3.8 Hydrology and Water Quality

3.8.1 Introduction

This section describes effects on Hydrology and Water Quality that would be caused by implementation of the TRTP. The following discussion addresses existing environmental conditions in the affected area, identifies and analyzes environmental impacts for a range of Project alternatives, and recommends measures to reduce or avoid adverse impacts anticipated from Project construction and operation. In addition, existing laws and regulations relevant to Hydrology and Water Quality are described. In some cases, compliance with these existing laws and regulations would serve to reduce or avoid certain impacts that might otherwise occur with the implementation of the Project.

The information and analysis that is presented in this section has been derived from several secondary sources, described below under Section 3.8.2.1 (Baseline Data Collection Methodology), as well as the *Riparian Conservation Area Report* and the *Hydrology and Water Quality Specialist Report*, prepared by Aspen Environmental Group (2008). While this section presents the findings of those reports, please refer to the full reports for more detailed information on Project effects on Hydrology and Water Quality.

Scoping Issues Addressed

During the scoping period for the EIR/EIS (August-October 2007), a series of scoping meetings were conducted with the public and government agencies, and written comments were received by agencies and the public that identified issues and concerns. The following issues related to Hydrology and Water Quality that were raised during scoping are addressed in this section:

- Project structures should not be placed in natural drainage channels

On January 17, 2008, after completion of the scoping process, the Lahontan Regional Water Quality Control Board (LRWQCB) submitted a comment letter that raised several concerns. Some of the key concerns mentioned include: direct physical impacts to aquatic, wetland, and riparian habitat; generation of construction and operational pollutants; alteration of flow regimes and groundwater recharge; and disruption of watershed level aquatic functions.

Summary and Comparison of Alternatives

Table 3.8-1 on the following page presents some key factors related to Hydrology and Water Quality for each alternative. It is important to note that the “Environmental Issues” indicated in Table 3.8-1 are not necessarily impact statements, but rather selected information items that provide a comparison between the alternatives. Specific impact statements that have been identified for the Project and alternatives, in accordance with the significance criteria introduced in Section 3.8.4.1 (Criteria for Determining Impact Significance) are described in Sections 3.8.5 through 3.8.11.

Table 3.8-1. Summary Comparison of Environmental Issues/Impacts – Hydrology and Water Quality

Environmental Issues	Alternative 1 (No Project/Action)	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Heli. Construction in ANF)	Alternative 7 (66-kV Subtransmission)
Number of named stream crossed by ROW (Impacts H-1, H-2, H-4)	Many named streams would be crossed by various actions in lieu of the Project, but the exact number is unknown.	41	Same as Alternative 2.	Alts 4A and 4C: 32; Alts 4B and 4D: 33.	36	Same as Alternative 2.	Same as Alternative 2.
Number of unnamed stream crossed by ROW (Impacts H-1, H-2, H-4)	Many unnamed streams would be crossed by various actions in lieu of the Project, but the exact number is unknown.	160	162	Alternative 4A: 152; Alternative 4B: 154; Alternative 4C: 157; Alternative 4D: 150.	157	Same as Alternative 2.	Same as Alternative 2.
Miles of T/L within a Flood Hazard Area (Impact H-4)	T/Ls that would be built in lieu of the Project could be placed in Flood Hazard Areas, but the number of miles is unknown.	19.94	19.86	Alternatives 4A through 4D: 14.12. Eastern transition station also located in a Flood Hazard area.	19.76	Same as Alternative 2.	Same as Alternative 2.
Number of named streams crossed by new and/or improved access and/or spur roads in the ANF	Many named streams would be crossed by various actions in lieu of the Project, but the exact number is unknown.	14	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	6	Same as Alternative 2.
Number of unnamed streams crossed by new and/or improved access and/or spur roads in the ANF	Many unnamed streams would be crossed by various actions in lieu of the Project, but the exact number is unknown.	123	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	62	Same as Alternative 2.

