Best Management Practices, no water quality impacts are expected with implementation of the Centennial Corridor Project.

Construction Site Best Management Practices

Construction Site Best Management Practices would be applied during construction activities to minimize the pollutants in storm water and non-storm water discharges throughout construction. Construction Site Best Management Practices would provide temporary erosion and sediment control, as well as control for potential pollutants other than sediment. Table 4-10 displays the six categories of Construction Site Best Management Practices that Caltrans has identified as suitable for controlling potential pollutants on construction sites. Although specific Construction Site Best Management Practices have not been identified, the following categories of Best Management Practices would be implemented for the Centennial Corridor Project. Detailed information regarding the specific Construction Site Best Management Practices associated with each category can be found in the Construction Site Best Management Practices Manual (Caltrans 2003a).

Table 4-10 Construction Site BMP Categories

Category
Temporary Soil Stabilization
Temporary Sediment Control
Wind Erosion Control
Tracking Control
Non-Storm Water Management
Waste Management and Materials Pollution Control

Source: Caltrans 2010.

Construction Site Best Management Practices would be evaluated and identified through the preparation of the Storm Water Pollution Prevention Plan. The Storm Water Pollution Prevention Plan would address all state and federal water quality control requirements and regulations. The Storm Water Pollution Prevention Plan would address all construction-related activities, equipment, and materials that have the potential to affect water quality. The Storm Water Pollution Prevention Plan would identify best management practices to minimize pollutants, sediment from erosion, storm water runoff, and other construction-related impacts. In addition, the Storm Water Pollution Prevention Plan would include a Construction Site Monitoring Program, which requires inspection and sampling and analysis procedures to ensure that the implemented Construction Site Best Management Practices are effective in minimizing the exceedance of any water quality standard. The Construction Site Best Management Practices identified in the Storm Water Pollution Prevention Plan would be consistent; therefore, they would comply with the control practices required under the Construction General Permit.

Design Pollution Prevention Best Management Practices

Design Pollution Prevention Best Management Practices are permanent measures to minimize pollution discharges by retaining source materials and stabilizing soils. The three objectives associated with Design Pollution Prevention Best Management Practices include maximizing vegetated surfaces; preventing downstream erosion; and stabilizing soil areas. These design objectives would be applied to the entire project. Without incorporation of Design Pollution Prevention Best Management Practices, the project could affect downstream channel erosion processes, leading to increased channel scouring and sediment deposition through changes in peak discharges and runoff volumes. With implementation of Caltrans-approved Design Pollution Prevention Best Management Practices, the runoff from the roadway would be attenuated and the pre-project flow regime would be maintained. Table 4-11 displays Caltrans-approved Design Pollution Prevention Best Management Practices that would be incorporated, as appropriate, into the design of the Centennial Corridor Project.

Table 4-11 Design Pollution Prevention Best Management Practices

Consideration of Downstream Effects Related to Potentially Increased Flow
Peak-Flow Attenuation Devices
Reduction of Paved Surface
Soil Modification
Energy Dissipation Devices
Preservation of Existing Vegetation
Concentrated Flow Conveyance Systems
Ditches, Berms, Dikes, and Swales
Overside Drains, Downdrains, Paved Spillways
Channel Linings
Flared Culvert End Sections
Outlet Protection/Velocity Dissipation Devices
Slope/Surface Protection Systems
Vegetated Surfaces
Benching/Terracing, Slope Rounding, Reduce Gradients
Hard Surfaces

Source: Caltrans 2010.

During the Project Initiation Document process, many Design Pollution Prevention Best Management Practices were identified and are discussed in the following subsections. During the Project Approval/Environmental Document process and the Plans, Specifications and Estimates process, as additional data becomes available, other Design Pollution Prevention Best Management Practices would be considered.

Consideration of Downstream Effects Related to Potentially Increased Flow

All transitions between culvert outlets, headwalls, wingwalls, and channels would be smoothed to minimize turbulence and scour. Offsite runoff would be handled by allowing flows to pass under or around the proposed project, and the existing drainage pattern would not be altered.

Offsite flows would be managed in a manner that would mimic the existing drainage network and not inundate the roadway surface or any of the existing drainage system. The proposed project would require coordination with all drainages that would be affected, including those that are locally (City/County) owned. Where possible, the runoff from all bridges would be conveyed to Treatment Best Management Practices. No bridge runoff would be directly discharged into waterways.

Slope/Surface Protection Systems

The proposed project would modify existing slopes and create new slopes. The preservation of existing vegetation would be maximized to help minimize the amount of clearing and grubbing that would be required on slopes. To minimize concentrated flows, benches or

terraces would be provided during original construction on high cut and fill slopes, and slopes would be rounded or shaped accordingly. The proposed project would create new slopes and modify existing slopes. Proposed slopes would generally be 4:1 (horizontal:vertical) or flatter (Caltrans 2012). Disturbed slopes would be revegetated per the Erosion Control Plan, which would be approved by the District Landscape Architect.

Concentrated Flow Conveyance Systems

Because it would be necessary to direct or intercept surface runoff, the proposed project would modify ditches, dikes, berms, or swales. Risks because of erosion or washout would be minimized through the use of erosion control measures such as hydroseeding, groundcover, and mulch. Velocity dissipation devices, flared end outlets, headwalls, transition structures, and splash walls would be incorporated into the design, where necessary, at culvert inlets and outlets to prevent erosion. Ditches would be modified and box culverts would be extended to help intercept sheet flow, where necessary, and to convey it to facilities that cross under the roadway.

Preservation of Existing Vegetation

The project design would consider minimizing the footprint and matching the existing grading as close as possible to preserve as much of the existing vegetation as possible.

Treatment Best Management Practices

Treatment Best Management Practices are permanent measures that improve storm water quality after construction is complete. Caltrans has approved nine Treatment Best Management Practices for statewide use. These Best Management Practices must be considered for the proposed project, pursuant to Section 4 of the Project Planning and Design Guide (Caltrans 2010), to minimize the long-term potential impacts from Caltrans facilities or activities. Table 4-12 displays the Caltrans-approved Treatment Best Management Practices.

Table 4-12 Caltrans-Approved Treatment Best Management Practices

Treatment Best Management Practices	
Biofiltration System	Multi-Chambered Treatment Train
Infiltration Device	Wet Basin
Detention Device	Traction Sand Traps
Dry Weather Flow Diversion	Media Filters
Gross Solid Removal Device	

Source: Caltrans 2010.

Each of the build alternatives would include project design features such as the design and installation of Treatment Best Management Practices to the maximum extent practicable. The targeted design constituent approach, outlined in the Project Planning and Design Guide (Caltrans 2010), would be used to determine the prioritization for potential Treatment Best Management Practices. The applicability of all nine Caltrans-approved Treatment Best Management Practices would be analyzed for the entirety of the Centennial Corridor Project from a water quality perspective in relation to the receiving water bodies within the proposed project limits. The proposed Treatment Best Management Practices strategy to compensate for potential pollutant sources associated with operation of the Centennial Corridor Project would be developed to treat the water quality volume and/or water quality flow. For each of the build alternatives, the water quality flow and the water quality volume would be routed away from local drainage courses and into the appropriate Treatment Best Management Practices; therefore, at the onset of a design storm event,[4] it is expected that there will be no observable increase in the surface water quality constituent loadings at each of the local drainage areas.

Maintenance Best Management Practices

Caltrans's Maintenance Division is responsible for conducting maintenance activities at different facilities throughout the State to ensure that the maximum benefits associated with constructed facilities are available to the traveling public. Most of these activities are handled by small crews with a minimal amount of soil disturbance.

The purpose of applying Maintenance Best Management Practices is to implement water quality controls that will minimize pollutant discharges during highway maintenance activities. Maintenance activities, along with the application of Maintenance Best Management Practices, would be ongoing throughout the lifespan of the facility. All of the Maintenance Best Management Practices implemented would be consistent with the specifications and guidelines presented in the Maintenance Staff Guide (Caltrans 2003). The Maintenance Staff Guide provides detailed instructions regarding the application of approved Maintenance Best Management Practices for Maintenance highway activities.

