Regional Connector Transit Corridor
Water Resources
Technical Memorandum

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Prepared for

Los Angeles County Metropolitan Transportation Authority

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ACRONYMS

BMPs	Best Management Practices
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
LARWQCB	Los Angeles Regional Water Quality Control Board
LRT	Light Rail Transit
LRTP	Long Range Transportation Plan
Metro	Los Angeles County Metropolitan Transportation Authority (LACMTA)
MWD	Metropolitan Water District
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
PCE	Perchloroethylene
RWQCB	Regional Water Quality Control Board
SUSMP	Standard Urban Stormwater Management Plan
SWRCB	State Water Resources Control Board
SWPPP	Stormwater Pollution Prevention Plan
TCE	Trichloroethylene

TMDL	Total Maximum Daily Loads
TSM	Transportation Management System
USEPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile organic compounds
WMA	Watershed Management Area
WRD	Water Replenishment District of Southern California

1.0 SUMMARY

This section discusses the Regional Connector Transit Corridor project in relation to surface and groundwater resources, the local drainage system, potential flooding and safety issues, and water quality. Existing conditions for these resources are described as well as the current applicable regulatory setting and potential impacts and mitigation from construction and operation of the proposed alternatives.

The area of potential impact for water resources differs slightly based on whether surface or groundwater resources are being analyzed. For surface water resources and surface water quality, existing conditions and impacts are considered within the Los Angeles River Watershed and the Los Angeles River Watershed Management Area. Groundwater resources and groundwater quality are evaluated in the context of the Central groundwater sub-basin of the Coastal Plain of Los Angeles which underlies the project area.

The Regional Connector project area is located in the middle of downtown Los Angeles, in an urban setting with mostly impervious land cover. Stormwater runoff is directed to existing drainage infrastructure, some of which runs directly underneath the proposed alignments. This local drainage infrastructure comprises a small part of the city's storm drain and flood protection system. Stormwater runoff in the project area is contaminated with common urban pollutants such as oil, grease, and heavy metals. These pollutants, in turn, have created poor water quality conditions in the main surface water feature near the project area, the Los Angeles River. Additionally, the large amount of impervious land cover in this area greatly reduces the amount of percolation to groundwater that can occur. The Regional Connector project alternatives would not significantly change the amount of impervious cover in the project area, nor would they result in adverse changes to the existing drainage system or the flow of runoff from the project area.

The City of Los Angeles receives its municipal water from a mixture of ground and surface water resources. In dry years, groundwater can account for as much as 30 percent of the city's supply; however, no production wells are located within the project area. The tunneling methods used in construction would not require the use of water and would therefore, not affect groundwater and/or municipal and industrial water supplies.

The No Build and Transportation System Management (TSM) Alternatives would result in no direct or indirect impacts to water resources in the project area. In addition, these alternatives would not result in any cumulative impacts to water resources in the Los Angeles River Watershed or to groundwater resources in the sub-basin.

Construction and operation of any of the build alternatives would potentially result in impacts to water resources. Construction activities including the excavation of tunnels have the potential to result in the generation of contaminated groundwater that requires disposal as well as the release of construction-related contaminants to groundwater. In order to assess the potential risks and impacts associated with tunnel construction, subsurface (geotechnical) investigations would be undertaken to evaluate soil, groundwater, seismic, and environmental conditions along the proposed alignment. Based on the findings from these investigations, design and construction methods would be developed to reduce potential impacts to a less than significant level. More detail about these potential impacts and best management practices that would be employed to reduce their significance is discussed in the Geotechnical/Subsurface/Seismic/Hazardous Materials Technical Memorandum. If encountered during construction or operations of the proposed project, contaminated groundwater would be treated and disposed of in coordination with local regulatory agencies and all applicable water quality regulations. Potential impacts and mitigation measures related to subsidence from groundwater dewatering are addressed in further detail in the Geotechnical/Subsurface/Seismic/Hazardous Materials Technical Memorandum.

Overall, implementation of the build alternatives would not result in significant impacts to surface or groundwater resources, water quality, and/or flooding and water-related safety issues. During both construction and operation, compliance with applicable local, state, and federal guidelines and regulations would ensure the maintenance of water quality standards. Additionally, implementation of best management practices (BMPs) including soil stabilization and erosion control measures; storage of materials and equipment in a manner that reduces the potential for spills or leaks to enter the storm drain system; and, the development and implementation of a spill prevention and cleanup plan, would further ensure that potential impacts to water resources are reduced to a less than significant level.

2.0 INTRODUCTION

Surface and groundwater quality can be potentially affected by construction activities such as grading and excavation which can lead to increased sedimentation. Construction staging areas can also generate increased stormwater runoff, which, if not properly dealt with, can lead to increases in erosion. Additionally, construction projects that result in increases in impervious surface area can lead to larger quantities and velocities of stormwater runoff, which in turn can result in detrimental impacts to water quality as well as drainage infrastructure. When analyzing project impacts, it is also necessary to consider impacts to flood plains, flood control facilities, and public safety in relation to the construction of publicly used structures in floodplain areas.

This section analyzes potential impacts to water resources and hydrology in the project area for each of the four alternatives as well as cumulative impacts potentially arising from other development and transportation projects in the general project vicinity. Mitigation measures for any identified significant impacts are proposed.

3.0 METHODOLOGY FOR IMPACT EVALUATION

3.1 Federal Regulatory Framework

3.1.1 Clean Water Act

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into waters of the U.S. and gives the U.S. Environmental Protection Agency (USEPA) the authority to implement pollution control programs such as setting wastewater standards for industries. In certain states such as California, the USEPA has delegated authority to state agencies.

All point sources that discharge into waters of the United States must obtain a NPDES permit under provisions of Section 402 of the CWA. In California, the State Water Resources Control Board (SWRCB) and RWQCBs are responsible for the implementation of the NPDES permitting process at the state and regional levels, respectively.

The NPDES permit process provides a regulatory mechanism for the control of point source discharges – a municipal or industrial discharge at a specific location or pipe – to surface waters of the U.S. Two exceptions that are regulated under the NPDES program are: 1) diffuse source discharges caused by general construction activities of over one acre, and 2) stormwater discharges in municipal stormwater systems as a separate system in which runoff is carried through a developed conveyance system to specific discharge locations. The NPDES program regulates pollution generated by runoff from construction activities, industrial activities, and urban land uses, including runoff from streets. Federal stormwater regulations require municipalities to obtain NPDES permits for stormwater discharges from municipal storm drains to surface waters. In 1990, the USEPA established final regulations for stormwater discharges through the implementation of Section 402(p) of the CWA. The two permits that enforce Section 402(p), the General Industrial Permit and the General Construction Permit, are a major attempt to control non-point source pollutants in urban runoff that discharge to a local storm drain system and then into receiving waters. Applicable permits are discussed in further detail in the discussion in Section 3.3.

Projects involving construction activities (e.g., clearing, grading, or excavation) involving land disturbance greater than one acre must file a Notice of Intent (NOI) with the LARWQCB (Region 4) to indicate their intent to comply with the State General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit). The Construction General Permit establishes conditions to minimize sediment and pollutant loading and requires preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) prior to construction. The SWPPP is intended to help identify the sources of sediment and other pollutants, and to establish BMPs for stormwater and non-stormwater source control and pollutant control.

Section 303(d) of the 1972 CWA requires states, territories, and authorized tribes to develop a list of water quality-impaired segments of waterways. The 303(d) list includes water bodies that do not meet water quality standards for the specified beneficial uses of that waterway, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water bodies on their 303(d) lists and implement a process, called Total Maximum Daily Loads (TMDLs), to meet water quality standards (USEPA 2002).

The TMDL process is a tool for implementing water quality standards and is based on the relationship between pollution sources and in-stream water quality conditions. The TMDL establishes the maximum allowable loadings of a pollutant that can be assimilated by a water body while still meeting applicable water quality standards. The TMDL provides the basis for the establishment of water quality-based controls. These controls should provide the pollution reduction necessary for a water body to meet water quality standards. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The TMDL's allocation calculation for each water body must include a margin of safety to ensure that the water body can be utilized for its State-designated uses. Additionally, the calculation also must account for seasonal variation in water quality (USEPA 2002).

TMDLs are intended to address all significant stressors which cause or threaten to cause impairments to beneficial uses, including point sources (e.g., sewage treatment plant discharges), nonpoint sources (e.g., runoff from fields, streets, range, or forest land), and naturally occurring sources (e.g., runoff from undisturbed lands). TMDLs may be based on readily available information and studies. In some cases, complex studies or models are needed to understand how stressors are causing water body impairment. In many cases, simple analytical efforts provide an adequate basis for stressor assessment and implementation planning. TMDLs are developed to provide an analytical basis for planning and implementing pollution controls, land management practices, and restoration projects needed to protect water quality. States are required to include approved TMDLs and associated implementation measures in State water quality management plans. Within California, TMDL implementation is through regional Basin Plans.

TMDL Implementation Plans provide a schedule for responsible jurisdictions to implement BMPs to comply with pollutant reduction schedules.

3.1.2 National Flood Insurance Program (NFIP)

In order to determine the necessity to comply with the Federal Emergency Management Agency's (FEMA) NFIP regulations, FEMA issues countywide Flood Insurance Rate Maps (FIRMs) delineating the limits of FEMA-defined flood zones throughout the county. Flood zones are defined as follows:

- Moderate to Low Risk Areas: Zones B, C, and X are defined as areas outside the one percent annual chance floodplain and no Base Flood Elevations or depths are shown within this zone;
- High Risk Areas:
  - Zone A is defined as areas with a one percent annual chance of flooding; however, detailed analyses are not performed for these areas and no depths or base flood elevations are shown on FIRMs;
  - Zones AE and A1-A30 are defined as areas with a one percent chance of flooding where base flood elevations are derived from detailed analyses and shown at selected intervals on FIRMs;
  - Zone AH is defined as areas with a one percent chance of shallow flooding, usually in the form of a pond with an average depth of one to three feet. Base flood elevations are derived from detailed analyses and shown at selected intervals on FIRMs; and,
  - Zone AO is defined as river or stream flood hazard areas and areas with a one percent or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth of one to three feet. Average flood depths are derived from detailed analyses and shown within these zones.

Volume 44 of the Code of Federal Regulations (CFR) Sections 59-65 sets the minimum basic NFIP floodplain management building requirements. These include:

- Ensure that proposed building sites will be reasonably safe from flooding, and that all new construction and substantial improvements in flood prone areas be properly designed and adequately anchored; constructed with materials resistant to flood damage; and, constructed with equipment and other service facilities that are designed or located to prevent water from entering components during flood conditions;
- All buildings constructed within a riverine floodplain (FEMA Flood Zones: A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective FIRM;
- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any *development* must not increase base flood elevation levels. The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials. A

hydrologic and hydraulic analysis must be performed prior to the start of development and must demonstrate that the development would not cause any rise in base flood levels;

- All buildings constructed within a coastal high hazard area, (any of the "v" Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structure (excluding the pilings and columns) is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components; and,

- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision.

3.2 State Regulatory Framework

3.2.1 Porter-Cologne Water Quality Control Act

The *Porter-Cologne Water Quality Control Act* of 1969 (Act) established the principal California program for water quality control. The Act authorizes the SWRCB to adopt, review, and revise all policies for all waters of the U.S. (including both surface and groundwater); regulates discharges to surface and groundwater; and directs the RWQCB to develop regional Basin Plans. Section 13170 of the *California Water Code* also authorizes the SWRCB to adopt water quality control plans on its own initiative. The Act also divides the State of California into nine Regional Water Quality Control Board (RWQCB) areas. Each RWQCB implements and enforces provisions of the CWA subject to policy guidance and review by the SWRCB. The project area is located in the LARWQCB Regional 4, the Los Angeles Region.

A key tool to preserving and enhancing the water quality of surface and groundwater resources throughout the state is the development of *Basin Plans* by the RWQCBs. Basin Plans: 1) designate beneficial uses for surface and ground waters, 2) set narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy, and 3) describe implementation programs to protect all waters in the region (LARWQCB 1995). Basin plans and the triennial review of these plans by the SWRCB is necessary for compliance with CWA Section 303 (40 CFR 131); however, none of the basin plans contain a comprehensive list of priority toxic pollutant criteria to satisfy CWA section 303.