3.8.2 Affected Environment

This section presents information on Hydrology and Water Quality conditions in Kern, Los Angeles, Orange, and San Bernardino Counties. Section 3.8.2.1 describes the data collection methodology and lists the resources used to gather the applicable data. Section 3.8.2.2 describes the Regional Setting for the proposed Project and alternatives and provides information on the baseline conditions in the Project region. Section 3.8.2.3 describes the baseline conditions for Hydrology and Water Quality within the proposed Project study area. Sections 3.8.2.4 through 3.8.2.8 describe the baseline conditions for Hydrology and Water Quality applicable to the alternative study areas.

3.8.2.1 Baseline Data Collection Methodology

Data collection was conducted through review of the following resources: aerial photographs; United States Geological Survey (USGS) topographic maps; National Hydrography Dataset (NHD) and CalWater GIS data; SCE's Proponent's Environmental Assessment (PEA); basin plans from the Lahontan, Los Angeles and Santa Ana Regional Water Quality Control Boards (RWQCBs); the 2006 Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments from the State Water Resources Control Board (SWRCB); groundwater basin data from Bulletin 118 – Update 2003 published by the Department of Water Resources (DWR); groundwater well data from the USGS National Water Information System (NWIS); climate data from the National Oceanographic and Atmospheric Administration (NOAA); flood hazard data from the Federal Emergency Management Agency (FEMA); soil data from the Natural Resources Conservation Service (NRCS); and field reconnaissance data.

The study area was defined as the set of existing water resources crossed or overlain by the proposed Project and alternatives. The current condition and quality of these water resources was used as the baseline against which to compare potential impacts of the proposed Project and alternatives. Additionally, because pollutants that enter these water bodies can be transported downstream or down-gradient to sensitive receiving waters, downstream receiving waters were also considered.

3.8.2.2 Regional Setting

For analysis of Hydrology and Water Quality impacts, the proposed Project has been organized into the following three general geographic regions: Northern Region, Central Region, and Southern Region. The Northern Region generally includes all Project components located between the Windhub Substation in southern Kern County to Vincent Substation located in unincorporated Los Angeles County. The Central Region includes all portions of the TRTP extending from Vincent Substation to the southern boundary of the Angeles National Forest (ANF). The Southern Region includes all Project components located south of the ANF within Los Angeles, Orange and San Bernardino Counties.

The State of California uses a hierarchical naming and numbering convention to define watershed areas for management purposes. Watershed boundaries are defined according to size and topography, with multiple sub-watersheds within larger watersheds. A general description of how watershed levels are defined is provided below, in Table 3.8-2. The NRCS, which is part of the U.S. Department of Agriculture (USDA), is responsible for maintaining the California Interagency Watershed Mapping Committee (IWMC), formerly the CalWater Committee. The IWMC has defined a set of naming and numbering conventions applicable to all watershed areas in the State, for the purposes of interagency cooperation and management. Table 3.8-2 shows the primary watershed classification levels used by the State of California, as defined by the IWMC, which are applicable to this analysis.

Table 3.8-2. State of California Watershed Hierarchy Classifications

Watershed Level	Approximate Square Miles	Description
Hydrologic Region (HR)	12,735	Defined by large-scale topographic and geologic considerations. The State of California is divided into ten HRs.
Hydrologic Unit (HU)	672	Defined by surface drainage; may include a major river watershed, groundwater basin, or closed drainage.
Hydrologic Area (HA)	244	Major subdivisions of hydrologic units, such as by major tributaries, groundwater attributes, or stream components.
Hydrologic Sub-area (HSA)	195	A major segment of an HA with significant geographical characteristics or hydrological homogeneity.

Source: CalWater, 2007

The proposed Project would cross the South Lahontan and South Coast Hydrologic Regions. Within these two Hydrologic Regions (HRs), the proposed Project would cross the following Hydrologic Units (HUs): the Antelope HU, the Santa Clara-Calleguas HU, the Los Angeles River HU, the San Gabriel River HU, and the Santa Ana River HU. (CalWater, 2004)