4.6 Cumulative Impacts

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative

[4] The "Design Storm" is defined by Caltrans as the particular rain event that generates runoff rates or volumes that the drainage facilities are designed to handle (Caltrans 2010).

impacts can result from individually minor, but collectively substantial, impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. This analysis considers known projects identified on the cumulative projects map maintained by the City of Bakersfield. In addition, the long-term growth projections for the area are used because they provide for future projects that would contribute to potential cumulative impacts for the project design year (2038). In addition to development projects, there are other circulation improvements that may contribute to cumulative impacts. Both the Thomas Roads Improvement Program projects and projects assumed under the Regional Traffic Impact Fee Program are part of the cumulative analysis. The California High Speed Rail system would also cross through the Biological Study Area (BSA).

Each of the cumulative projects has prepared its own environmental document. The following projects have the greatest potential to influence cumulative impacts:

- The Bakersfield Commons project (GPA/ZC 06-1877) is a 255-acre project located east and west of Coffee Road between Brimhall Road and SR 58. The City of Bakersfield approved the General Plan Amendment and zone change in August 2010. The Bakersfield Commons project allows 1,400,000 square feet of retail commercial, 600,000 square feet of office commercial, 345 multi-family homes, and 80 single-family homes.

- A General Plan amendment and zone change was approved for the 564-acre Stockdale Ranch project in June 2010. The project site, which is on the south side of Stockdale Highway near Heath Road, will be annexed into the City of Bakersfield. The project provides 3,583 residential units and 941,700 square feet of commercial/business park uses. Twenty (20) acres are provided for Open Space-Park use.

- A General Plan amendment and zone change was approved for the 323-acre Saco Ranch Commercial Center project in August 2010. The project is located in the northwestern portion of Bakersfield, generally southeast and southwest of the intersection of Coffee Road and 7th Standard Road, west of the Union Pacific Railroad. The project would allow approximately 1,459,500 square feet of retail commercial, 332,000 square feet of office uses, and 1,376,496 square feet of industrial uses. Full build-out is expected in 2030.

- The Crossroads Plaza Commercial Center project is located in the southern portion of Bakersfield, on the west side of Gosford Road, between Panama Lane and Harris Road.

The project, located on 75 net acres, would allow development of a retail store (approximately 138,621 square feet, with 10,817 square feet containing a garden center), restaurants (42,741 square feet), and community retail center (605,008 square feet with 26,568 square feet containing a garden center). Discretionary actions included a Tentative Parcel Map and Site Plan Review. The project was approved in December 2010.

- The Regional Traffic Impact Fee Program requires new development to pay a proportionate share of the cost for new and expanded transportation facilities. The program includes a range of local street improvements designed to relieve traffic congestion. These improvements, which would be built through 2035, include the widening of several north-south roadways that cross SR 58, particularly in the western portion of the study area.

- The California High Speed Rail system proposes construction of more than 800 miles of track that would connect major population centers. The proposed system is broken into nine segments. One of the first segments proposed for construction would be in the Central Valley from Fresno to Bakersfield. The California High Speed Rail environmental document evaluated alignment alternatives for the Fresno-to-Bakersfield segment. A California High Speed Rail station is proposed for downtown Bakersfield near the existing train station. Within this area, two potential alternative alignments are proposed. Alternatives D1-S and D2-N were evaluated in the Environmental Impact Report/Environmental Impact Statement and both feature a station location consistent with the preferred Bakersfield station location in downtown Bakersfield near Truxtun Avenue in the vicinity of the existing Amtrak station. The station platform for Alternative D1-S would be elevated over the Burlington Northern Santa Fe Railway mainline. For Alternative D2-N, the elevated station platform would be in the Mill Creek Redevelopment area, just south of the Burlington Northern Santa Fe Railway right-of-way. The Draft Environmental Impact Report/Environmental Impact Statement was circulated for public review from August 15, 2011, to September 28, 2011.

- The SR 178/Fairfax Road interchange project built an interchange at SR 178 and Fairfax Road and added an additional eastbound and westbound lane to SR 178 within the project area. The project also widened Fairfax Road through the State right-of-way and constructed a soundwall along the residential area in the northwest quadrant of the project. Work began on October 15, 2007, and was completed in 2009.

- The Mohawk Street Extension is a 1.2-mile, six-lane, north-south arterial from Rosedale Highway to Truxtun Avenue. The project constructed bridges over the Burlington

Northern Santa Fe Railway, the future Westside Parkway, and the Kern River. A box culvert was also built for Mohawk Street to cross over the Cross Valley Canal. Construction on the Mohawk Street Extension began in summer 2009 and was completed in 2011. The project added a traffic signal at the Rosedale Highway/Mohawk Street intersection in September 2009 to facilitate construction, including the import of more than 38,500 truckloads of fill dirt, totaling 0.5 million cubic yards. Improvements to the Mohawk Street/Truxtun Avenue intersection included signal modifications and access to the new roadway.

- The SR 99/7th Standard Road interchange project widened 7th Standard Road within the project area; constructed a separate parallel bridge adjacent to and north of the existing bridge crossing SR 99; modified on- and off-ramps; and constructed an overpass for 7th Standard Road over the Union Pacific Railroad. Construction began May 6, 2008, and was completed in 2010.

- The proposed North Beltway project will widen 7th Standard Road from the existing two-lane road to a four-lane expressway from Coffee Road to Zachary Avenue. The project includes construction of new bridges over the Calloway, Friant-Kern, and Lerdo canals. The design also includes a grade separation at the Burlington Northern Santa Fe Railway near Santa Fe Way.

- Phase I of this corridor is complete and involved construction of a four-lane facility from the William M Thomas Terminal at Meadows Field Airport to SR 99. This project was completed in spring 2008.

- Phase II of the corridor improvement, which is complete, included widening the existing two-lane roadway to arterial standards, including construction of curb, gutter, sidewalk, and drainage facilities. Traffic signals at the Golden State Avenue and Saco Road intersections and a signal modification at Coffee Road were installed. A grade separation over the Union Pacific Railroad and an overpass structure over SR 99 were constructed. Modifications of the existing northbound off-ramp and new northbound on-ramp were constructed within State right-of-way.

- Phase III of the project was completed in spring 2011, widening approximately 6 miles of 7th Standard Road from Coffee Road to Zachary Road. This phase widened 7th Standard from two to four lanes with a median. Also included in this phase was construction of new bridges over the Lerdo, Friant-Kern, and Calloway canals.

- Phase IV extends the project west over the Burlington Northern Santa Fe Railroad at Santa Fe Way. A grade separation (bridge) was constructed at Santa Fe Way. This project is complete.

- Phase V of the 7th Standard Road Project will continue the widening to I-5 to complete the corridor. Phase V is awaiting funding.

- The 24th Street project proposes to make improvements to the Oak Street/24th Street intersection and widen 24th and 23rd streets (SR 178) from SR 99 to M Street. Conceptual engineering and environmental studies are complete. The Draft Environmental Document is expected to be circulated in early 2012, with approval of the Final Environmental Document expected in early 2013. The project will then be designed, and construction is slated to begin early 2014.

- The Hageman Flyover project would construct a roadway across SR 99 to connect Hageman Road with Golden State Avenue (SR 204). A Project Study Report has been completed, and preliminary design and environmental studies are underway. The Draft Environmental Document is expected to be circulated in mid 2012, with the Final Environmental Document completed in early 2013.

- The SR 178 at Morning Drive interchange project would construct a new interchange at SR 178 and Morning Drive and would widen SR 178 to four lanes for approximately 1.5 miles. Approval of the Final Environmental Document occurred in September 2011. Final design is underway and is expected to be completed by fall of 2012. Construction is expected to begin in late 2012.