3.2.2 State Antidegradation Policy

In accordance with the federal Antidegradation Policy, the state policy was adopted by the SWRCB to maintain high quality waters in California. This state policy establishes ambient water quality criteria for priority toxic pollutants. Implemented by the RWQCBs, the policy is necessary to achieve the federal CWA's goals and objectives. In addition, the policy protects bodies of water where the existing water quality is higher than necessary for the protection of present and anticipated beneficial uses. Toxic pollutants regulated under the policy can be attributed to, among other sources, industrial and municipal discharges. The numeric criteria are important in deriving water quality based effluent limits in National Pollutant Discharge Elimination System (NPDES) permits as well as wasteload allocations for total maximum daily loads (TMDLs) (40 CFR 131).

3.2.3 National Pollutant Discharge Elimination System (NPDES)

In accordance with CWA Section 402(p), which regulates municipal and industrial stormwater discharges under the NPDES program, the State Water Resources Control Board (SWRCB) adopted a Construction General Permit applicable to all stormwater discharges associated with construction activity. The Construction General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit, Order No. 99-08-DQW) applies to stormwater discharges from construction sites that disturb land equal to or greater than one acre. The Los Angeles RWQCB (LARWQCB) adopted a new Construction General Permit on September 2, 2009 (Construction General Permit Order 2009-0009-DWQ). The new permit goes into effect on July 1, 2010 and all discharges will be required to obtain coverage under it. The new Order has similar requirements to the current permit, but it specifies more minimum BMPs that were previously only required as elements of the SWPPP or suggested by guidance.

Construction activity subject to this permit includes clearing, grading, and ground disturbances such as stockpiling or excavation. The Construction General Permit requires dischargers to:

- Develop and implement a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP includes plans for minimizing, mitigating and monitoring possible impacts from construction-related contamination of surface waters. In addition, the SWPPP must list BMPs that will be used to limit impacts from stormwater runoff and the placement of BMPs.
- Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the United States.
- Perform inspections of all BMPs

In order to obtain coverage under the Construction General Permit, the permit applicant must submit a Notice of Intent (NOI) to the SWRCB and prepare and implement a SWPPP. Since construction of the Regional Connector would disturb more than one acre, it would be subject to these permit requirements.

3.3 Regional/Local Regulatory Framework

3.3.1 Los Angeles Regional Water Quality Control Board (LARWQCB)

3.3.1.1 NPDES Permits

The LARWQCB is responsible for issuing the Los Angeles County Municipal Stormwater Permit (Order No. 01-182, NPDES No. CAS0041, amended by Regional Order R4-2007-0042 on August 9, 2007). The existing permit covers the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the Los County Flood Control District. The permit covers the permittees for contributions to discharges of stormwater and urban runoff from municipal separate storm sewer systems (MS4s), also called storm drain systems. The discharges flow to water courses within the Los Angeles County Flood Control District and into receiving waters of the Los Angeles Region. Discharges are covered under countywide waste discharge requirements (WDRs) contained in Order No. 96-054 adopted by the LARWQCB in 1996. These WDRs also serve as the NPDES permit for discharge of municipal stormwater.

The MS4 permit requires permittees to implement a Standard Urban Stormwater Management Plan (SUSMP) that designates BMPs that must be used in specified categories of development to treat stormwater runoff, control peak flow discharges, and reduce post-project discharge of pollutants from stormwater conveyance systems.

In addition to the Municipal NPDES Permit issued by the LARWQCB, General NPDES Permit CAG994004 Discharges of Groundwater from Construction Dewatering to Surface Waters, allows for the discharge of treated or untreated groundwater generated from dewatering activities when such discharges will not cause state or federal water quality objectives to be exceeded. This permit would apply to the proposed alternatives with the potential for dewatering.

WDRs for General Waste Discharge Requirements for Specified Discharges to Groundwater in Santa Clara and Los Angeles River Basins (Order No. 93-010)

This WDR allows for the discharge of water resulting from the following activities that may occur as part of the proposed project: construction dewatering, dust control application, and subterranean seepage dewatering.

The WDR requires that wastewater be analyzed prior to being discharged in order to determine if it contains pollutants in excess of the applicable Basin Plan Water Quality

Objectives. Additionally, any wastewater that might be encountered and subsequently discharged to groundwater would need to comply with applicable water quality standards.

Due to the potential for construction dewatering activities and potential subterranean seepage dewatering during operation, this WDR could apply to some of the proposed alternatives.

WDRs for Discharge of Non-Hazardous Contaminated Soils and Other Wastes in Los Angeles River and Santa Clara River Basins (Order No. 91-93)

The purpose of this WDR is to protect waters of the State from contamination due to disposal of soils contaminated with moderate concentrations of petroleum hydrocarbons, heavy metals and other wastes. The permit allows the disposal of up to 100,000 cubic yards of nonhazardous contaminated soils and other wastes for a maximum period of 90 days. This WDR requires that waste used as soil backfill shall not contain any substance in concentrations toxic to human, animal, plant, or aquatic life. The Construction General Permit allows for temporary stockpiling of nonhazardous, contaminated soils until they can be appropriately disposed of or reused, per permit conditions. Due to the project area's long history of commercial and industrial uses, there is significant potential for subsurface hazardous materials to be found in the project area.

3.3.1.2 Basin Plan

The Basin Plan that applies to the project area is the *Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (LARWQCB 1995). This plan sets forth the regulatory water quality standards for surface waters and groundwater within the region. The water quality standards address both the designated beneficial uses for each water body and the water quality objectives to meet them. Where multiple designated beneficial uses exist, water quality standards are written to protect the most sensitive use.

3.3.1.3 Total Maximum Daily Loads (TMDLs)

In accordance with the federal CWA and the state Porter-Cologne Water Quality Control Act, TMDLs have been developed and incorporated into the Basin Plan for some pollutants identified on the 303(d) list as causing contamination in the Los Angeles River Watershed. The Los Angeles River has TMDLs for metals, trash, and nutrients (Resolution Numbers 2007-014, 2007-012, and 2003-016).

3.3.1.4 Standard Urban Stormwater Mitigation Plan (SUSMP)

As part of the Los Angeles County Municipal NPDES Permit, the permittees implemented a stormwater quality management program. The goal of this program is to accomplish the requirements of the NPDES permit and reduce the amount of pollutants in stormwater and urban runoff. The SUSMP is one specific requirement of the stormwater quality management program. The SUSMP outlines the necessary BMPs which must be incorporated into design plans for projects and/or development related activities that include vehicle or equipment maintenance areas (Los Angeles County DPW 2002).

3.3.2 County and City of Los Angeles

3.3.2.1 Los Angeles County General Plan

The Los Angeles County General Plan (1986) contains the following policies related to water resources, water quality, and flood hazards:

- Restrict urban development in flood prone areas;
- Conserve the available supply of water and protect water quality;
- Full compliance with all NPDES permits;
- Full compliance with all approved TMDL implementation and compliance plans for impaired water bodies;
- Protect groundwater recharge and watershed areas; and,
- Encourage the maintenance, management, and improvement of groundwater supplies.

3.3.2.2 Los Angeles County Code

Los Angeles County's Stormwater Ordinance regulates discharges to the storm drain system, runoff management requirements, and violations of the ordinance (Chapter 12.80, Parts 3-5). Applicable sections include:

- Prior to construction activity, all stormwater and runoff pollution mitigation measures must be implemented as required by applicable permits (Section 450); and,
- All BMPs required by applicable construction activity permits must be in effect during the term of the project (Section 510).

3.3.2.3 City of Los Angeles General Plan

Water resources and flood hazard goals and policies are addressed in the city's Infrastructure Systems and Safety Elements of the General Plan (City of Los Angeles 1996). Policies are generally geared towards the protection of water quality, risk reduction in relation to flooding hazards, and compliance with all applicable state and federal regulations.

3.3.2.4 City of Los Angeles Specific Plan for the Management of Flood Hazards (Ordinance No. 172081)

The City of Los Angeles has more stringent floodplain management building requirements than those required by the federal government. Ordinance number 172081 defines Special Flood Hazard Areas as those designated as A, AO, AE, AH, AI-30, A-99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, V, VE and VI-30 Zones on the Los Angeles Flood Hazard Map. The proposed alternative alignments of the Regional Connector project are not located within any of these zones.

3.3.2.5 Los Angeles Department of Water and Power (LADWP)

As the water supply authority for the project area, LADWP prepared an Urban Water Management Plan to promote effective management of its water resources. The plan outlines the strategies that will be used to meet the City's current and future water needs, within the following categories that may apply to the proposed project:

- Protect existing water supplies from contamination and clean up groundwater supplies; and,
- Maintain the structural integrity of the Los Angeles Aqueduct and in-City water distribution systems.

3.4 Standards of Significance

3.4.1 NEPA Guidance

The Federal Transit Administration (FTA) NEPA guidance acknowledges that mass transportation projects have the potential to impact water quality by increasing runoff or altering surface or sub-surface drainage patterns (FTA 2009). In order to address potential impacts, this environmental document discusses:

- Activities that could generate wastewater and the provisions for containing these possible pollutants; and
- The project's potential for increasing runoff, and measures that will be used to reduce runoff or prevent pollutants from entering stormwater systems.

3.4.2 CEQA Guidance

The following significance criteria were developed based on guidance from Appendix G of the state CEQA Guidelines (2009) and the City of Los Angeles CEQA Thresholds Guide (2006). The proposed project alternatives would be determined to result in a significant impact to hydrology and water quality if they would:

- Violate any applicable water quality standards or waste discharge requirements, including those defined in Section 13050 of the California Water Code (CWC);
- Affect the rate or change the direction of movement of existing groundwater contaminants, or expand the area affected by contaminants;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table;
- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding; or
- Cause inundation by dam failure, seiche, tsunami, or mudflow.

3.4.3 City of Los Angeles Bureau of Engineering

Drainage and flood control structures and improvements in the City of Los Angeles are subject to review and approval by the City of Los Angeles Bureau of Engineering. The City uses a 50-year design storm for flood control design purposes, which is a predicted storm event that is considered to be conservative. A potential impact from the project alternatives would be considered to be significant if flooding during the 50-year design storm event would have the potential to harm people or damage property or sensitive biological resources.

3.5 Evaluation Methodology

In order to determine alternative-specific impacts to hydrology and water quality, existing data on hydrology, drainage patterns, water quality, and flooding hazards was evaluated. Existing water quality conditions and identified beneficial uses in the watershed were assessed. Other issues considered include impacts to aquifer recharge, and possible groundwater contamination resulting from operation of the proposed alternatives.

Construction and operation phases of the proposed project were analyzed for compliance with applicable regulations that function to maintain and improve current water quality conditions. Construction and operation activities were also assessed in order to determine their possible impact on existing drainage patterns and the exposure of people and/or property to water-related hazards.

To determine potential environmental impacts, regulatory requirements and laws were reviewed at the federal, state, and local level. The Clean Water Act (CWA), regulated through the United States Environmental Protection Agency (USEPA), provides the legal framework for several water quality regulations that are important in this analysis. In California, the USEPA has delegated responsibility of the primary regulations to the state. Applicable regulations would include:

- The National Flood Insurance Act through examination of the most current FEMA issued Flood Insurance Rate Maps (FIRMs);
- The National Pollutant Discharge Elimination System (NPDES) General Construction Permit (issued by the State Water Resources Control Board (SWRCB));
- The Los Angeles County Municipal Stormwater Discharge Permit issued by the Los Angeles Regional Water Quality Control Board (LARWQCB), and the Standard Urban Stormwater Management Plan (SUSMP);
- The LARWQCB Basin Plan, the California Toxics Rule, the California Nonpoint Source Pollution Control Plan, and the State Antidegradation Policy.

Two NPDES permits that pertain to proposed project alternatives are the NPDES General Industrial Permit and the General Construction Permit. Each of the alternatives was analyzed for potential construction-related surface water sedimentation generated by erosion and runoff from proposed staging areas and for potential increases in impervious surface area and associated potential increases in post-construction stormwater runoff volumes.

In the case that a potentially significant impact would be anticipated, proposed mitigation measures were developed consistent with NPDES permit regulations.

Hydrology and water quality impacts are analyzed for direct, indirect, and cumulative impacts. Cumulative impacts refer to two or more individual effects which, when considered together, are considerable, or which compound or increase other environmental impacts. Cumulative effects include both direct and indirect effects as well as past and reasonably foreseeable future actions in combination with the actions of other projects. Potential cumulative impacts to water resources are discussed in terms of their potential severity as well as the likelihood of their occurrence. Based in part on guidance from the Council on Environmental Quality

(CEQ) for the analysis of the significance of cumulative impacts, the same standards used to measure direct and indirect impacts will apply to the analysis of cumulative impacts.