Northern Region

The Northern Region lies within the Antelope Valley, which is located in the western Mojave high desert. This region is mostly within the southwestern-most portion of the South Lahontan HR and also includes a small area within the north-central portion of the South Coast HR, as illustrated in Figure 3.8-1. Water quality regulation for this area is governed by the Lahontan and Los Angeles RWQCBs. This area includes both the Antelope and Santa Clara-Calleguas HUs, and is bounded by the San Gabriel Mountains to the south and by the Tehachapi and Diablo ranges to the north. Within the Antelope HU, the proposed Project and alternatives cross five Hydrologic Areas (HAs), including: Chafee HA, Willow Springs HA, Neenach HA, Lancaster HA, and Rock Creek HA. The Antelope HU is a closed watershed, which means that precipitation falling within this watershed never reaches any ocean or other watershed (LACSD, 2005). The topography of the Antelope Valley is a flat desert floor between 2,300 to 3,500 feet above sea level that is cut by numerous small, mostly dry creeks and washes that drain generally in an easterly direction toward several dry lakebeds. The portion of the Santa Clara-Calleguas HU that lies within the Northern Region drains to the Santa Clara River and eventually to the Pacific Ocean. Within the Santa Clara-Calleguas HU, the proposed Project and alternatives cross the Acton Hydrologic Sub-Area (HSA). The topography of this area is comprised of mostly undeveloped foothills that form the headwaters of the Upper Santa Clara River. (CalWater, 2004; DWR, 2003)

The climate in this region is characterized by hot, dry summers, mild to cool winters, and sparse rainfall. Average annual temperature for the region ranges between a high of 80 degrees Fahrenheit (°F) in July to a low of 45 °F in December (City-Data.com, 2007b). Average precipitation within the Antelope Watershed ranges between five and 10 inches per year, from less than five inches per year along the northerly boundary of the Antelope Valley to about 10 inches per year along the southerly boundary. Most precipitation occurs between October and March, although short duration thunderstorms sometimes occur during the summer months (LADPW, 2005a). Average precipitation in the Santa Clara-Calleguas HU portion of the Northern Region, as measured at the city of Acton, is approximately nine inches per year (City-Data.com, 2007a).

Over time, land uses in the Antelope Valley have been transitioning from agricultural to residential and commercial. The Antelope Valley is also mined for various minerals, including borate, aggregate, and salt. Employment within this area is limited, with a large percentage of the population commuting to jobs in the southerly portions of Los Angeles County. The population within the Northern Region is projected to increase rapidly over the next twenty years from approximately 285,000 persons in 2006 to approximately 550,000 persons in 2025 (AVEK, 2005). Land use in the Santa Clara-Calleguas HU portion of the Northern Region is mostly open space with sparse residential development (USDA, 2005a).

Surface Water

Water Bodies

As shown in Figure 3.8-1, the Northern Region is contained within the Antelope and Santa Clara-Calleguas HUs (CalWater, 2004). Stream channels in this region are well defined but typically ephemeral in the foothills, and become less defined washes upon reaching the desert floor. The flat topography and lack of defined channels can lead to unconfined overland flow during storm events. Major named drainages in the region include Amargosa Creek, Anaverde Creek, Cottonwood Creek, Oak Creek, and the Upper Santa Clara River (USGS, 2007). Precipitation within the Antelope Watershed that does not evaporate or infiltrate to the groundwater flows to several usually dry lakes, known as playa lakes. Playa lakes are formed when precipitation fills a shallow depression on a flat surface, such as a desert floor. These lakes are endorheic, which means that they have no outlet. The playa lakes in this region include Rosamond Lake, Rogers Dry Lake, and Buckhorn Dry Lake (LACSD, 2005). Precipitation within the Santa Clara-Calleguas Watershed that does not evaporate or infiltrate to the groundwater eventually flows to the Pacific Ocean. In addition to the major drainages and playa lakes, other notable hydrologic features in the region include Palmdale Lake, Little Rock Reservoir, the California Aqueduct, and the Los Angeles Aqueduct. The TRTP also crosses approximately 50 unnamed streams and numerous small gullies and washes in this region (USGS, 2007). Santa Clara River Reach 7, which also crosses through the Northern Region, is listed as impaired for coliform bacteria on the 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments (SWRCB, 2006).