- The SR 178 Widening project proposes to widen SR 178 to six lanes from Canteria Drive to Masterson Street, and to four lanes from Masterson Street to Miramonte Drive. The project includes signal modifications at Canteria Drive, Alfred Harrell Highway, Masterson Street, and Miramonte Drive. Preliminary alignment studies and environmental technical studies are completed. Circulation of the Draft Environmental Document has been circulated for public review and approval of the Final Environmental Document is expected in mid 2012. Final design to start in late 2012 and end in late 2013 with construction anticipated to begin in late 2013.

- The Rosedale Highway project would widen Rosedale Highway to a six-lane facillity from Allen Road to SR 99. The environmental document includes clearance for a grade separation at the railroad crossing near Landco Drive. The grade separation project is programmed to be funded through the City of Bakersfield's Transportation Impact Fee

program. The Draft environmental Document has been circulated for public review. Approval of the Final Environmental Document is expected in fall 2012, and construction is expected to begin in mid 2014.

- The West Beltway project would build a six-lane north-south facility, extending from SR 119 to 7th Standard Road with 10 potential intersections/interchanges. The initial phase would construct an expressway along a portion of the alignment. Construction of the project is dependent upon future development and available funding.

4.6.1 Water Quality

The geographic context for the analysis of cumulative impacts associated with water quality is the area covered by HSA 557.10. Development of the Centennial Corridor Project, in combination with all other development that would occur in the hydrologic sub-area, would involve construction activities, increases in storm water runoff from new impervious surface area, and possibly reduction in groundwater recharge areas. Construction of new development throughout the hydrologic sub-area could result in the erosion of soil, thereby cumulatively degrading water quality within the hydrologic sub-area. In addition, the increase in impervious surface area resulting from future development may also adversely affect water quality by increasing the amount of storm water runoff, transportation-related pollutants, and associated targeted design constituents entering the storm drain system; however, new development would have to comply with existing regulations regarding construction practices that minimize risks of erosion and runoff. Among the various regulations are the applicable provisions of the Statewide National Pollutant Discharge Elimination System Permit; County and municipal codes related to control of storm water quality for new development and significant redevelopment, roads and highways, and public works projects; municipal grading permits; and other National Pollutant Discharge Elimination System permits. This would minimize degradation of water quality at individual project construction sites. Consequently, cumulative water quality impacts would be minimized during the construction and operational phases. Compliance with applicable State Water Resources Control Board and Regional Water Quality Control Board regulations would ensure that water quality is maintained to the maximum extent practicable for potential development projects within the hydrologic sub-area; therefore, there would be no water quality impacts associated with implementation of the Centennial Corridor Project, and the proposed project would not have a cumulatively considerable contribution to the cumulative effects related to water quality.

4.6.2 Groundwater

The geographic context for the analysis of cumulative impacts associated with groundwater is the area underlain by the Southern San Joaquin Groundwater Basin (Basin). The Centennial Corridor Project is not located within an identified recharge area. Pile driving, dewatering, and other construction activities that would encounter groundwater could potentially occur. While the insertion of support and foundation structures in the groundwater may reduce the storage capacity of groundwater, the displaced volume would not be substantial relative to the volume of the Basin. Likewise, the volume of water used during construction for dust control and other uses would be nominal; therefore, construction activities would not substantially deplete groundwater supplies nor interfere substantially with groundwater recharge. Thus, there would be no potential impacts to groundwater recharge in the area of the Centennial Corridor Project. Although implementation of the Centennial Corridor Project would not have a cumulatively considerable contribution to the adverse effects on groundwater recharge in the Basin, the overall development associated with transportation infrastructure projects that may be planned within the Basin could directly and/or indirectly result in the loss of groundwater volume and recharge areas. This loss would be mitigated by the City's groundwater recharge programs that are managed to ensure that groundwater will continue to be a viable water supply in the future (California Department of Water Resources 2003). In addition, all of the projects would be required to implement Treatment Best Management Practices to the maximum extent practicable. Treatment Best Management Practices, such as infiltration devices, augment groundwater by retaining storm water runoff, which subsequently infiltrates into the groundwater regime.

Due to the volume of traffic and the nature of materials that are transported on roadways, sources of groundwater contamination would be associated with both hazardous and nonhazardous materials that are transported through the area that could result in accidental spills, leaks, toxic releases, fire, or explosion. The transport of hazardous materials is regulated by the California Highway Patrol. Hazardous materials and waste transporters are responsible for complying with all applicable packaging, labeling, and shipping regulations, which reduce the potential for a spill to impact water quality. The Office of Emergency Services also provides emergency response services involving hazardous material incidents. The United States Department of Transportation Office of Hazardous Materials Safety prescribes strict regulations for the safe transportation of hazardous materials, as described in Title 49 of the Code of Federal Regulations and implemented by Title 13 of the California Code of Regulations. Appropriate documentation for all hazardous waste that is transported would be provided as required for compliance with existing hazardous materials regulations codified in titles 8, 22, and 26 of the California Code of Regulations, and their enabling legislation set forth in Chapter 6.95 of the California Health and Safety Code. Compliance with all applicable Federal and State laws related to the transportation of hazardous materials

would reduce the likelihood and severity of accidents during transit. Furthermore, any spill (i.e., hazardous and nonhazardous) would generate an immediate, local response to report, contain, and mitigate the incident.

Caltrans has identified pollutants associated with highway runoff that are considered treatable by Caltrans-approved Treatment Best Management Practices. These pollutants, designated as Targeted Design Constituents, include sediment, metals (i.e., total and dissolved fractions of zinc, lead, and copper), nitrogen (e.g., ammonia), phosphorus, and general metals. Storm water runoff from the project right-of-way would be conveyed to Treatment Best Management Practices; therefore, highway runoff conveyed to Caltrans-approved Treatment Best Management Practices would be treated to the maximum extent practicable and not create any groundwater quality impacts.

Furthermore, Caltrans's Maintenance Division conducts highway activities (i.e., Sweeping Operations; Litter and Debris Removal; and Emergency Response and Cleanup Practices) on a regular basis to correct situations that could cause water pollution; therefore, implementation of these maintenance activities would reduce the discharge of potential pollutants to the storm water drainage system and watercourses and not create any groundwater quality impacts.

Therefore, there would be no groundwater impacts associated with the Centennial Corridor Project, and the proposed project would not have a cumulatively considerable contribution to the cumulative effects related to groundwater.

Chapter 5 Avoidance and Minimization Measures

Impact: Storm Water Erosion

Minimization Measures. The Centennial Corridor Project would require the following measures, to minimize potential water quality and hydrological impacts associated with construction and operation.

- **WQ-1: Implement Storm Water Best Management Practices.** The Centennial Corridor Project would be required to conform to the requirements of the Caltrans Statewide National Pollutant Discharge Elimination System Storm Water Permit, Order No. 99-06-DWQ, NPDES No. CAS000003, adopted by the State Water Resources Control Board on July 15, 1999, and any subsequent permit in effect at the time of construction. In addition, the Centennial Corridor Project would be required to comply with the requirements of Order No. 5-01-130, and the National Pollutant Discharge Elimination System Permit for Construction Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002, as well as implementation of the best management practices specified in Caltrans' Storm Water Management Plan (Caltrans 2003b).
- **WQ-2: Prepare and Implement a Storm Water Pollution Prevention Plan.** The Contractor would be required to develop an acceptable Storm Water Pollution Prevention Plan. The Storm Water Pollution Prevention Plan shall contain best management practices that have demonstrated effectiveness at reducing storm water pollution. The Storm Water Pollution Prevention Plan shall address all construction-related activities, equipment, and materials that have the potential to affect water quality. All Construction Site Best Management Practices would follow the latest edition of the Storm Water Quality Handbooks, Construction Site Best Management Practices Manual to control and minimize the impacts of construction-related pollutants. The Storm Water Pollution Prevention Plan shall include best management practices to control pollutants, sediment from erosion, storm water runoff, and other construction-related impacts. In addition, the Storm Water Pollution Prevention Plan shall include implementation of specific storm water effluent monitoring requirements based on the project's risk level to ensure that the implemented best management practices are effective in preventing the exceedance of any water quality standards.