In addition, the City of Los Angeles CEQA Guide (2006) describes appropriate considerations for cumulative impact analysis methodology for water resources. The city's guidelines rely on the same impact assessment methodology and standards of significance as those that are used to measure potential direct and indirect impacts to water resources. The guide states that related projects located in the same defined resource area should be analyzed for any potential combined effect. The specific standards that were used to measure the significance of a potential impact are described in Section 3.4.

4.0 AFFECTED ENVIRONMENT

The proposed alternatives are located in the Los Angeles River Watershed Management Area (WMA). The Los Angeles River Watershed covers an area of over 834 square miles from the eastern portions of the Santa Monica Mountains, Simi Hills, and the Santa Susana Mountains in the west to the San Gabriel Mountains in the east. While the upper portion of the watershed is covered by forest and open space, approximately 474 square miles of the watershed is highly developed with commercial, industrial, and residential uses.

4.1 Municipal Water Supply

The Los Angeles Department of Water and Power (LADWP) is responsible for supplying, treating, and distributing water for domestic and industrial uses in the project area. The City of Los Angeles obtains its water supply from local wells in the Los Angeles ground water basin, the Los Angeles aqueducts, and by purchasing water from the Metropolitan Water District (MWD) (City of Los Angeles Planning Department 1995). Water distributed by the MWD comes from the Colorado River and from the State Water Project. In addition to these sources, some wastewater within the LADWP service area is reclaimed for reuse for irrigation, industrial use, and groundwater recharge (Los Angeles Grand Avenue Authority 2006).

Groundwater is a major component of the water supply in the Los Angeles metropolitan area. Local groundwater resources provide about 15 percent of the total water supply. In drought years this number can be as large as 30 percent (City of Los Angeles 2005a). The city owns water rights in the Upper Los Angeles River Area groundwater basin in addition to the supply that comes from the Central and West Coast sub-basins of the Coastal Plain of Los Angeles Groundwater Basin (City of Los Angeles and USACE 2007). On average, about 86 percent of the groundwater supply comes from the Upper Los Angeles River Area groundwater basin (City of Los Angeles 2005a).

4.2 Surface Water Hydrology

4.2.1 Regional Surface Water Setting and Conditions

The Los Angeles River originates at the western end of the San Fernando Valley at the confluence of Arroyo Calabasas and Bell Creek. The six major tributaries along the river include Tujunga Wash, Burbank Western Storm Drain, Verdugo Wash, Arroyo Secco, Rio Hondo, and Compton Creek. The Rio Hondo is hydraulically connected to the San Gabriel River Watershed because flows from the San Gabriel River are routed to Whittier Narrows Reservoir and through the Rio Hondo during larger flood events (City of Los Angeles 2005a). The project area is considered to be located in the middle reach of the Los Angeles River basin (the reach between U.S. Highway 101 and the confluence with the Rio Hondo River). Figure 4-1 depicts a regional view of the project area in the Los Angeles River watershed.

The climate of the project area is mild with an average annual temperature of 74.9 degrees Fahrenheit and an average annual rainfall is 14.5 inches. However, rainfall amounts can vary significantly, sometimes exceeding 30 inches in an extreme wet year (City of Los Angeles 2005a). Nearly all precipitation occurs from December to March. Precipitation during the summer months is infrequent, and periods of no rain for several months are common (City of Los Angeles Bureau of Engineering 2001). Topography throughout the coastal plain area is generally defined by gradually sloping land from the foothills of the San Gabriel Mountains to the Pacific Ocean. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Los Angeles River's confluence with the Arroyo Secco, to mean sea level at the mouth of the Los Angeles River.

The proposed project alternatives are located in the Los Angeles-San Gabriel Hydrologic Unit and more specifically within the Los Angeles River Watershed Management Area (Figure 4-1). Encompassing a total of 824 square miles, the Los Angeles River watershed is one of the largest watersheds in the region and one of the most diverse in terms of land use patterns. Approximately 324 square miles of the watershed are covered by open space or forest areas including the area near the headwaters in the Santa Monica, Santa Susana, and San Gabriel Mountains. The remainder of the watershed is highly developed (LARWQCB 2007). Table 4-1 summarizes major land use patterns in the Los Angeles River Watershed and Figure 4-2 shows this information graphically. In addition to the Los Angeles River in the vicinity of the proposed project, other surface water bodies consist of two small lakes located more than a mile from the vicinity of the proposed alignments.

4.2.2 Local Surface Water Setting and Conditions

The proposed project alignment encompasses an area of approximately 1,200 acres in the central downtown area of Los Angeles. No surface water bodies are located directly in the project area. The closest surface water feature is the Los Angeles River which runs approximately 0.5 miles east of Alameda Street, which is near the project area's eastern boundary. Land use along this part of the river is comprised of industrial, residential, and commercial, including major refineries and petroleum products storage facilities, major freeways, and rail lines (LARWQCB 2007). Due to the impervious surfaces related to development in the project area, surface water runoff and peak runoff rates have increased. Another reason for the increase in peak runoff rates in the coastal plain areas stems from the elimination of natural ponding areas and improved hydraulic efficiency of water carriers such as streets and storm drains systems.

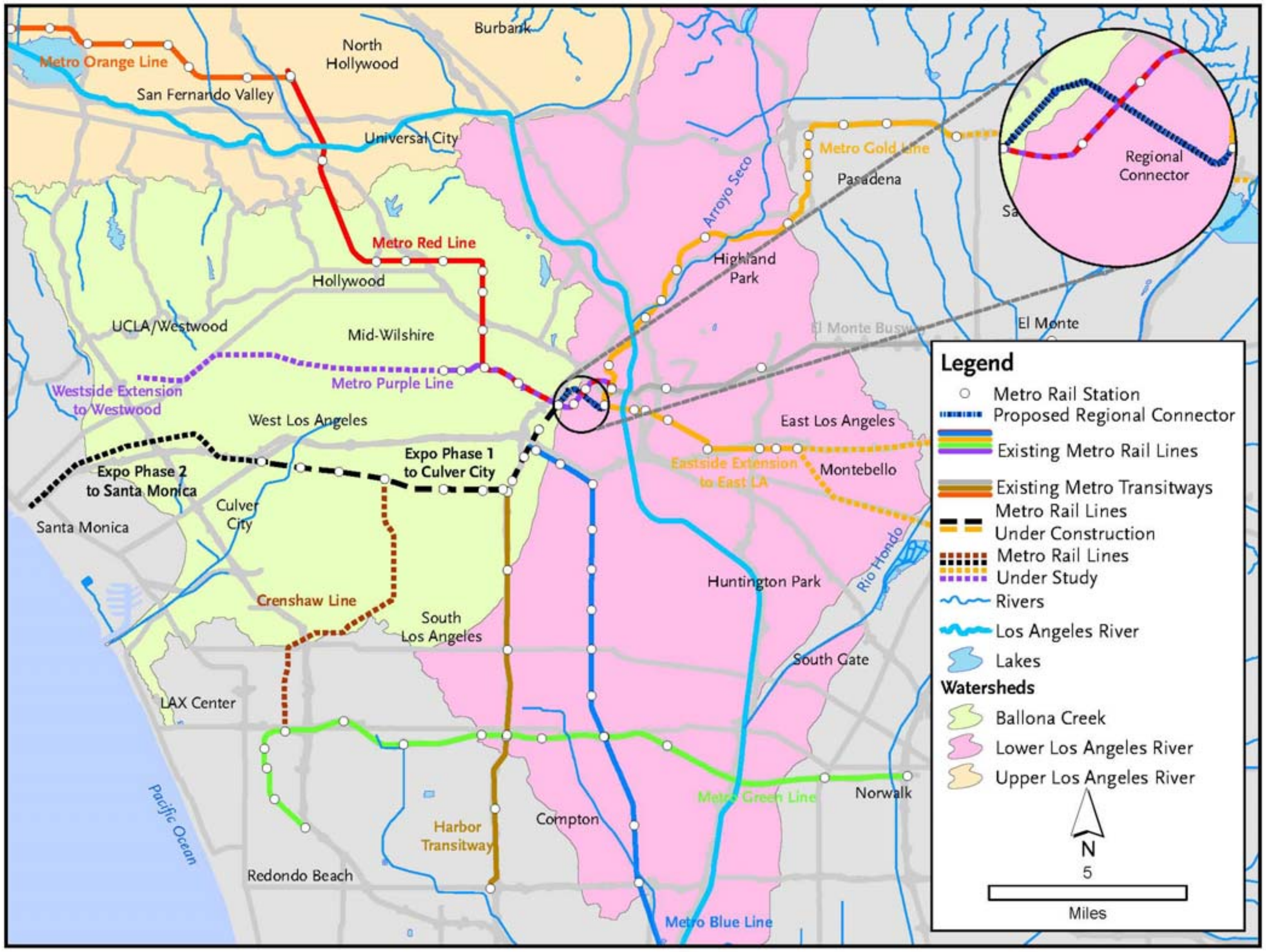

Figure 4-1. Regional View of the Los Angeles River Watershed

Table 4-1. Land Use Summary in the Los Angeles River Watershed Management Area (WMA)

Land Use Type	Land Use Areas (acres)
Commercial	18,500
Industrial	12,500
Multifamily Housing	13,750
Single-Family (high, mid, and low-density	83,530
Transportation/Utilities/Mixed	14,800
Water	400
Open Space/Agriculture	41,500
Other	20
Total (in acres)	**185,000**

Source: City of Los Angeles 2005b

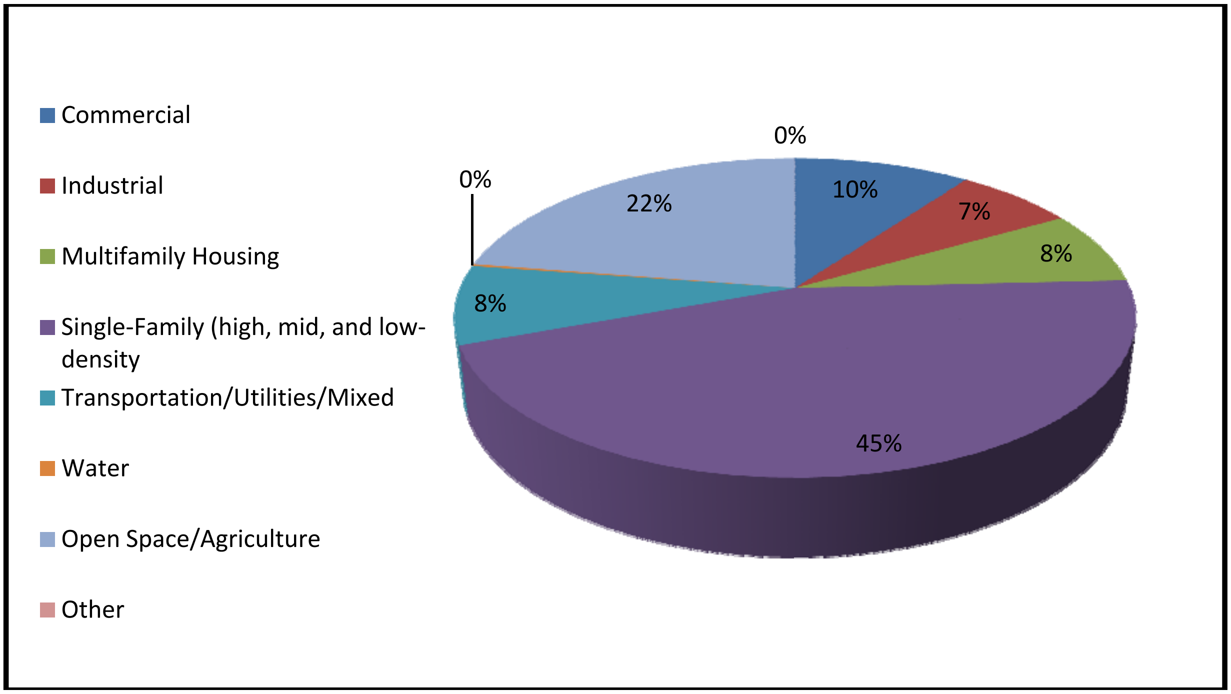

Figure 4-2. Land Use in the Los Angeles River Watershed Management Area

4.3 Groundwater

The Los Angeles Coastal Plain Groundwater Basins underlie the project area. These groundwater basins are incorporated into the Coastal Plain Hydrographic Subunit. The Coastal Plain Hydrographic Subunit contains the Central, West Coast, Santa Monica, and Hollywood Basins. The Central Sub-basin, one of the most important basins in the hydrographic subunit, directly underlies the project area (City of Los Angeles Planning Department 1995). The Central Basin extends over much of the Coastal Plain and holds most of its groundwater. The basin underlies the service areas of the Metropolitan Water District member agencies, the Central Basin Municipal Water District (Central Basin MWD), West Basin Municipal Water District (West Basin MWD), the City of Compton, the City of Los Angeles, and the City of Long Beach (MWD of Southern California 2007). Total water storage in the basin is 13.8 million acre feet and the natural safe yield is 125,805 acre feet per year. The depth of the Central Basin is between 1,600 and 2,200 feet (MWD of Southern California 2007). The Central Basin is further divided into the Los Angeles Forebay, the Montebello Forebay, and the Whittier and Central Basin Pressure Areas. The proposed project is located within the Los Angeles Forebay Area.