Floodplains

In addition to the defined drainage channels and water bodies within the Northern Region, floodplains are an important part of the hydrologic network. A floodplain is a geographic area of relatively level land that is occasionally subject to inundation by surface water from rivers or streams that occur within the floodplain. A “100-year flood” refers to the maximum level of water that is expected to inundate a floodplain ten times every 1,000 years. FEMA has estimated the boundaries for 100-year floodplains for several drainages in the Northern Region, as shown in Figure 3.8-2. FEMA has also created Flood Insurance Rate Maps (FIRMs), which define the predicted boundaries of 100-year floods (SCE, 2007). FEMA refers to 100-year floodplains, such as those seen on Figure 3.8-2, as “Flood Hazard Areas.” Not all streams have floodplain mapping by FEMA or any other agency. This does not mean the floodplain is not there, only that the floodplain has not been mapped. Any development that takes place in a Flood Hazard Area must comply with floodplain management ordinances (FEMA, 2005).

Groundwater

As shown in Figure 3.8-3, the Northern Region is underlain by the Antelope Valley Groundwater Basin and the Freemont Valley Groundwater Basin.

Antelope Valley Groundwater Basin

The Antelope Valley Groundwater Basin underlies approximately 1,580 square miles of alluvial valley in the western Mojave Desert. The basin is bounded on the northwest by the Garlock fault zone at the base of the Tehachapi Mountains and on the southwest by the San Andreas fault zone at the base of the San

Gabriel Mountains. The basin is bounded on the east by ridges, buttes, and low hills that form a surface and groundwater drainage divide. On the north, the basin is bounded by the Fremont Valley Groundwater Basin at a groundwater divide approximated by a southeastward-trending line from the mouth of Oak Creek through Middle Butte to exposed bedrock near Gem Hill. Farther east, the Antelope Valley Groundwater Basin is bounded by the Rand Mountains. Runoff in Big Rock and Little Rock Creeks from the San Gabriel Mountains and in Cottonwood Creek from the Tehachapi Mountains flows toward a closed basin at Rosamond Lake. Rogers Lake is a closed basin in the northern part of Antelope Valley that collects ephemeral runoff from surrounding hills (DWR, 2003).

Recharge to the Antelope Valley Groundwater Basin is primarily accomplished by perennial runoff from the surrounding mountains and hills. Most recharge occurs at the foot of the mountains and hills by percolation through the head of alluvial fan systems. Big Rock and Little Rock Creeks, in the southern part of the basin, contribute about 80 percent of runoff into the basin. Other minor recharge is from return of irrigation water and septic system effluent (DWR, 2003).

The primary water-bearing materials in the Antelope Valley Groundwater Basin are Pleistocene and Holocene age unconsolidated alluvial and lacustrine deposits that consist of compact gravels, sand, silt, and clay. Coarse alluvial deposits form the two main aquifers of the basin: a lower aquifer and an upper aquifer. The upper aquifer, which is the primary source of groundwater for the valley, is generally unconfined whereas the lower aquifer is generally confined (DWR, 2003).

Total basin storage capacity is approximately 70,000,000 acre-feet (af), with a range in annual natural recharge of 31,200 to 59,100 af/year. Because of increased pumping since the 1920s, groundwater use has exceeded estimated natural recharge, resulting in overdraft conditions (USGS, 2003). This overdraft has caused water levels to decline by more than 200 feet in some areas and by at least 100 feet in most of the Antelope Valley. Water data collected in 1996 shows that depth to water within the Antelope Valley Groundwater basin ranges between 100 feet and 500 feet below ground surface (bgs) (USGS, 2003).

The USEPA and the California Department of Public Health regulate drinking water quality under the Safe Drinking Water Act of 1974. This Act sets health-based standards, known as Maximum Contaminant Levels (MCLs), which are used to assess the suitability of groundwater supply for use as drinking water (SCE, 2007). In the Antelope Valley Groundwater Basin, MCLs are exceeded in several wells throughout the basin for the following contaminants: inorganics, radiology, nitrates, pesticides, volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) (DWR, 2003).