Impact: Construction Discharges

Minimization Measures. If construction of the Centennial Corridor Project requires the discharge of groundwater to the environment or dredged or fill material, the Centennial

Corridor Project would require the following measures to minimize potential water quality and hydrological impacts associated with construction.

- **WQ-3: Discharge of Construction Water.** If dewatering is expected for the preferred alternative, the contractor shall fully conform to the requirements specified in Order No. R5-00-175, General Waste Discharge requirements for Discharges to Surface Water which Pose an Insignificant (*De Minimus*) Threat to Water Quality, from the Central Valley Regional Water Quality Control Board.
- **WQ-4: Discharge of Dredged or Fill Material.** Because the proposed project involves work over the Kern River, a Section 404 Permit is likely for the discharge of dredged or fill material into waters of the U.S. This permit is administered by the United States Army Corps of Engineers. It is possible that this project may be covered under United States Army Corps of Engineers Nationwide Permit 14 because this project involves linear transportation crossings.
- **WQ-5: Discharge of Pollutants into Waters of the U.S.** A Section 401 Certification from the State is most frequently required in tandem with a Section 404 Permit; therefore, a 401 Certification from the State would be required to ensure that the discharge will comply with applicable Federal and State effluent limitations and water quality standards. Locally, this program is administered by the Regional Water Quality Control Board.

Impact: Bank or Streambed Alteration

Minimization Measures. For any proposed construction activity in any river, stream, or lake, the Centennial Corridor Project would require the following measure to minimize potential water quality and hydrological impacts.

- **WQ-6: Bank or Stream Bed Alteration Agreement.** Per Section 1602 of the Fish and Game Code, the Centennial Corridor Project would be required to notify the Department of Fish and Game of any proposed activity that would substantially divert or obstruct the natural flow of any river, stream, or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

Chapter 6 **List of Preparers**

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Appendix A **Project Risk Analysis**

On September 2, 2009, the State Water Resources Control Board adopted the National Pollution Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ), commonly referred to as the Construction General Permit (General Permit). The new General Permit became effective on July 1, 2010. The General Permit establishes three levels of risk possible for a construction site. Risk is calculated in two parts: (1) Project Sediment Risk and (2) Receiving Water Risk. Accordingly, the following discusses the risk level determination for the Centennial Corridor Project.

The California Department of Transportation (Caltrans), in cooperation with the City of Bakersfield (City), proposes to establish a new alignment for State Route (SR) 58, which would provide a continuous route along SR 58 from Interstate 5 (I-5) via the Westside Parkway to Cottonwood Road on existing SR 58, east of SR 99 (Post Miles T31.7 to R55.6). Improvements to SR 99 (Post Miles 21.2 to 26.2) would also be required to accommodate the connection with SR 58. The project is located at the southern end of the San Joaquin Valley in the city of Bakersfield in Kern County, California. The study site is bounded on the east by Cottonwood Road, on the west by I-5, on the north by Gilmore Avenue, and on the south by Wilson Road. The project alternatives for Segment 1 include three build alternatives and a No Build Alternative, which are described in Section 1.1.

Segment 1 is the easternmost segment of the Centennial Corridor Project. It begins at SR 58 at Cottonwood Road and continues westerly to connect to the Westside Parkway. The study area for Segment 1 is bounded on the east by Cottonwood Road, on the west by Coffee Road, on the north by Gilmore Avenue, and on the south by Wilson Road. The three build alternatives (Alternatives A, B, and C) propose new alignments that would extend from the existing SR 58 (East) and connect to the east end of the Westside Parkway. Alternatives A and B would be located west of SR 99, and Build Alternative C would parallel SR 99 to the west. Under Alternative A, the eastern end of the Westside Parkway mainline would be realigned to conform to the Alternative A alignment, and ramp connections would be provided to the Mohawk Street interchange. Under Build Alternatives B and C, the alignments would connect to the Westside Parkway by extending the mainline lanes constructed as part of the Westside Parkway project.

Segment 1 is located in the Kern Delta Watershed Area. The project risk level is based on findings of the construction site sediment and receiving water risk determination. The assumptions and input parameters used to determine the risk level are described below.

Sediment Risk

The rainfall erosivity factor (R-factor) for this area was determined using the U.S. Environmental Protection Agency rainfall erosivity calculator (US EPA 2010). Input parameters for the R-factor are displayed in Table A-1.

Table A-1 R-Factor Parameters

Estimated Construction Start Date	April 1, 2014
Estimated Construction End Date	August 1, 2016
Latitude	35.3569
Longitude	119.0461
R-Factor Value	21.89

The soil erodibility factor, K, was determined using the RUSLE K Factor tool available at the State Water Resources Control Board[5]. As indicated from the tool, the weighted average K factor for all soils within the watershed area is 0.32.

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. The length of sheet flow and slope were determined using the State Water Resources Control Board RUSLE LS Factor tool. According to the online map, the average LS factor for the Kern Delta Watershed was displayed as 0.16.

The Kern Delta Watershed Sediment Risk Factor is **Low**.

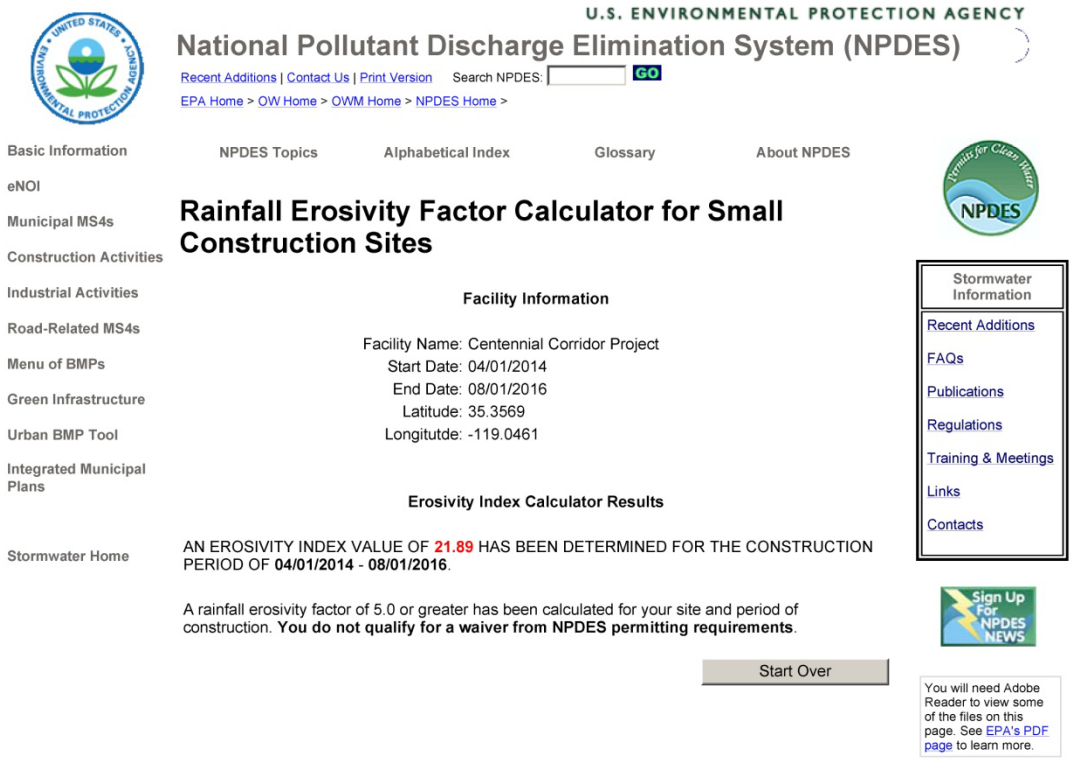
Receiving Water Risk

Based on the State Water Resources Control Board Receiving Water Risk level tool, the disturbed area within the Kern Delta Watershed does not discharge (either directly or indirectly) to a 303(d)-listed water body impaired by sediment, nor does it discharge to a water body with a U.S. Environmental Protection Agency-approved total maximum daily load for sedimentation/siltation. The Kern Delta Watershed does not drain to a water body with designated beneficial uses of Spawn and Cold and Migratory. Based on these findings, the Receiving Water Risk Factor for the Kern Delta Watershed is **Low**.