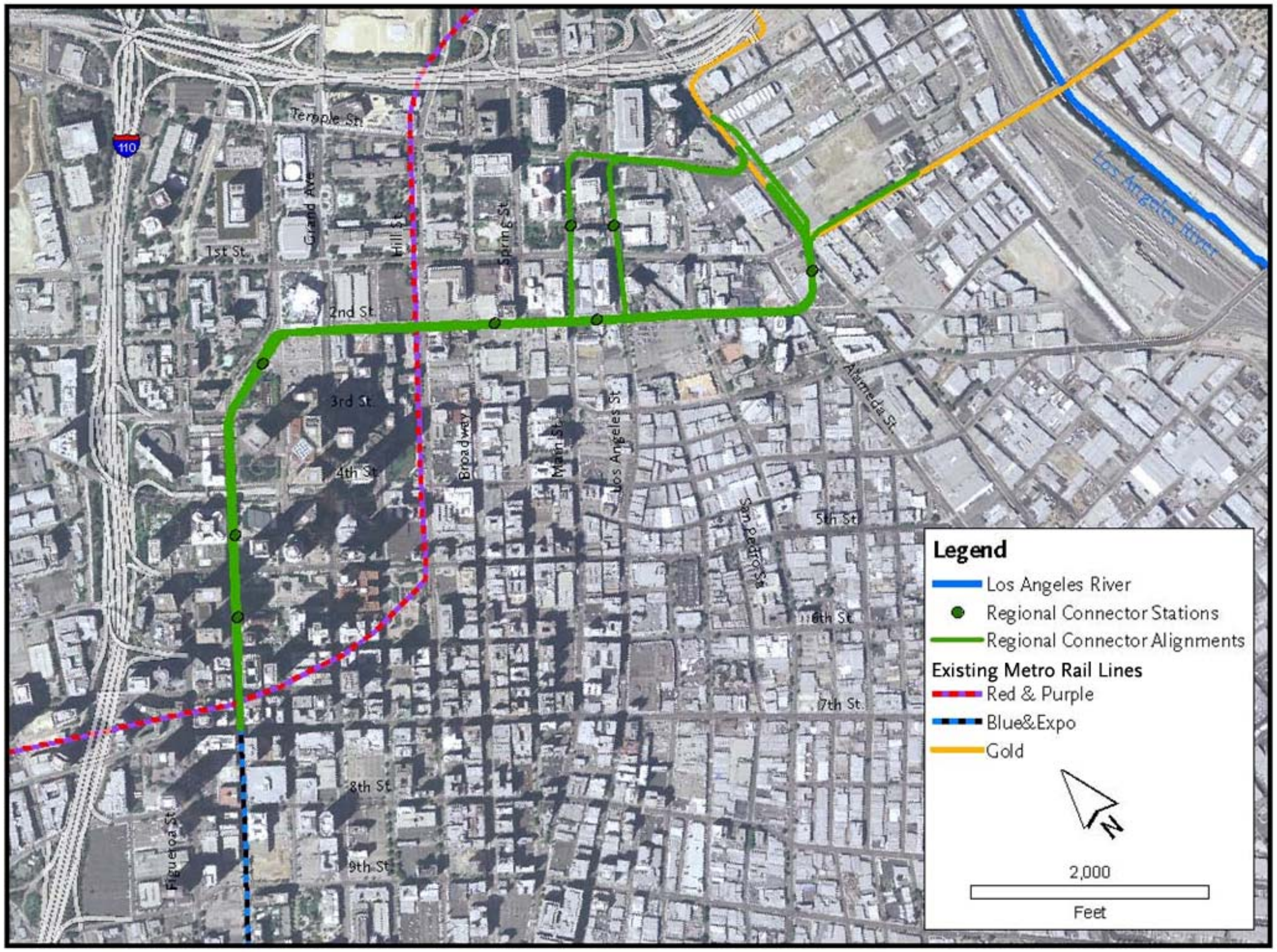

Figure 4-3. Location of the Los Angeles River Relative to the Project Location

Groundwater resources are replenished in the Central Basin through surface and subsurface flow and by direct percolation of precipitation, stream flow, and applied water in the forebay areas (DWR 2004). Natural replenishment of groundwater happens in the forebay areas where permeable sediment is exposed at ground surface (DWR 2004). For the Central Sub-basin, this takes place largely in the Whittier Narrows area near the Rio Hondo, east of the project area by approximately 10 miles. Percolation and groundwater replenishment in the Los Angeles Forebay is limited due to the large amount of paving and urban development throughout the City of Los Angeles (DWR 2004).

The Los Angeles Forebay Area extends generally in a fan pattern around the Los Angeles River. The project area is underlain by the more shallow aquifers of the Lakewood Formation (including the Semiperched, the Gaspur, the Exposition, the Gardena, and the Gage aquifers). The main source of potable groundwater in the Central Basin is from the deeper aquifers of the San Pedro Formation (including the Lynwood, Silverado and Sunnyside Aquifers). The shallower aquifers locally produce smaller volumes of potable water. With water bearing units ranging in thickness from up to 180 feet (Semiperched and Gaspur aquifers) to up to 280 feet (Lakewood Formation), these shallow aquifers extend to depths of 100 feet above mean sea level (msl) to almost 600 feet below msl (800 feet below ground surface). The deeper water bearing units of the San Pedro Formation are up to 800 feet thick and extend up to 2,200 feet below msl. In the Forebay Area, many of the aquifers merge and allow for direct recharge into the deeper aquifers (MWD of Southern California 2007). As described above, land use in the vicinity of the proposed project is highly impervious; therefore, recharge to groundwater in this area is minimal. Historically, Central Basin water levels ranged from a high of about 160 feet above msl in the northeast portion of the basin to a low of about 90 feet below msl in the Long Beach area.

Exploratory borings in the vicinity of the proposed alternatives have discovered groundwater along Flower Street between 7th and 2nd Streets at depths ranging from approximately 15 to 35 feet below ground surface. Other borings made adjacent to Flower Street between 2nd and 5th Streets discovered groundwater at depths between approximately 18 to 27 feet below the ground surface. In the area of Hill and Alameda Streets, borings reported groundwater seepage at depths between approximately 14 to 36 feet (Metro 2008). From these preliminary borings, it appears that groundwater is perched on the underlying San Fernando formation bedrock. Perched groundwater is groundwater that is separated from the water table and is often formed in response to water that collects during rain events or is in the process of being recharged by percolation from nearby surface water or other perched water zones.

In addition to setting beneficial uses for inland surface water resources such as the Los Angeles River, the LARWQCB sets beneficial uses for groundwater in the Central Basin. Designated beneficial uses consist of both municipal and domestic supplies as well as agricultural and industrial uses (LARWQCB 1995). Contamination in the Central Basin limits the uses of groundwater from the basin (City of Los Angeles Planning Department 1995). Groundwater quality in the project area is described in more detail in Section 4.7.2.

4.4 Drainage

The project area is part of the Los Angeles River Basin, which includes the coastal areas of Los Angeles County south of the divide of the San Gabriel Mountains and Santa Susana Mountains, plus a small part of the coastal portion of Ventura County south of the divide of the Santa Monica Mountains (City of Los Angeles Planning Department 1995).

For planning purposes, the City of Los Angeles divides the Los Angeles River Basin into three drainage areas: the Upper Los Angeles River Area, the Santa Monica Bay area, and the Central area. The three major rivers that drain the basin include the Los Angeles River, the Rio Hondo, and the San Gabriel River. The Los Angeles River is the closest surface water feature to the project area. This river drains the San Fernando Valley, flowing southward through the Coastal Plain where it is joined by the Rio Hondo 12 miles upstream from the Pacific Ocean (City of Los Angeles Planning Department 1995). Figure 4-4 shows the drainage pattern of these surface water resources in the proximity of the project area.

Drainage in the immediate project area generally flows southeast towards the Los Angeles River. Storm drain pipes along the backbone of the project area range in size from 12 to 84 inches in diameter (CDM 2009). Along Alameda Street, pipes are generally 72 to 84 inches in diameter and flow south to Traction Avenue before turning east to the discharge point into the Los Angeles River. Storm drain pipes along Temple, North Main, and Los Angeles Streets are generally smaller ranging in size from 12 to 36 inches in diameter (CDM 2009). Drainage along 2nd Street flows directly southeast through a large box culvert to the intersection of Traction and Alameda. From the intersections of 2nd and Flower Streets and 4th and Flower Streets, drainage converges at the intersection of 3rd and Flower Streets before heading east to the Los Angeles River. From the intersection of 4th and Flower Streets, drainage flows south before discharging into the Los Angeles River east of the proposed project site.

Runoff rates and volumes have increased in the City of Los Angeles, and more specifically in the project area due to urbanization and increased impervious cover associated with large areas of asphalt, concrete, buildings, and other land uses which concentrate storm runoff. Due to previous flood control projects, almost all local streams and rivers (including the Los Angeles River) have been channelized and/or culverted in the urban areas and they now serve primarily as storm runoff channels.

Storm drains within the city are constructed and maintained by both the City and the Los Angeles County Flood Control District. The Los Angeles County Flood Control District constructs the major storm drains and open flood control channels, and the City constructs