Freemont Valley Groundwater Basin

The Freemont Valley Groundwater Basin underlies 523 square miles of alluvial valley in eastern Kern County and northwestern San Bernardino County. The basin is bounded on the northwest by the Garlock fault zone against impermeable crystalline rocks of the El Paso Mountains and the Sierra Nevada. This basin is bounded on the east by crystalline rocks of the Summit Range, Red Mountain, Lava Mountains, Rand Mountains, Castle Butte, Bissel Hills, and Rosamond Hills. The basin is bounded on the southwest by the Antelope Valley Groundwater Basin along a groundwater divide approximated by a line connecting the mouth of Oak Creek through Middle Butte to exposed basement rock near Gem Hill (DWR, 2003).

Natural recharge of the Freemont Valley Groundwater Basin includes the percolation of ephemeral streams that flow from the Sierra Nevada. The general groundwater flow direction is toward Koehn Lake at the center of the valley. There is no appreciable quantity of groundwater flowing out of the basin (DWR, 2003).

The water-bearing materials of the Freemont Valley Groundwater Basin are dominated by Quaternary alluvium and lacustrine deposits. Groundwater in the alluvium is generally unconfined, although locally confined conditions occur near Koehn Lake (DWR, 2003).

The total storage capacity of the basin is calculated to be approximately 4,800,000 af. Hydrographs indicate that groundwater elevations declined in the southwestern part of the basin by approximately nine feet between 1957 and 1999 (DWR, 2003). Depth to groundwater in the southern portion of the basin is greater than 100 feet bgs (USGS, 2003).

In the Freemont Valley Groundwater basin, no primary MCLs are exceeded. However, groundwater in parts of the basin has high concentrations of Total Dissolved Solids (TDS), including fluoride and sodium (DWR, 2003).

Central Region

The Central Region lies within the ANF, which is located north of the City of Los Angeles, in the San Gabriel Mountains. This mountain range is aligned in a general east-west direction and forms the northern portion of the South Coast HR, as illustrated in Figure 3.8-1. Water quality regulation for this area is governed by the Los Angeles RWQCB (LARWQCB). This region includes the Santa Clara-Calleguas, Los Angeles River, and San Gabriel River HUs, and is bounded by the ANF administrative boundaries to the north and south. Although a portion of the ANF lies within the South Lahontan HR and drains to the Antelope Valley, all of the ANF land that is within the Central Region near TRTP drains to the South Coast HR and eventually to the Pacific Ocean. Within the Santa Clara-Calleguas HU, the proposed Project and alternatives cross the Acton HSA. Within the Los Angeles River HU, the proposed Project and alternatives cross four Hydrologic Sub-Areas, including: Tujunga HSA, Monk Hill HSA, Pasadena HSA, and Santa Anita HSA. Within the San Gabriel River HU, the proposed Project and alternatives cross the Upper Canyon HSA. Topography in the Central Region is generally rugged with deep, V-shaped canyons separated by sharp dividing ridges. Steep walled canyons with side slopes of 70 percent or more are common. The gradient of principal canyons ranges from 150 to 850 feet per mile. Stream channels are typically unimproved and defined by the natural drainage of the landscape (LADPW, 2005b).

The climate within the Central Region varies between subtropical on the Pacific Ocean side of the San Gabriel Mountain range to semi-arid on the Mojave Desert side. Nearly all precipitation occurs during the months of December through March. Precipitation during summer months is infrequent and rainless periods of several months are common. Average annual rainfall for the San Gabriel Mountains is approximately 27 inches (LADPW, 2005b). Snowfall at elevations above 5,000 feet is frequently experienced during winter storms, but the snow melts rapidly except on higher peaks and northern slopes. Mount Islip along the crest of the ANF has annual rainfall highs of approximately 42 inches (SCE, 2007). January and July are the coldest and warmest months of the year, respectively. At Mount Wilson (elevation 5,850 feet), the 30-year average daily minimum temperature for January is 35 °F and the average daily maximum temperature for July is 80 °F (LADPW, 2005b).

The ANF is predominantly characterized by undeveloped lands and open space which is managed by the USDA Forest Service for the purposes of recreation and natural resources management, among various other uses. The principal vegetative cover of upper mountain areas consists of various species of brush and shrubs known as chaparral. Most trees found on mountain slopes are oak, with alder, willow, and sycamore found along streambeds at lower elevations. Pine, cedar, and juniper are found in ravines at higher elevations and along high mountain summits (LADPW, 2005b).