Based on a Sediment Risk Factor of Low and a Receiving Water Risk Factor of Low, the Kern Delta Watershed's combined risk level is Level 1.

As Risk Level 1, for disturbed areas within the Kern Delta Watershed, the discharger must comply with the requirements included in Attachment C of the General Permit.

[5] http://www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml



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Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Facility Name: Centennial Corridor Project
Start Date: 04/01/2014
End Date: 08/01/2016
Latitude: 35.3569
Longitutde: -119.0461

Erosivity Index Calculator Results

AN EROSIVITY INDEX VALUE OF **21.89** HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF **04/01/2014 - 08/01/2016**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction. **You do not qualify for a waiver from NPDES permitting requirements**.

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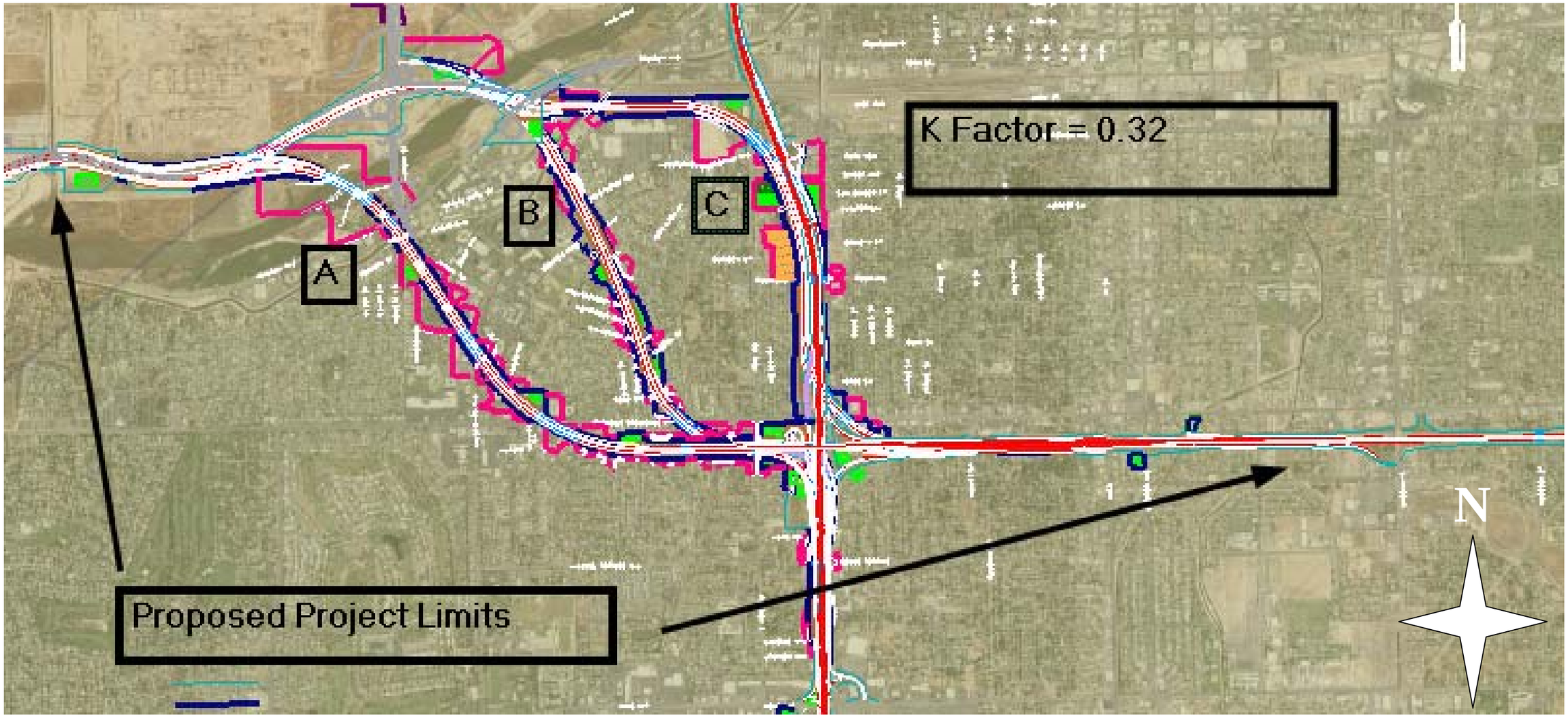
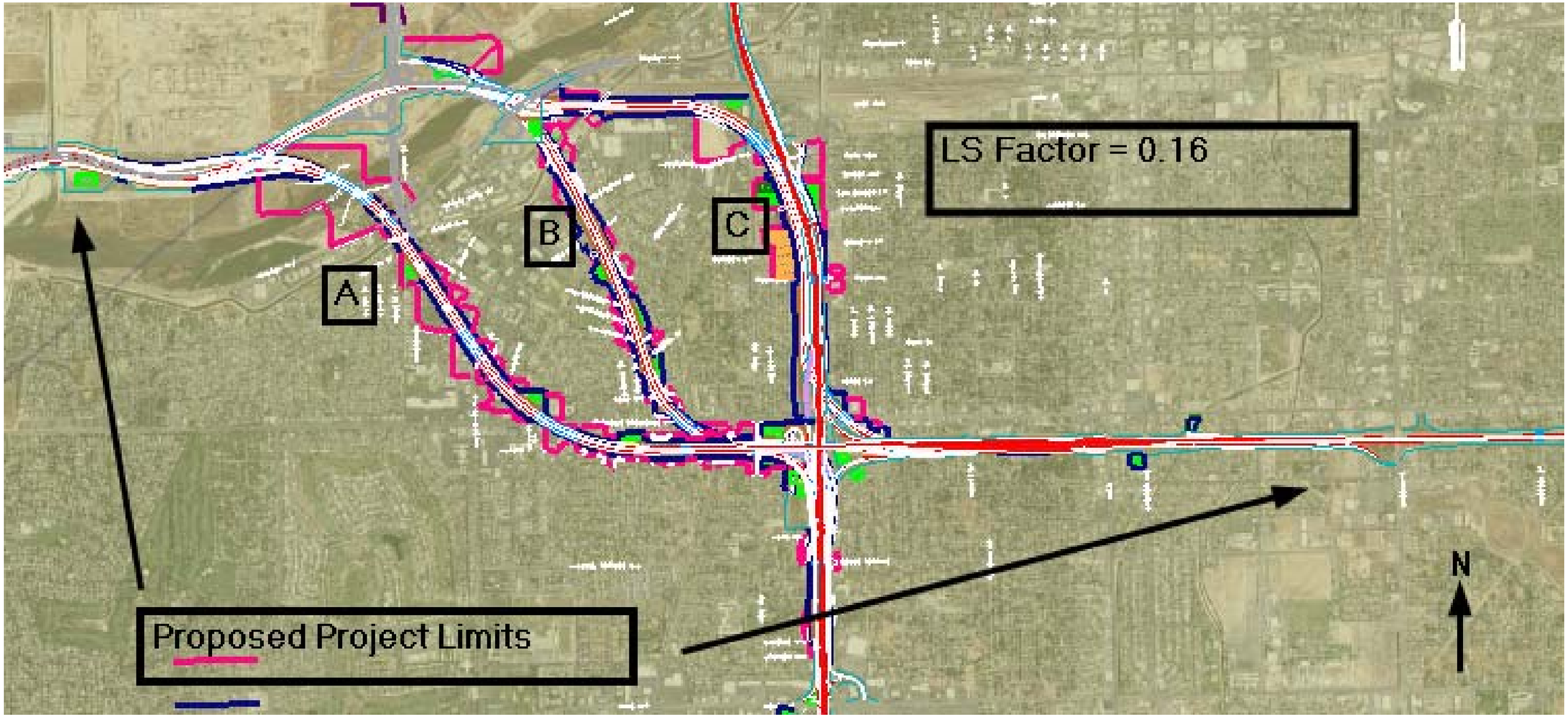
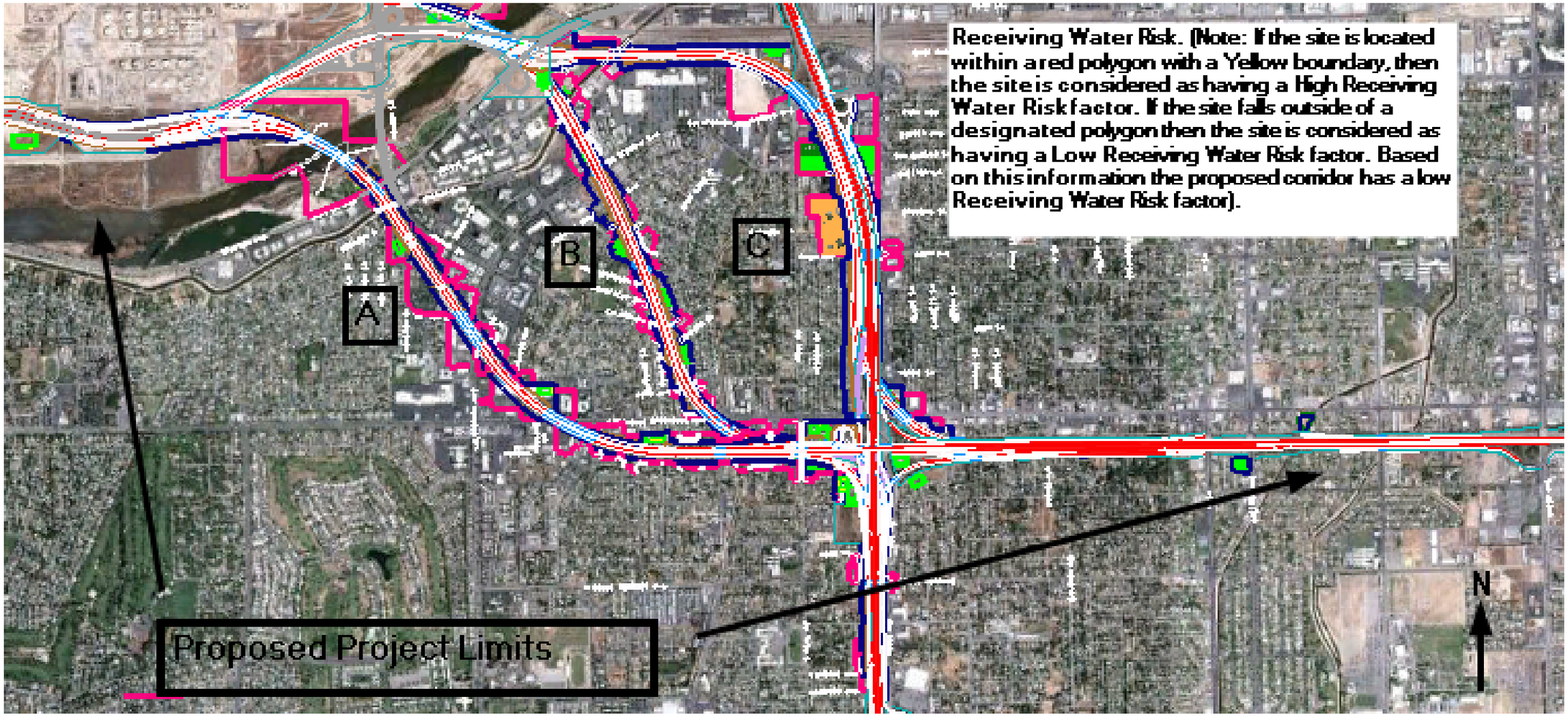