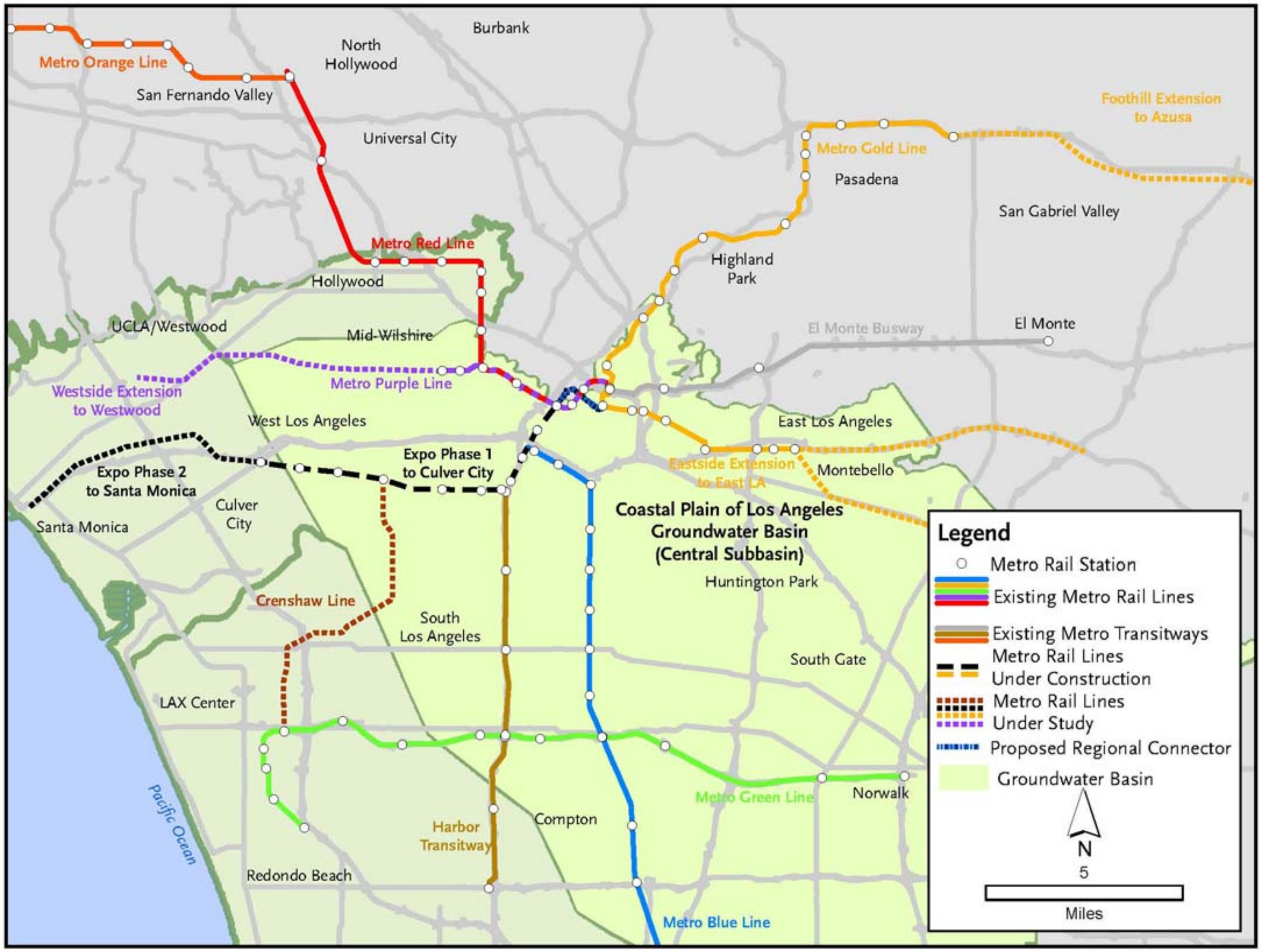

Figure 4-4. Groundwater Basin Boundaries Relative to the Project Area

local interconnecting tributary drains. The City's system is designed to convey storm flows from a ten-year storm event, while the County system is designed for a 50 year storm event.

4.5 Flooding

Historical flooding in the Los Angeles River basin has caused extensive property damage and loss of lives. Major storms include January 1914, 1934, 1943, and 1956, February 1978 and 1980, and March 1938 and 1983. As described above, the basin the project area is located in is considered the middle reach of the Los Angeles River. The channel capacity of the middle reach can safely convey the 100-year flow within the channel banks. In comparison, the upper reach of the river (located immediately upstream of the project area) is not certified to adequately handle the 100-year flood. However, as identified on current FEMA floodplain mapping, the 100-year flow in the river is fully contained in the river channel (see Figure 4-5).

The project area is outside of the 100-year and 500-year flood zones and thus would not be susceptible to these storm events as defined by FEMA (100-year and 500-year storms are defined as having a one percent and 0.2 percent chance, respectively, of occurring in any given year). The closest 100-year floodplain area is along the Los Angeles River between Broadway and Mission Road approximately 0.5 to 0.7 miles from the project area (City of Los Angeles 1996). The 100-year flood zone is used as the benchmark in administering the National Flood Insurance Program (NFIP), a voluntary program managed by FEMA through which communities enforce floodplain management ordinances in return for federally backed flood insurance (City of Los Angeles Planning Department 1995).

Flooding impacts are generated when development is placed in floodplain areas. Figure 4-5 shows the location of the proposed Regional Connector alignments located in flood zone X, where there is no flood hazard. Since the project area is not in a floodplain, potential floodplain impacts do not apply to the analysis of the alternatives.

4.6 Inundation

Inundation is defined as flooding related to earthquake-induced failure of up-gradient dams, flood control facilities, or other water retaining structures. Multiple flood control facilities are located in the San Fernando Valley portion of the Los Angeles River watershed. Failure of these flood control mechanisms would potentially cause inundation in the vicinity of the proposed alternatives. A limited portion of the eastern section of the proposed build alternatives is at the edge of a potential inundation area (near the intersection of Alameda Street with both Temple and 1st Streets) (City of Los Angeles 1996). However, the majority of the length of the build alternatives is not located in an area mapped to have the potential to be susceptible to this type of flooding.

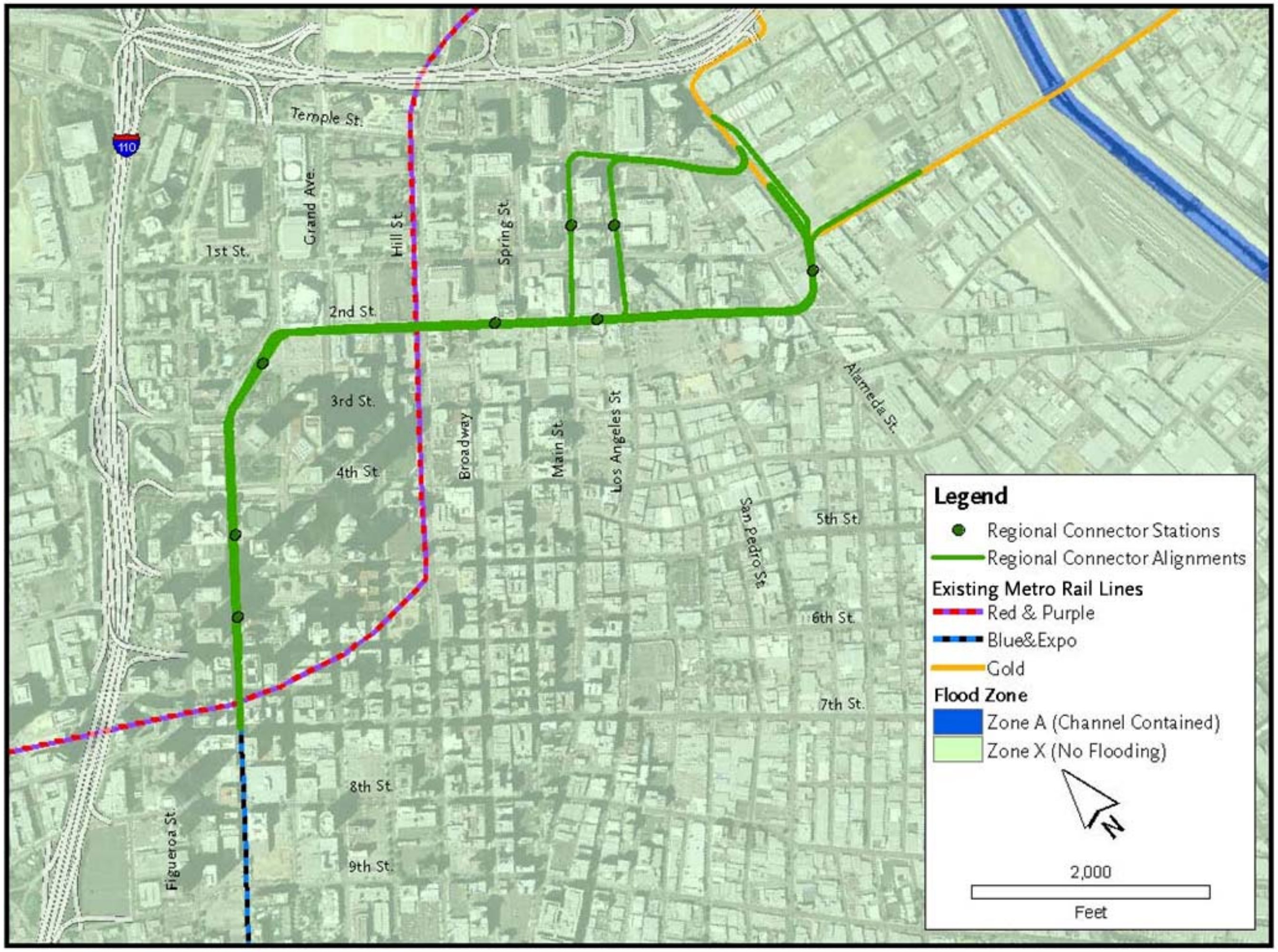

Figure 4-5.The 100-year Flood Zone Near the Proposed Project

Earthquake activity can also cause large waves to form in enclosed bodies of water. Known as seiches, these waves have the potential to cause inundation. Along the same lines, tsunamis are tidal waves generated in large bodies of water by fault displacement or major ground movement. The proposed project alignments are located over a mile from the nearest enclosed water bodies and more than 10 miles from the ocean. Therefore, the alternatives are not located within areas potentially impacted by seiches or tsunamis. The Geotechnical/Subsurface/Seismic/Hazardous Materials Technical Memorandum also addresses potential impacts from seiche and tsunami-related flooding.

4.7 Water Quality

4.7.1 Surface Water

Daily urban runoff from the project area has negative impacts to surface water quality. Runoff washes residues from the land, including deposits from vehicles, pet waste, pesticides, and street litter into the storm drain system. The Basin Plan for the Los Angeles River watershed lists the following beneficial uses for the river (LARWQCB 1995):

- Groundwater Recharge: Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
- Water Contact Recreation (REC-1 and REC-2): Uses of water for recreational activities involving both body contact with water (REC-1) and no body contact with water (REC-2). These uses include, but are not limited to, swimming, wading, and boating.
- Warm Freshwater Habitat: Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Water bodies not meeting the beneficial uses of state water quality standards are placed on the 303(d) List of Water Quality Limited Segments and states are required to develop TMDLs for the pollutants causing the impairment.

The Los Angeles River in the project area is listed on the LARWQCB's 2008 CWA Section 303(d) list of impaired water bodies. Total Maximum Daily Loads (TMDLs) have been developed for trash, metals, and nitrogen compounds. In addition to the impact trash has on aesthetics, its presence inhibits plant growth and it can be ingested by or entangle wildlife (City of Los Angeles and USACE 2007).

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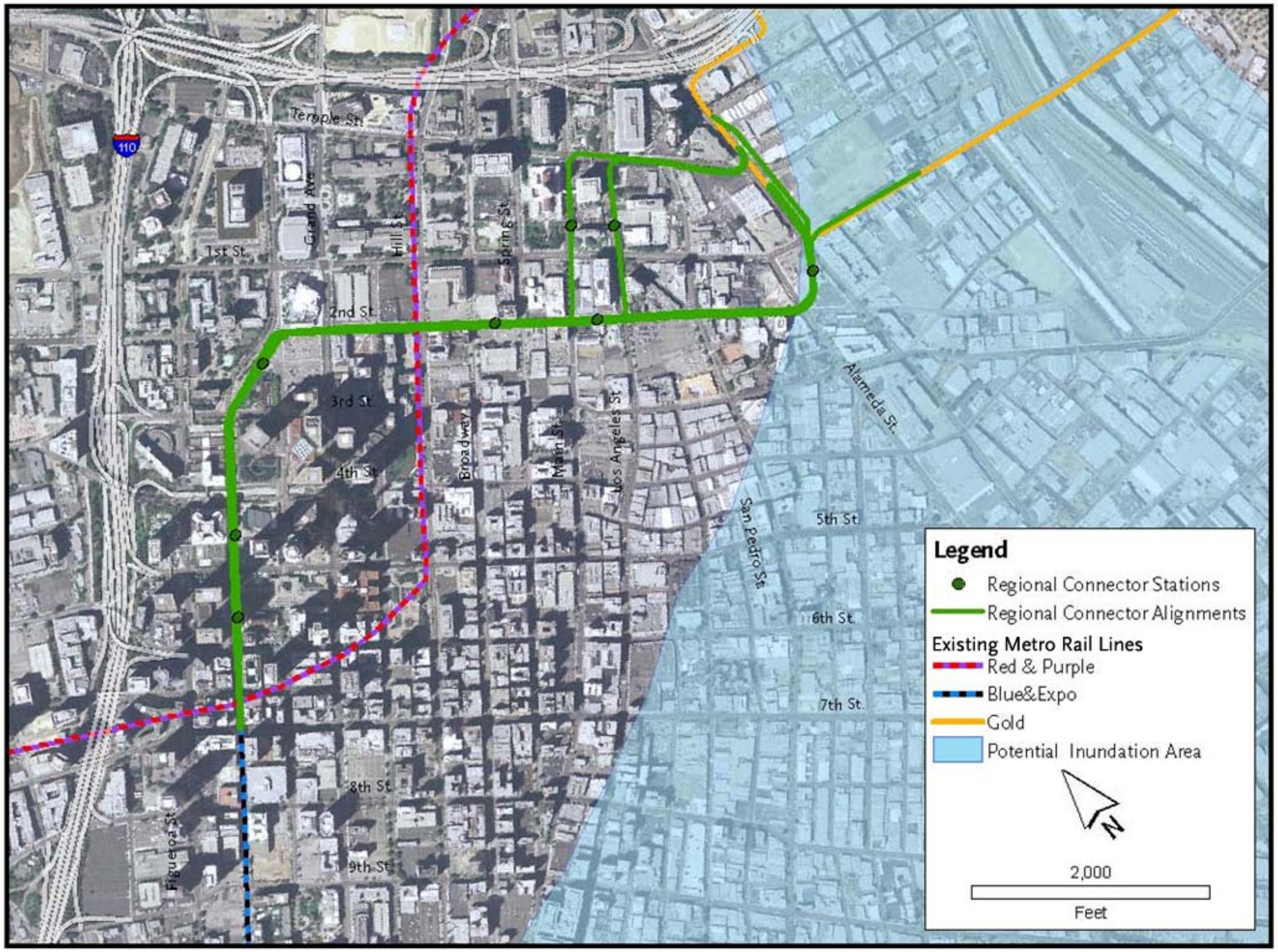

Figure 4-6. Potential Inundation Areas Relative to the Project Area

Table 4-2 summarizes the pollutants causing impairment in the reach of the Los Angeles River through the project area, the TMDL requirement status, and the associated TMDL completion and approval dates.