Surface Water

Water Bodies

As shown in Figure 3.8-1, the Central Region is contained within the Los Angeles River, San Gabriel River, and Santa Clara-Calleguas HUs (CalWater, 2004). In this mountainous area, the steep canyon slopes and channel gradients promote a rapid concentration of stormwater runoff. Depression storage and detention storage effects are minor in the rugged terrain. Precipitation during periods of soil moisture deficiency is nearly entirely absorbed by soils, and except for periods of extremely intense rainfall, significant runoff does not occur until soils are wetted to capacity. Due to high infiltration rates and porosity of mountain soils, runoff occurs primarily as subsurface flow or interflow in addition to direct runoff (LADPW, 2005b). Major named drainages in the Central Region include Alder Creek, Arroyo Seco, Big Tujunga Creek, Clear Creek, Eaton Wash, Fall Creek, Monte Cristo Creek, North Fork Mill Creek, Tujunga Wash, and the West Fork San Gabriel River. The TRTP also crosses approximately 65 unnamed streams and countless rills and small gullies in this region (USGS, 2007). Many of these unnamed drainages may qualify as Riparian Conservation Areas (RCAs). Please see Section 3.4, Biological Resources, for further information on RCAs. None of the streams or other water bodies in the Central Region is listed as impaired on the 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments (SWRCB, 2006).

Floodplains

FEMA has estimated the boundaries for 100-year floodplains for several drainages in the Central Region, as shown in Figure 3.8-4. The floodplains in the Central Region are relatively narrow compared to those of the Northern Region due to the steep terrain and deeply incised stream channels.

Groundwater

As shown in Figure 3.8-3, the edges of the Central Region are underlain by the Antelope Valley Groundwater Basin to the north and the Raymond Groundwater Basin to the south. The rest of the Central Region is not underlain by a named/identified groundwater basin. The Antelope Valley Groundwater Basin is described above in Section 3.8.2.2.

Raymond Groundwater Basin

The Raymond Groundwater Basin underlies approximately 50 square miles of the northwest part of the San Gabriel Valley. The west boundary is delineated by a drainage divide at Pickens Canyon Wash and the southeast boundary is the Raymond fault. The Raymond fault trends east-northeast and acts as a groundwater barrier along the southern boundary of the Raymond Groundwater Basin. This fault acts as a complete barrier along its western end and becomes a less effective barrier eastward. East of Santa Anita Wash, this fault ceases to be an effective barrier and the flow of groundwater southward into the San Gabriel Valley Groundwater Basin becomes essentially unrestricted. A north trending divide paralleling the Eaton Wash separates both surface and subsurface water flow in the eastern portion of the basin (DWR, 2003).

Natural recharge to the Raymond Groundwater Basin is mainly from direct percolation of precipitation and percolation of ephemeral streamflow from the San Gabriel Mountains in the north. The principal streams bringing surface inflow are the Arroyo Seco, Eaton Creek and Santa Anita Creek. Some stream runoff is diverted into spreading grounds and some is impounded behind small dams, allowing the water to infiltrate and contribute to groundwater recharge of the basin. An unknown amount of underflow enters the basin from the San Gabriel Mountains through fracture systems (DWR, 2003).

The water-bearing materials of Raymond Groundwater Basin are dominated by unconsolidated Quaternary alluvial gravel, sand, and silt deposited by streams flowing out of the San Gabriel Mountains. Water in the older alluvium is typically unconfined and sediment sizes range from coarser to finer moving away from the San Gabriel Mountains. However, confined groundwater conditions have existed locally in the basin, particularly along the Raymond fault near Raymond Hill, where layers of finer grained sediments are more abundant (DWR, 2003).

The total storage capacity of Raymond Groundwater Basin is approximately 1,450,000 af. No estimates of available storage have recently been made. In 1970, the available amount of stored water was estimated to be 1,000,000 af, leaving approximately 450,000 af of storage space available. Because this basin is managed, the present amount of stored water and storage space available should be similar to the amount available in 1970 (DWR, 2003). Depth to groundwater is at least 200 feet bgs throughout the basin (MWD, 2007).