K Factor Risk Level Determination Exhibit.



LS Factor Risk Level Determination Exhibit.



Receiving Water Risk Level Determination Exhibit.

	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**		21.89
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**		0.16
14			
15	**Watershed Erosion Estimate (=RxKxLS) in tons/acre**		1.120768
16	**Site Sediment Risk Factor**		**Low**
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: Low

Project RW Risk: Low

Project Combined Risk: Level 1

Appendix B **Segment 2 Analysis**

1.0 PURPOSE OF THE TECHNICAL MEMORANDUM

In January 2007, the Westside Parkway Final Environmental Assessment and Environmental Impact Report was completed and approved by the Federal Highway Administration, California Department of Transportation (Caltrans), and City of Bakersfield (City). This document evaluated environmental impacts for the proposed 8.1-mile-long east-west freeway that extends from Heath Road at Stockdale Highway to a point near State Route (SR) 99 at Truxtun Avenue in Bakersfield and an unincorporated portion of Kern County. Since approval of the Environmental Assessment/Environmental Impact Report, many design refinements have been necessary, and revalidation reports were prepared to assess the potential environmental impacts associated with the design refinements. As part of the Centennial Corridor Project, additional design refinements to the Westside Parkway are proposed. These are discussed in Section 2.0, Change in Project Design.

This Water Quality Impact Assessment Technical Memorandum was prepared to assess the changes in the environmental setting, circumstances, impacts, and avoidance, minimization, or mitigation measures resulting from the design refinements of the project compared to the approved 2007 Environmental Assessment/Environmental Impact Report.

2.0 CHANGES IN PROJECT DESIGN

Construction of the Westside Parkway has recently been completed for the most part. Incorporation of the road as part of the Centennial Corridor would require minor modifications to the approved design plans. This would include the addition of auxiliary lanes and changes to ramps; however, the impacts associated with these improvements are being addressed as part of Segment 1. This technical memorandum is focused on the potential impacts associated with the designation of the roadway as SR 58 and providing the connection to the existing SR 58 freeway, SR 99, and ultimately to Interstate 5 (I-5).

3.0 CHANGE IN ENVIRONMENTAL SETTING

Based on an evaluation of exhibits that display the 2009 project design refinements for Westside Parkway, the environmental setting pertaining to water resources remains unchanged from that described in the approved 2007 Environmental Assessment/Environmental Impact Report.

4.0 CHANGE IN ENVIRONMENTAL CIRCUMSTANCES

Designating the Westside Parkway as SR 58 and creating a connection to the existing SR 58 freeway, SR 99, and ultimately to I-5 would cause no changes in environmental circumstances pertaining to water quality. The designation as SR 58 would not increase the roadway's footprint; no surface water or groundwater resources would be affected as a result of the change in designation.

5.0 CHANGE IN ENVIRONMENTAL IMPACT

Designating the Westside Parkway as SR 58 and creating a connection to the existing SR 58 freeway, SR 99, and ultimately to I-5 would cause no changes to surface water or groundwater impacts.

6.0 CHANGE TO AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES SINCE LAST DOCUMENT WAS APPROVED

No new or additional avoidance and minimization measures would be required when redesignating the Westside Parkway as SR 58.

7.0 CHANGE TO ENVIRONMENTAL COMMITMENT SINCE LAST DOCUMENT WAS APPROVED

No changes to environmental commitments arise from the design changes to the Westside Parkway studied for this revalidation report on water resources.

8.0 LIST OF PREPARERS

Veronica Seyde, CPESC, CPSWQ, QSD, Project Scientist. M.S. Environmental Studies/B.A. Biology. More than 25 years of experience in water quality sciences, with more than 10 years of experience providing environmental documentation for water resource sections in compliance with National Environmental Policy Act/California Environmental Quality Act elements of environmental impact documents and analyzing the implications of storm water and dry weather urban runoff.