Table 4-2. 303(d) List of Pollutants Requiring TMDLs, Los Angeles River Reach 3, Downtown Los Angeles

Pollutant	TMDL Requirement Status	Date USEPA Approved TMDL
Ammonia	B[1]	3/18/2004
Copper	B	12/22/2005
Lead	B	12/22/2005
Nutrients (Algae)	B	3/18/2004
Trash	B	7/24/2008

Source: LARWQCB 2008
Notes: [1] B = Pollutant being addressed by USEPA approved TMDL.

Water quality monitoring along the urbanized section of the Los Angeles River is conducted by the Los Angeles County Department of Public Works (LACDPW) and reported in their annual Stormwater Monitoring Reports. As described in the 2007-2008 report, the County monitors water quality in the river at the existing stream gage station located in the City of Long Beach (LACDPW 2008).

Findings from the County's most recent water quality report describe that the total runoff volume and pollutant loading at the Los Angeles River monitoring station was usually higher than at other monitoring stations in the county (LACDPW 2008). However, this is likely due to the fact that the Los Angeles River has approximately two to twenty-five times the surface area of other watersheds, thus creating more potential for surface runoff pollution.

4.7.2 Groundwater

Due to the long history of commercial and industrial activity in the project area, groundwater contaminants include sulfate, total dissolved solids, iron, chloride, and other types of industrial wastes (City of Los Angeles Planning Department 1995). Wells are sampled by the LACDPW on an annual basis for major minerals, total dissolved solids, electrical conductivity, pH, phosphate, iron, manganese, fluoride, and boron (City of Los Angeles Planning Department 1995). In addition, the Water Replenishment District (WRD) of Southern California and the U.S. Geological Survey (USGS) conduct regional groundwater quality monitoring in the Central Sub-basin. The WRD's monitoring for Water Year 2006-2007 found that groundwater in the main producing aquifers of the basin is of good quality; however volatile organic compounds (VOCs) (primarily perchloroethylene (PCE) and trichloroethylene (TCE)) are present in the Central Basin and have impacted many production wells (WRD 2008). The VOCs are at low concentrations and are below enforceable regulatory levels.

The Geotechnical/Subsurface/Seismic/Hazardous Materials Technical Memorandum describes specific local causes and sources of groundwater contamination within 0.25 mile of the proposed alignments as well as some that are located directly along the alignments for the build alternatives.

Table 4-3 summarizes water quality in public supply wells in the Coastal Plain of Los Angeles Central Sub-basin as monitored by the WRD of Southern California.

Table 4-3. Constituents of Concern in the Central Basin

Constituent	Units	Range Detected in Sampling
Total Dissolved Solids	mg/L	170 to 2,770 Average: 500
Volatile Organic Compounds (TCE and PCE[1])	µg/L	Not detected to 32 for TCE Not detected to 8.3 for PCE
Perchlorate	µg/L	Less than 6
Nitrate	mg/L	Not detected to 12
Iron and manganese	mg/L	Not detected to 8.4 for iron Not detected to 1.3 for manganese
Chromium	µg/L	Not Available

Source: WRD 2008
Notes: TCE = trichloroethylene; PCE = perchloroethylene

5.0 IMPACTS

The proposed project is located in downtown Los Angeles, which is an urban environment, served by existing drainage infrastructure and comprised predominantly of impervious surfaces. This section addresses potential impacts to ground and surface water resources, drainage, flooding, and public safety issues that could stem from construction and operation of the proposed alternatives.

5.1 No Build Alternative

Under the No Build Alternative, there would be no transportation improvements beyond those listed in Metro's Long Range Transportation Plan (LRTP). By the projection year 2035, it is expected that the Metro Expo Line to Santa Monica, the Metro Gold Line to Azusa, the Metro Gold Line to I-605, the Metro Purple Line to Westwood, and the Metro Crenshaw Line would be operational. While it is anticipated that bus service in the project area would predominantly remain the same, there may be some service adjustments in order to provide connections to the Metro Expo Line and Metro Gold Line service areas. The No Build Alternative would not involve any new construction of rail lines or other transportation improvements within the Regional Connector corridor.

5.1.1 Construction

Since there would be no new construction under the No Build Alternative, no impacts would be expected in relation to erosion, increased runoff, or construction dewatering and disposal of contaminated groundwater.

There would be no construction of new tracks or stations under the No Build Alternative, and therefore, there would not be any new structures placed in the 100-year flood hazard area. The proposed bus improvements under the No Build Alternative would not affect flood flows. Therefore, the No Build Alternative would result in no impact associated with flooding hazards.

5.1.2 Operation

The existing project area is urbanized and is mostly covered by impervious surfaces. The No Build Alternative would not change these conditions and would not impact groundwater resources or recharge. While there would be some service adjustments under the No Build Alternative, these would result in negligible increases in the buildup of typical runoff contaminants that collect on streets (i.e., oil, grease, and metals). There would be no increase in pollutant loadings that would percolate to groundwater. Overall, the No Build Alternative would not increase groundwater supply withdrawals, would not alter groundwater recharge, would not affect groundwater quality, and would not increase flood flows. Operation of the No Build Alternative would result in no direct impacts to water quality or hydrology. However, there would be less potential for the transit system to replace automobile trips and associated potential reduction in roadway pollutants.

5.1.3 Cumulative

There would be no cumulative impacts from the No Build Alternative.

5.2 Transportation System Management (TSM) Alternative

Similar to the No Build Alternative, this alternative is focused on enhancements to and/or restructuring of the existing transit service in the project area. In addition to the provisions in Metro's LRTP, two new shuttle bus routes would operate to link the 7th Street/Metro Center Station to Union Station. The TSM Alternative would involve no construction of additional tracks or stations outside of the projects already approved in the LRTP. The creation of peak hour bus-only lanes would not require any new construction since this would potentially be accomplished by restricting parking on streets that do not already have dedicated all-day bus lanes.

5.2.1 Construction

There may be some rebuilding of existing drainage structures at some bus shelter locations where reconstruction of the bus shelter and bus landing might be required. This is particularly likely to occur where a new concrete landing the length of the bus would be constructed. The minor physical modifications associated with the TSM Alternative would result in no impact to the existing drainage infrastructure or the direction of drainage through the project area.

There would be no construction-related erosion or stormwater runoff and there would be no need to dispose of contaminated groundwater potentially encountered during dewatering activities. The TSM Alternative would result in no impacts to water quality, hydrology, and/or drainage.

5.2.2 Operations

Proposed transportation improvements under the TSM Alternative would be accomplished through minor physical modifications such as upgraded bus stops and new shuttle bus routes. Therefore, operation of the TSM Alternative would result in negligible increases in the buildup of typical runoff contaminants that collect on streets (i.e., oil, grease, and metals). There would be no increase in pollutant loadings that would percolate to groundwater. The TSM Alternative would not increase groundwater supply withdrawals, would not alter groundwater recharge or contribute to groundwater contamination, would not significantly change the local storm sewer drainage pattern, and would not increase flood flows. Operation of the TSM Alternative would result in no impact to water quality or hydrology.

The proposed express shuttle bus lines and new bus stops would not affect flood flows; therefore, the TSM Alternative would result in no impact associated with flooding hazards.

5.2.3 Cumulative

Since there would be no direct or indirect impacts to water resources and hydrology, there would be no cumulative impacts under the TSM Alternative.

5.3 At-Grade Emphasis LRT Alternative

This alternative includes both underground and at-grade configurations with approximately 46 percent of the route located underground. Under the At-Grade Emphasis LRT Alternative, there would be a direct connection from the existing underground 7th Street/Metro Center Station to the Metro Gold Line at Temple Street. This alternative would involve the construction of at least three new stations.

5.3.1 Construction

5.3.1.1 Groundwater Impacts

The existing project area consists predominantly of impervious surfaces. Therefore, the project area does not currently allow for direct percolation within the Central Los Angeles Basin and there would be no direct or indirect impacts on groundwater levels for water supplies used for consumption by municipal, industrial and irrigation purposes.

While approximately half of the At-Grade Emphasis LRT Alternative would be constructed above ground and would not require as much excavation and tunneling as the underground alternatives (analyzed below), there would still be a potential need for dewatering if groundwater is encountered during construction activities. Stations and tunneling would occur between 50 and 80 feet below ground. As described in Section 4.3, recent borings showed groundwater depths of 15 to 35 feet below ground along Flower Street in the vicinity of the proposed At-Grade Emphasis LRT Alternative alignment. Due to the presence of relatively shallow groundwater, it is likely that groundwater would be encountered during tunneling and excavation activities.

Additionally, as described in Section 4.7.2, groundwater in the Central Basin as well as locally in the vicinity of the proposed alignment is contaminated with pollutants common to urban industrial and commercial activities; therefore, groundwater encountered during construction could be contaminated. Given the likelihood of encountering contaminated groundwater, compliance with federal, state, and local laws and regulations (as described in the Geotechnical/Subsurface/ Seismic/ Hazardous Materials Technical Memorandum) would be required during construction activities. A dewatering permit from the LARWQCB would be necessary and any contaminated groundwater would be properly treated prior to being discharged. Uncontaminated groundwater that is collected during construction dewatering can be treated and pumped back into the groundwater table, pumped to the sewer or storm drain system, or used onsite for dust control purposes. Additional data gathering and site specific groundwater investigation may be necessary to further determine the extent and location of groundwater contaminants as well as potential impacts (CDM 2009).

Excavation activities also have the potential to create a preferential pathway for the spreading of contaminated groundwater in the groundwater basin. This impact could be mitigated by the use of impermeable concrete grouting materials which would reduce contaminant migration. Further mitigation measures to protect against potential environmental and social impacts from encountering contaminated groundwater are also described in the Geotechnical/Subsurface/ Seismic/ Hazardous Materials Technical Memorandum. Potential impacts on groundwater quality would be less than significant with mitigation.

In general, construction-related tunnel excavation dewatering impacts have the potential to result in over-withdrawal of groundwater resources. However, as previously described, groundwater encountered along the project alignment is perched (e.g., separated from the aquifers of the San Fernando Formation); therefore, potential dewatering would not impact groundwater levels in the aquifers used for municipal and industrial water uses.

5.3.1.2 Drainage Impacts

Under the At-Grade Emphasis LRT Alternative, there is a potential for conflicts with the existing drainage system along 2nd Street between Grand Avenue and Olive Street where the alignment would be constructed through the 2nd Street Tunnel. Along the intersection of 2nd Street and Grand Avenue, it is anticipated that there would be minimal potential conflicts with the current location of the drainage system. The existing storm drain system would also potentially conflict with the proposed construction of the proposed station at Flower/4th/5th Streets. Overall however, construction of the At-Grade Emphasis LRT Alternative would be expected to result in minimal impacts and need for relocation of the current drainage system. In the case where construction activities would result in the need to relocate certain drainage infrastructure, temporary lines would be installed during the construction period. Construction of the At-Grade Emphasis LRT Alternative would have no significant impact on the overall drainage pattern in the project area.