Anne Kochaon, QEP, Peer Review, M.S. Environmental Engineering, 28 years of experience in environmental planning and impact assessment. Contribution: Quality Assurance/ Quality Control.

Appendix C **Segment 3 Analysis**

1.0 PURPOSE OF THE TECHNICAL MEMORANDUM

The California Department of Transportation (Caltrans) proposes to establish a new alignment for State Route (SR) 58, which would provide a continuous route along SR 58 from Interstate 5 (I-5) via the Westside Parkway to Cottonwood Road on existing SR 58, east of SR 99 (Post Miles T31.7 to R55.6). Improvements to SR 99 (Post Mile 21.2 to 26.2) would also be required to accommodate the connection with SR 58. The proposed continuous route, known as the Centennial Corridor, has been divided into three distinct segments. The segments of the corridor are shown in Figure 1 of this document. A Water Quality Assessment Report has been prepared for Segment 1. Segment 2 includes the Westside Parkway and extends from approximately Mohawk Street to Heath Road, which is currently under construction. This segment would be transferred into the State Highway System.

Segment 3, the focus of this Technical Memorandum, extends from Heath Road to I-5. The construction timing for this segment is unknown, but it would not occur until there is sufficient funding and greater traffic demand; therefore, the analysis of Segment 3 has been done at a conceptual level (Tier 1[6]). The approval being sought is route adoption, with more detailed analysis occurring at the time construction is proposed.

An alignment for Segment 3 was identified as part of the 2002 *Route 58 Route Adoption Project, Tier 1 Environmental Impact Statement/Environmental Impact Report*. The analysis contained herein will incorporate the results of that study. A Tier II (project-level) document will be prepared for Segment 3 as a separate documentation effort at a later time when funding becomes available.

Information on Segment 3 was obtained from the *Route 58 Route Adoption Project Tier I Environmental Impact Statement/Environmental Impact Report* (Caltrans *et al.* 2002). Based on the Tier I route adoption evaluation, the Cross Valley Canal Option was selected as the Least Damaging Practicable Alternative and will be addressed in this analysis.

[6] A Tier I document evaluates the impacts at a programmatic level (i.e., conceptual level). This approach is used when facility construction is not anticipated in the foreseeable future. The Tier I document allows the preservation and acquisition of right-of-way. As such, a Tier I document is not adequate to address construction-level impacts; therefore, subsequent documentation will be required before the project can move forward into the detailed engineering phase.

2.0 PROJECT DESCRIPTION

The study area for this technical memorandum consists of the Segment 3 alignment (Cross Valley Canal Option). The alignment generally follows the Cross Valley Canal, which is south of the alignment, from the planned terminus of the Westside Parkway (Segment 2) at Heath Road, west to I-5. From the terminus of the Westside Parkway, the alignment would angle southwest to Heath Road and then assume an east-west direction for approximately 6 miles before angling slighlty southwest for approximately 1.5 miles to its ultimate connection with I-5 near the Cross Valley Canal.

3.0 CHANGE IN ENVIRONMENTAL SETTING

The environmental setting pertaining to water resources remains unchanged from that described in the Water Quality Assessment Report and the 2002 Environmental Impact Statement/Environmental Impact Report.

4.0 CHANGE IN ENVIRONMENTAL CIRCUMSTANCES

There have been no changes in environmental circumstances for water resources since the 2002 Environmental Impact Statement/Environmental Impact Report was approved.

5.0 CHANGE IN ENVIRONMENTAL IMPACT

No new impacts to water quality would result from the proposed alignment for Segment 3. A full water quality impact assessment would be conducted after the design of Segment 3 is near completion. In the current condition, Stockdale Highway would be used as an interim connection between Segment 2 and I-5.

6.0 CHANGE TO AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES SINCE LAST DOCUMENT WAS APPROVED

Given that the environmental documentation for Segment 3 was conducted at a conceptual level, avoidance, minimization, and mitigation measures described in the approved Environmental Impact Statement/Environmental Impact Report are still valid. No new or additional avoidance, minimization, and mitigation measures would be required as a result of incorporation of Segment 3 as part of the Centennial Corridor.

7.0 CHANGE TO ENVIRONMENTAL COMMITMENT SINCE LAST DOCUMENT WAS APPROVED

No changes in environmental commitments concerning water resources have occurred since approval of the 2002 Environmental Impact Statement/Environmental Impact Report.

8.0 LIST OF PREPARERS

Veronica Seyde, CPESC, CPSWQ, QSD, Project Scientist. M.S. Environmental Studies/B.A. Biology. More than 25 years of experience in water quality sciences, with more than 10 years of experience providing environmental documentation for water resource sections in compliance with National Environmental Policy Act/California Environmental Quality Act elements of environmental impact documents and analyzing the implications of storm water and dry weather urban runoff.

Anne Kochaon, QEP, Peer Review. M.S. Environmental Engineering, 26 years of experience in environmental planning and impact assessment. Contribution: Quality Assurance/ Quality Control.

9.0 REFERENCE

California Department of Transportation, Federal Highway Administration, and Kern Council of Governments (Caltrans *et al.*). 2002. *Final Route 58 Route Adoption Project: A Tier I Environmental Impact Statement/Environmental Impact Report.* Fresno, CA: Caltrans, FHWA, and Kern COG.

Appendix D Retention Basin Design Characteristics and Site Map

Proposed Retention Basins

Alternative A

Table D-1 Modified Retention Basin Table for Alternative A

Retention Basin ID	Location	Size (acres)	Depth (feet)
MA7 (E7)	Relocated existing basin E7 located 1,000 feet east of the Friant Kern Canal and south of the future Westside Parkway to 1,000 feet east of the Friant-Kern Canal and north of the future Westside Parkway	3.15	10
MA18 (E18)	West of State Route 99 and north of Mona Way	8.5	16

Source: Storm Water Data Report, 2012.

Table D-2 Proposed Retention Basin for Alternative A

Retention Basin ID	Location	Size (acres)	Depth (feet)
A1	Southwest of Mohawk Street and south of the Carrier Canal	2.46	7
A2	North of Stockdale Highway and south of Dunsmuir Road	1.89	4
A3	East of McDonald Way up to the alley east of Morrison Street	3.08	7
A4	West of Real Road and north of Elcia Drive	1.52	7
A5	South of State Route 58 and east of State Route 99 (in between connectors)	1.53	6
A6	West of Chester Avenue, east of Hayber Court and south of Frontage Road	1.09	6
A7	North of Wood Lane, west of State Route 99	1.84	7

Source: Storm Water Data Report, 2012.

Alternative B

Table D-3 Modified Retention Basin Table For Alternative B

Retention Basin ID	Location	Size (acres)	Depth (feet)
MB8	West of Mohawk Street and South of the Westside Parkway connector (north of the Cross Valley Canal)	1.41	8
MB9	East side of Mohawk Street Inside the Loop On-Ramp to the Westside Parkway westbound connector	0.78	7
MB10	East of Mohawk Street and south of the Westside Parkway connector (north of the Cross Valley Canal)	0.73	7
MB12	East of Truxtun Avenue and north of the loop connector	1.34	10
MB13	West of Commerce Drive and east of Truxtun Avenue	0.53	10
MB18	West of State Route 99 and north of Mona Way	8.5	18

Source: Storm Water Data Report, 2012.

Table D-4 Proposed Retention Basin Table For Alternative B

Retention Basin ID	Location	Size (acres)	Depth (feet)
B1	West of Mohawk Street and north of the Westside Parkway connector	1.8	10
B2	South of Truxtun Avenue and west of the loop connector	1.32	10
B3	North of California Avenue and west of the Alternative B alignment	0.92	7
B4	South of Marella Way and west of La Mirada Dr	2.4	7
B5	East of Williamson Way, west of Real Road and north of Elcia Drive	2.12	10
B6	South of State Route 58 and east of State Route 99 (in between connectors)	1.48	6
B7	West of Chester Avenue, east of Hayber Court and south of Frontage Road	1.09	6
B8	North of Wood Lane, west of State Route 99	1.84	7

Source: Storm Water Data Report, 2012.

Alternative C

Table D-5 Modified Retention Basin Table for Alternative C

Retention Basin ID	Location	Size (acres)	Depth (feet)
MC8	Configured as 2 basins. One located West of Mohawk Street and south of the Westside Parkway connector (north of the Cross Valley Canal). The other basin is located West of Mohawk Street inside the Loop On Ramp to the Westside Parkway East Bound Connector. The second Basin will be connected with an equalizer pipe	1.41	8
MB9	East side of Mohawk Street Inside the Loop On-Ramp to the Westside Parkway West Bound Connector	0.78	7
MC13	West of Commerce Drive and east of Truxtun Avenue to replace and combine runoff from existing basins E12 and E13.	2.56	10
MC17	West of State Route 99, south of California Avenue, and north of Palm Avenue.	4.03	25
MC18	West of State Route 99 and north of Mona Way	8.5	15

Source: Storm Water Data Report, 2012.

Table D-6 Proposed Retention Basin for Alternative C

Retention Basin ID	Location	Size (acres)	Depth (feet)
C1	West of Mohawk Street and north of the Westside Parkway connector	1.8	10
C2	West of Commerce Drive and east of Truxtun Avenue	1.32	6
C3	East of the Carrier Canal and south of the Alternative C alignment	1.08	7
C4	South of the BNSF railroad tracks, west of State Route 99 and north of the Alternative C alignment	2.83	6
C5	South of Sunset Avenue and west of Oak Street	0.9	10
C6	South of Palm Street and east of Wetherley Drive, west of State Route 99	2.31	7
C7	East of State Route 99 and north of Brundage Lane	0.61	6
C8	North of State Route 58 and south of Brundage Lane	0.78	6
C9	South of State Route 58 and east of State Route 99 (in between connectors)	1.53	6
C10	South of State Route 58, east of Hybert Court, and west of Chester Avenue	1.61	7
C11	North of Wood Lane, west of State Route 99	1.84	6

Source: Storm Water Data Report, 2012.

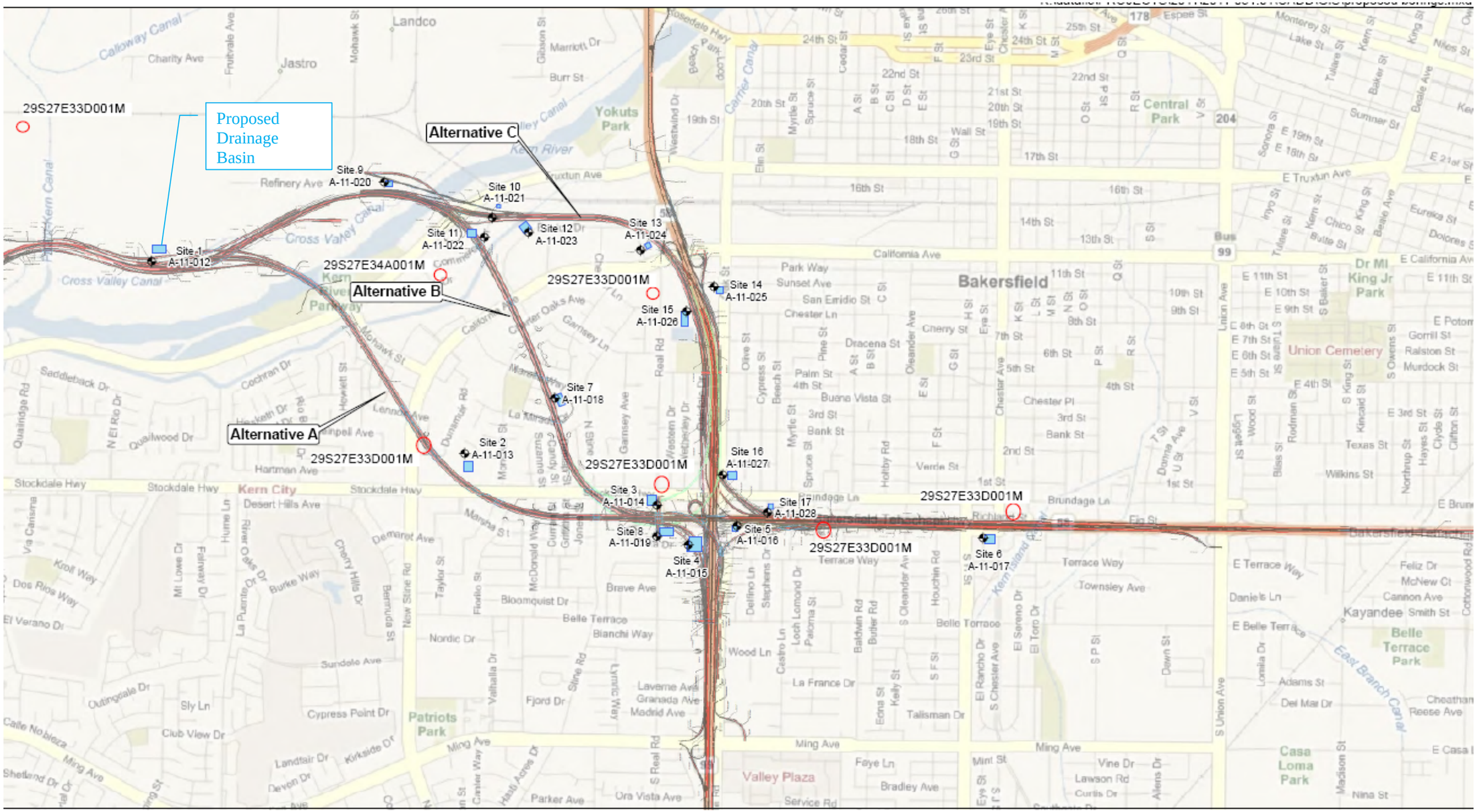


Figure D-1 Proposed Retention Basin and Soil Boring location.

Table D-7 Centennial Corridor Hydraulic Conductivity Field Test Data.

IFD SITE NO.	TEST BOTTOM DEPTH (feet)	APPROXIMATE SOIL TYPE	HYDRAULIC CONDUCTIVITY FIELD TEST (inch/hour)
	0.5	SM/SP	> 5
	5	SM/SP	> 5
	9	SP	> 5
1	15	SP/SP-SM	> 5
	5	SM	0.08
	12	SM	0.03
2	17	SM/ML	0.22
	4	SM	< 0.01
	11	SP	1.8
3	16	SP	> 5
	4	SM	0.78
	10	SP	> 5
4	15	SP	4.6
	0.5	SP	0.82
	4	SP	2
	9	SP	> 5
5	13	SM	> 5
	6	SP/SM	> 5
	10	SP	> 5
6	15	SP	> 5
	5	SM	0.02
	10	SP	> 5
7	15	SP	> 5
	5	SM	1.9
	10	SP	> 5
8	15	SP	> 5
	5	SM	> 5
	12	SP	> 5
9	15	SP	> 5
	5	SM/SP-SM	> 5
	10	SP-SM	> 5
10	15	SP-SM	> 5
	6	ML	0.02
	11	CL	0.01
11	15	CL	0.06
	4	SP-SM	0.69
	10	SP-SM	> 5
12	15	SP-SM	> 5
	5	SM	0.05
	12	SP	> 5
13	16	SP	> 5
	5	SP-SM/SP	> 5
	11	SP	> 5
14	15	SP	> 5
	5	ML	0.03
	10	ML	0.02
15	17	ML/SM	0.42
	6	SM	0.05
	13	SP	0.52
16	17	SP	> 5
	5	SM	0.05
	11	SP	> 5
17	15	SP	4.9