5.3.1.3 Flooding Impacts

The proposed alignment is outside of the 100-year flood hazard area; therefore, construction and operation of the At-Grade Emphasis LRT Alternative would not alter any existing flood zones. No fill would be placed in and no encroachment would be made to an existing floodplain. As described in the Geotechnical/Subsurface/Seismic/Hazardous Materials Technical Memorandum, the majority of the At-Grade Emphasis LRT Alternative alignment is not located in an Inundation Hazard Area. There is also no potential for seiches and tsunamis as there are no lakes or reservoirs in the vicinity and the ocean is over 10 miles from the proposed alignment. The alternative is located in an urbanized area comprised mainly of impervious surfaces and has an existing extensive drainage infrastructure. Construction of the At-Grade Emphasis LRT Alternative would not increase the risk of flooding.

There would be no significant impacts from construction on the natural and beneficial floodplain values in the vicinity of the proposed project. In addition, the at-grade alignment would be consistent with local and regional land use and transportation planning and, therefore, would not result in incompatible floodplain development. Overall, implementation of the At-Grade Emphasis LRT Alternative would not result in flooding impacts.

5.3.1.4 Water Quality Impacts

Water quality impacts could potentially result from construction of the At-Grade Emphasis LRT Alternative. Construction activities have the potential to increase erosion and sedimentation around proposed construction and staging areas. Grading activities associated with construction could potentially result in a temporary increase in the amount of suspended solids running off construction sites. In the case of a storm event, construction site runoff could result in sheet erosion of exposed soil. If not adequately controlled, contaminated water runoff from these areas has the potential to degrade surface water quality. While the introduction of new impervious surfaces resulting from the construction of the At-Grade Emphasis LRT Alternative has the potential to increase the concentration and accumulation of pollutants associated with transit projects (e.g. oil and grease), the project area is already highly urbanized. Proposed construction would take place on already impervious land and therefore would not significantly increase the amount or peak flow of runoff entering the storm drain system.

In order to reduce any potential impacts related to stormwater runoff, a Notice of Intent (NOI) and a SWPPP would be prepared in order to comply with the SWRCB's NPDES Construction General Permit. Implementation of the SWPPP would ensure that the applicable provisions of Sections 301 and 402 of the CWA and Chapter 6 Article 4.4, Stormwater and Urban Runoff Pollution Control from the Los Angeles Municipal Code, would be met and pollutant discharges would be properly controlled. Additionally, a SUSMP would be prepared and implemented in accordance with the Los Angeles Municipal Code, to ensure that stormwater runoff is managed for water quality concerns through implementation of appropriate BMPs. Prior to issuance of any grading or building permits, the County and/or Stormwater Division of the Bureau of Sanitation must approve the SUSMP. Applicable BMPs include;

- Oil/water separators;
- Catch basin inserts;
- Storm drain inserts;

- Media filtration; and/or
- Catch basin screens.

Construction Stormwater Management Controls: These controls would function to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, solvents) with stormwater. The SWPPP would specify properly designed, centralized storage areas that would keep these materials out of the rain. Spill cleanup materials (e.g., rags, absorbent materials, and secondary containment) would be kept at the work site when handling materials. It is important that site supervisors and workers have knowledge of the SWPPP. Therefore, site supervisors would conduct regular meetings to discuss pollution prevention. The frequency of such meetings and the personnel required to attend would be specified in the SWPPP.

The SWPPP would also specify a monitoring program to be implemented by the construction site supervisor, and would include both dry and wet weather inspections. City personnel would also conduct regular inspections to ensure compliance with the SWPPP.

Erosion and Sediment Control: BMPs designed to reduce erosion of exposed soil may include, but are not limited to: soil stabilization controls, water for dust control, perimeter silt fences, placement of straw wattles, and sediment basins. The potential for erosion is generally increased in the case that grading is performed during the rainy season, as disturbed soil can be exposed to rainfall and storm runoff. If grading activities must take place during the rainy season, the BMPs selected would focus on erosion control and keeping sediment in place. End-of-pipe sediment control measures (e.g., basins and traps) would be used as secondary measures. Entry and egress from construction sites would be carefully controlled to minimize off-site tracking of sediment. Additional sources of information regarding BMPs include the California Stormwater Municipal and Construction Activity BMP Handbooks.

The effect on water quality would be minor since the project area is already highly urbanized. Additionally, the amount of impervious surfaces and any potential added runoff would be small compared to the region as a whole. In order to ensure that surface water runoff would not have significant impacts on water quality, human health, or safety, appropriate measures would be taken to control runoff. Some examples of these include establishing an erosion control plan, ensuring the proper storage and handling of hazardous materials, and the periodic monitoring of the water quality of runoff leaving the site.

5.3.1.5 Groundwater Quality Impacts

Due to the predominance of impervious surfaces throughout the project area, there is minimal percolation to the underlying groundwater basins. Therefore, any potential increases in contaminated surface water runoff would have no significant impact on groundwater quality.

Tunneling during construction could potentially create a preferential pathway for any contaminated groundwater that is potentially encountered. This could cause the contamination to spread at higher rates than would normally occur without disruption by construction activity. This has the potential to result in an impact that would be managed to a less than significant level with the potential mitigation techniques described in Section 6.0.

5.3.2 Operation

5.3.2.1 Groundwater Impacts

Upon implementation of the At-Grade Emphasis LRT Alternative, conditions in the project area would be comparable to existing conditions, that is, the project area would continue to be developed largely with impervious surfaces. Although unlikely during the operation phase of the At-Grade Emphasis LRT Alternative, groundwater dewatering and subsequent discharge may occur. The tunnel and underground stations would be constructed to preclude gas leakage or groundwater intrusion into the tunnel using a technique similar to that used for the Metro Gold Line tunnels in Boyle Heights. This technique consists of installing a pre-cast concrete lining with rubber gaskets between the tunnel segments to prevent water and gas leakage into the tunnel. This method will avoid the leakage of water into the tunnels and stations. During operation, in the unlikely event that any water accumulates in the tunnel portions of the alignment, it would be pumped out by sump pumps and treated in accordance with applicable discharge permits before being discharged into the drainage system. Therefore, potential impacts to groundwater would be less than significant.

5.3.2.2 Water Quality Impacts

Operation of the At-Grade Emphasis LRT Alternative would likely decrease Vehicle Miles Traveled (VMT) of personal automobiles through the project area. An overall reduction in VMT could decrease the primary pollutants associated with all types of transportation operations such as heavy metals, solvents, and petroleum hydrocarbons. This would be a beneficial impact to surface water quality in the project area.

Indirect water quality impacts would stem from operation, over time, of the At-Grade Emphasis LRT Alternative. Indirect impacts potentially resulting from long-term operation of the At-Grade Emphasis LRT Alternative would be similar to direct impacts, but would occur later in time. Potential indirect impacts could be related to groundwater leaking into the tunnels and potential impacts to surface and groundwater quality. Indirect water quality impacts stemming from operation of the At-Grade Emphasis LRT Alternative would be less than significant.

Overall, water quality impacts associated with operation of the At-Grade Emphasis LRT Alternative would be less than significant or slightly beneficial.

5.3.3 Cumulative

Development of the At-Grade Emphasis LRT Alternative in combination with related renovation, new construction, and transportation projects identified in the vicinity of the proposed project could result in cumulative impacts to water quality. However, each of the concurrent projects would be subject to applicable water quality regulations and, thus, would be required to prepare a SWPPP for construction activities and to incorporate BMPs to control pollutant discharges. In addition, all the related projects would be required to operate in compliance with Chapter 13.29, Stormwater and Urban Runoff Pollution Prevention Control and SUSMP of the Los Angeles Municipal Code and to submit and implement a SUSMP. The SUSMP would contain design features and appropriate BMPs to reduce post-construction pollutants in stormwater discharges.

As described under existing conditions (Section 4), the project area within the Los Angeles River Watershed is covered by urban uses. The existing drainage system in the watershed consists of engineered storm channels and, therefore, would be expected to change little due to potential cumulative increases in stormwater runoff. It is not expected that any of the cumulative projects would result in a substantial change to the amount of impervious land cover in the project area, or a substantial alteration of the drainage systems. Since the amount of runoff generated in the project area would not be expected to significantly increase due to development of surrounding projects, substantial increases in erosion, siltation, flooding, or exceedance of the stormwater drainage system would not be expected.

Overall, construction and operation of the At-Grade Emphasis LRT Alternative would not contribute to significant cumulative water quality, hydrology, and/or drainage impacts.

5.4 Underground Emphasis LRT Alternative

The Underground Emphasis LRT Alternative would be underground except for a single at-grade crossing at the intersection of 1st and Alameda Streets. Newly constructed light rail right of way would consist of a combination of underground double tracks running beneath Flower and 2nd Streets and at-grade double tracks at the northeast corner of the project area. Additionally, three new stations are proposed under this alternative.

5.4.1 Construction

5.4.1.1 Groundwater Impacts

The components for construction of the Underground Emphasis LRT Alternative are generally the same in relation to their potential impacts on groundwater as those described for the At-Grade Emphasis LRT Alternative. Given the existing impervious nature of the project area, there is minimal infiltration to groundwater under existing conditions. Implementation of the Underground Emphasis LRT Alternative would not significantly impact groundwater recharge.

Additionally, potential dewatering activities would not be expected to impact the quantity of groundwater used for consumption by municipal, industrial, or irrigation purposes.

As with the At-Grade Emphasis LRT Alternative, trenching and tunneling activities could lead to exposure of contaminated groundwater and the need to dewater and dispose of contaminated groundwater. The Geotechnical/Subsurface/Seismic/ Hazardous Materials Technical Memorandum analyzes potential impacts from encountering contaminated groundwater as well as mitigation measures that would be employed in order to ensure proper handling of contaminated materials. Compliance with federal, state, and local laws and regulations (as described in the Geotechnical/Subsurface/ Seismic/ Hazardous Materials Technical Memorandum) would be required during construction activities. A dewatering permit from the LARWQCB would be necessary and any contaminated groundwater would be properly treated prior to being discharged. Uncontaminated groundwater that is collected during construction dewatering can be treated and pumped back into the groundwater table, pumped to the sewer or storm drain system, or used onsite for dust control purposes.

Excavation activities also have the potential to create a preferential pathway for the spreading of contaminated groundwater in the groundwater basin. This impact could be mitigated by the use of impermeable concrete grouting materials which would reduce contaminant migration. Further mitigation measures to protect against potential environmental and social impacts from encountering contaminated groundwater are also described in the Geotechnical/Subsurface/ Seismic/ Hazardous Materials Technical Memorandum. Potential impacts on groundwater quality would be less than significant with mitigation.

In general, construction-related tunnel excavation dewatering impacts have the potential to result in over-withdrawal of groundwater resources. However, as previously described, groundwater encountered along the project alignment is perched (e.g., separated from the aquifers of the San Fernando Formation); therefore, potential dewatering would not impact groundwater levels in the aquifers used for municipal and industrial water uses.

5.4.1.2 Drainage Impacts

As described in the analysis of storm drain impacts under the At-Grade Emphasis LRT Alternative, there could be conflicts with the existing storm drain infrastructure along the proposed alignment. Similar impacts would be expected under the Underground Emphasis LRT Alternative. The main conflicts could occur along the pipe backbone along Flower and 2nd Streets. However, design measures would be implemented in order to address potential conflicts and there would be no significant impact to the capacity of the existing system or the overall direction of storm flows through the drainage infrastructure in the project area.

5.4.1.3 Flooding Impacts

Construction of the Underground Emphasis LRT Alternative would not occur in the 100- or 500-year floodplain areas as delineated by FEMA. Additionally, construction of this alternative would not impact any flood control structures in the Los Angeles River watershed. As described above in Section 4.6, the proposed alternatives are not located in an Inundation Hazard Area, or in an area with potential to be flooded by a seiche or tsunami. Overall, the proposed project area is urbanized and covered by impervious surfaces. Construction of the Underground Emphasis LRT Alternative would not increase the risk of flooding. Flooding and floodplain impacts would be less than significant.

5.4.1.4 Water Quality Impacts

Construction-related impacts from the Underground Emphasis LRT Alternative would be similar to those described for the At-Grade Emphasis LRT Alternative; the main difference would be the amount and intensity of construction activity that would take place. Construction-related activities including grading and excavation have the potential to result in water quality impacts due to increased erosion and sedimentation. Runoff during construction would be routed to the existing underground storm drain systems and/or lined channels, mitigating offsite erosion. In addition, applicable municipal NPDES permits and waste discharge requirements would be complied with in order to minimize potential impacts to water quality.

As described above in Section 5.3, the At-Grade Emphasis LRT Alternative, in order to comply with the Los Angeles Municipal NPDES permit and the SUSMP, a Stormwater Pollution Prevention Plan (SWPPP) including BMPs would be prepared which would reduce potential adverse effects to surface water quality from sedimentation during construction. The SWPPP would include specific measures to ensure that runoff from construction sites do not further impair the water quality of the Los Angeles River. These measures would be the same as those described in Section 5.3.

5.4.2 Operation

5.4.2.1 Groundwater Impacts

The tunnel and underground stations would be constructed to preclude gas leakage or groundwater intrusion into the tunnel using a technique similar to that used for the Metro Gold Line tunnels in Boyle Heights. This technique consists of installing a pre-cast concrete lining with rubber gaskets between the tunnel segments to prevent water and gas leakage into the tunnel and stations. In the unlikely event that groundwater accumulates in tunnels during operation, the water would be pumped out and treated to meet municipal standards before being discharged to the city's sewer system. Impacts to groundwater under the Underground Emphasis LRT Alternative would be less than significant.

5.4.2.2 Water Quality Impacts

Similar to the At-Grade Emphasis LRT Alternative, it is anticipated that the amount of impervious surfaces in the project area would remain equivalent to existing conditions. Therefore, operation of the Underground Emphasis LRT Alternative would not contribute to a substantial increase in stormwater runoff or degradation of existing water quality.

Implementation of the Underground Emphasis LRT Alternative would be expected to result in more daily transit trips than the No Build, TSM or At-Grade Emphasis LRT Alternatives, thereby reducing annual VMT of automobiles through the project area. Therefore, there would be less buildup of pollutant loads associated with automobile use such as oil, grease, and metals. Overall, water quality impacts associated with operation of the Underground Emphasis LRT Alternative would be less than significant or slightly beneficial.

5.4.3 Cumulative

Neither the proposed project nor any of the projects considered for cumulative impacts would be developed in active recharge areas; therefore, cumulative impacts to groundwater quality and quantity would be less than significant.

Increases in pollutant loading resulting from construction of the Underground Emphasis LRT Alternative, combined with potential impacts from the construction activity of renovation and new development projects in the vicinity of the project area could result in cumulative increases in the amount of polluted stormwater runoff as well as cumulative impacts to water quality. Related projects that do not require the construction of new facilities would not have a direct physical effect on water resources in the project area. Proposed transportation projects in the area that would be expected to reduce traffic congestion or reduce VMT would be beneficial to water quality in the region since reductions in air emissions and accident-related roadway surface pollutants would reduce the level of water-borne pollutants that are able to migrate to surface and groundwater. Projects requiring the construction of new or expanded facilities would potentially have the greatest impact on water quality. Increases in surface parking areas and clearing and grading activities could increase surface water pollutants such as those related to increased automobile traffic and operation as well as construction-related erosion and sedimentation.

As described in Section 5.3.3, existing programs, procedures, and permits administered by the LARWQCB would be required and adhered to for the Regional Connector project as well as any of the other related projects. Therefore, potential cumulative construction and operation-related impacts associated with water quality would be less than significant. Potential cumulative impacts to pollutant loads and resulting water quality would be expected to be less under the Underground Emphasis LRT Alternative than under the No Build Alternative since the operation of light-rail vehicles would not be expected to cause or contribute to pollutants commonly associated with non-light rail transportation such as oil, grease, and metals.

To the extent that the proposed project and projects considered for cumulative impacts would be built within already urbanized areas, there would be minimal increases in impervious surfaces and cumulative impacts to water quality would be less than significant. Additionally, potential impacts would be minimized by the same measures as described under Section 5.3.3 (described in further detail in Section 6.0).

5.5 Fully Underground LRT Alternative – Little Tokyo Variation 1

The Fully Underground LRT Alternative – Little Tokyo Variation 1 would be identical to the Underground Emphasis LRT Alternative with the Broadway Station Option described above in Section 5.4 for all areas west of 2nd Street and Central Avenue. East of Central Avenue, this alternative includes an underground station just southwest of the intersection of 1st and Alameda Streets. In addition to this station, this alternative includes a new underground three-way junction. One set of tracks extend north from the junction and would continue underground under Temple Street and surface in the LADWP yard. The other set of tracks leaving the three-way junction would rise to street level to the east within East 1st Street in order to accommodate a new portal and connect to the existing Metro Gold Line tracks.

5.5.1 Construction

Potential impacts from construction to groundwater resources, floodplains, and water quality would be the same as those described for the Underground Emphasis LRT Alternative (Sections 5.4.1 and 5.4.2).

Potential impacts to stormwater drainage facilities could result from construction of this alternative. However, as described above in Section 5.4.1.2, design measures would address these potential conflicts. Overall, with appropriate mitigation there would be no significant impact to the capacity of the existing system or the overall direction of storm flows through the drainage infrastructure in the project area.

Construction of the underground station at 2nd Street and Central Avenue and new portions of track connecting to the underground three-way junction near the intersection of 1st and Alameda Streets at the connection point with the Metro Gold Line would be located in the potential inundation area (Figure 4-6). Construction would not affect flood control structures in the vicinity of the project area. Given the fact that this area near Alameda Street is currently fully urbanized and highly impervious, construction-related inundation impacts would be less than significant. Additionally, construction would comply with the City of Los Angeles' policies and regulations related to inundation hazards.

5.5.2 Operation

Potential impacts from operation of the Fully Underground LRT Alternative – Little Tokyo Variation 1 would be the same as those described above in Section 5.4.2.

5.5.3 Cumulative

Potential cumulative impacts would be the same as those described in Section 5.4.3.

5.6 Fully Underground LRT Alternative – Little Tokyo Variation 2

Similar to the Fully Underground LRT Alternative - Little Tokyo Variation 1, Little Tokyo Variation 2 would be identical to the Underground Emphasis LRT Alternative with the Broadway Station Option for all areas west of 2nd Street and Central Avenue. This alternative also includes a new underground station near 2nd Street and Central Avenue; however, under this alternative, the new station would have two underground levels, each with a single-track platform. This alternative would have a similar underground junction as that described for the Little Tokyo Variation 1; the main difference would be that the junction would have two underground levels.

5.6.1 Construction

Potential construction impacts would be the same as those described in Section 5.5.1.

In addition to construction of the proposed two-level underground 2nd Street/Central Avenue station, the Fully Underground LRT Alternative - Little Tokyo Variation 2 includes construction of a two-level underground junction to the northeast of the intersection of 1st and Alameda Streets. Potential construction-related impacts to inundation and stormwater drainage facilities would be the same as those described for the Little Tokyo Variation 1 (Section 5.5.1).

5.6.2 Operation

Potential impacts from operation would be the same as those described in Section 5.4.3.

5.6.3 Cumulative

Given that potential construction and operation impacts would be the same as those described in the analysis for the Underground Emphasis LRT Alternative (Section 5.4), potential cumulative impacts would also be the same.

6.0 POTENTIAL MITIGATION MEASURES

In the case that contaminated groundwater is encountered and it is determined that there is potential for the contamination to spread, this would be mitigated during the design and engineering process. For example, it could be specified that impermeable concrete-based grouting materials be used to fill the gap between the tunnel and the surrounding earth. The permeability of grouting materials is lower than surrounding soil types and this would reduce the possibility that the tunnel could serve as a preferential pathway for contaminant migration. Additional BMPs that would address potential impacts from encountering contaminated groundwater and groundwater dewatering activities are proposed in the Geotechnical/Subsurface/Seismic/Hazardous Materials Technical Memorandum.

Additional potential construction mitigation measures could include:

- Establish an erosion control plan prior to the initiation of construction activities. The erosion control plan would include:
    - Use of natural drainage, detention ponds, sediment ponds, or infiltration pits to allow runoff to collect and reduce or prevent erosion;
    - Use of barriers to direct and slow the rate of runoff and to filter out large-sized sediments;
    - Use of down-drains or chutes to carry runoff from the top of a slope to the bottom; and,
    - Control the use of water for irrigation and dust control so as to avoid off-site runoff.

Potentially significant impacts to water quality stemming from both construction and operation of the Regional Connector project could be mitigated with the following measures as appropriate;

- Project design could include properly designed and maintained biological oil and grease removal systems in new storm drain systems to treat water before it leaves project sites;
- Proper storage of hazardous materials to prevent contact with precipitation and runoff;
- Development and maintenance of an effective monitoring and cleanup program for spills and leaks of hazardous materials;

- Placement of equipment to be repaired or maintained in covered areas on a pad of absorbent material to contain leaks, spills, or small discharges;
- Periodic and consistent removal of landscape and construction debris;
- The removal of any significant chemical residue on the project sites through appropriate methods;
- The use of non-toxic alternatives for any necessary applications of herbicides or fertilizers;
- Installation of detention basins to remove suspended solids by settlement; and/or,
- Periodic monitoring of the water quality of runoff before discharge from the site and into the storm drainage system.

7.0 CONCLUSIONS

7.1 No Build Alternative

7.1.1 NEPA Findings

There would be no adverse impacts from the No Build Alternative with respect to surface or groundwater resources, the stormwater drainage system, water quality, or flooding and safety issues.

7.1.2 CEQA Determinations

The No Build Alternative would have no impact on surface or groundwater resources, the stormwater drainage system, water quality, or flooding and safety issues.

7.2 Transportation System Management (TSM) Alternative

7.2.1 NEPA Findings

There would be no adverse impacts from the TSM Alternative with respect to surface or groundwater resources, the stormwater drainage system, water quality, or flooding and safety issues.

7.2.2 CEQA Determinations

The TSM Alternative would not be expected to result in significant impacts to existing conditions in relation to surface water and groundwater resources, drainage, inundation and flooding, or water quality. Additionally, this alternative would not be expected to result in significant impacts related to erosion, increased runoff, or construction dewatering and disposal of contaminated groundwater.

7.3 At-Grade Emphasis LRT Alternative

7.3.1 NEPA Findings

There is the potential for adverse impacts with respect to polluted stormwater runoff affecting water quality during construction of the At-Grade Emphasis LRT Alternative. There is also a possibility of encountering contaminated groundwater during excavation activities. Compliance with applicable regulations as well as implementation of mitigation measures would reduce these potential impacts to a less than significant level.

7.3.2 CEQA Determinations

The At-Grade Emphasis LRT Alternative could result in impacts associated with polluted stormwater runoff and degradation of surface and groundwater quality. Compliance with federal, state, and local laws would reduce many of these potential impacts to a less than significant level. In addition, implementation of specific mitigation measures would reduce specific issues (such as runoff contamination from hazardous construction materials) to a less than significant level.

7.4 Underground Emphasis LRT Alternative

7.4.1 NEPA Findings

There is the potential for adverse impacts with respect to polluted stormwater runoff affecting water quality during construction of the Underground Emphasis LRT Alternative. There is also a possibility of encountering contaminated groundwater during excavation activities. Compliance with applicable regulations as well as implementation of mitigation measures would reduce these potential impacts to a less than significant level.

7.4.2 CEQA Determinations

As with the At-Grade Emphasis LRT Alternative, the Underground Emphasis LRT Alternative could result in potential impacts associated with polluted stormwater runoff and degradation of surface and groundwater quality. Compliance with federal, state, and local laws would reduce many of these potential impacts to a less than significant level. In some instances, implementation of specific mitigation measures would be necessary to reduce potential impacts to a less than significant level.

7.5 Fully Underground LRT Alternative – Little Tokyo Variation 1

7.5.1NEPA Findings

NEPA findings for this alternative would be the same as those for the Underground Emphasis Alternative (Section 7.4.1).

7.5.2 CEQA Determinations

Similar to the CEQA determinations described in Sections 7.3.2 and 7.4.2, the Fully Underground LRT Alternative – Little Tokyo Variation 1 could result in impacts to surface water and groundwater quality. Compliance with federal, state, and local laws and regulations, as well as the implementation of specific mitigation measures and BMPs would reduce potential impacts to a less than significant level.

7.6 Fully Underground LRT Alternative – Little Tokyo Variation 2

7.6.1 NEPA Findings

NEPA findings would be the same as those described for the Fully Underground LRT Alternative – Little Tokyo Variation 1.

7.6.2 CEQA Determinations

CEQA determinations would be the same as those described above in Section 7.5.2.

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