In the Raymond Groundwater Basin, MCLs are exceeded in several wells for the following contaminants: total dissolved solids, nitrate, VOCs, and perchlorate (MWD, 2007). As discussed above in Section 3.8.2.2, in the Antelope Valley Groundwater Basin, MCLs are exceeded for the following contaminants: inorganics, radiology, nitrates, pesticides, VOCs and SVOCs (DWR, 2003).

Southern Region

The Southern Region lies within the Greater Los Angeles Basin, within the South Coast HR, as illustrated in Figure 3.8-1. Water quality regulation for this area is governed by the Los Angeles and Santa Ana RWQCBs. This region includes the Los Angeles River, San Gabriel River, and Santa Ana River HUs. Within the Los Angeles River HU, the proposed Project and alternatives cross the Pasadena HSA and the Los Angeles HA. Within the San Gabriel River HU, the proposed Project and alternatives cross the Upper San Gabriel HA and four HSAs, including: Lower Canyon HSA, Central HSA, La Habra HSA, and Yorba Linda HSA. Within the Santa Ana River HU, the proposed Project and alternatives cross the Chino HSA and the Santa Ana Narrows HSA. The Southern Region encompasses much of the San Gabriel Valley and the southwestern portion of San Bernardino County. The topography is variable, but is generally formed by flat or gently sloping coastal plains and valleys with areas of rolling hills.

Differences in topography are responsible for large variations in temperature, humidity, precipitation, and cloud cover throughout the Southern Region. The coastal plains, with mild rainy winters and warm dry summers, are noted for their subtropical “Mediterranean” climate, while the inland slopes and basins of the Transverse Ranges are characterized by more extreme temperatures and little precipitation. With prevailing winds from the west and northwest, moist air from the Pacific Ocean is carried inland through the Southern Region until it is forced upward by the mountains. The resulting storms, common from November through March, are followed by dry periods during summer months. The average maximum and minimum winter (January) temperatures in downtown Los Angeles are 67°F and 49°F respectively, and in Ontario are 68°F and 45°F, respectively. The average maximum and minimum summer (July) temperatures in downtown Los Angeles are 83°F and 63°F respectively, and in Ontario are 95°F and 62°F, respectively. Precipitation in the Southern Region generally occurs as rainfall; snowfall is rare. Most precipitation occurs during just a few major storms. Average annual rainfall in the City of Los Angeles is approximately 16 inches (SCE, 2007).

Most of the Southern Region is a highly developed urban landscape, with a mix of industrial, commercial, and residential land uses. Residential development is nearly continuous throughout the Greater Los Angeles Basin, and is only broken by a few preserved open spaces, such as the Chino Hills and Puente Hills.

Surface Water

Water Bodies

As shown in Figure 3.8-1, the Southern Region is contained within the Los Angeles River, San Gabriel River, and Santa Ana River HUs (CalWater, 2004). Streams are generally dry in the summer months, but it is common for perennial flows to be present, especially in the larger streams which are fed by the San Gabriel Mountains or urban runoff. Many of the drainages in this region have been lined with concrete to serve as flood control channels, or otherwise altered to conform to the urban landscape. Flood-control and debris-control dams have been built on many of the larger channels, especially at the interface between the mountains and the urban area, such as the Whittier Narrows Flood Control Basin and the Santa Fe Flood Control Basin. With the exception of several smaller or headwater drainages in undeveloped areas such as the Chino Hills and Puente Hills, few streams remain in a natural state. Major named drainages in the region include Alhambra Wash, Avocado Creek, Chino Creek, Cucamonga Creek, Eaton Wash, La Cañada Verde Creek, Little Chino Creek, Mission Creek, Rio Hondo, Rubio Wash, and the San Gabriel River. The TRTP also crosses approximately 50 unnamed streams in this region (USGS, 2007). Several of the streams and other water bodies in the Southern Region are listed as impaired on the 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments, including: Reach 3 of the San Gabriel River for toxicity; Reach 2 of the Rio Hondo for coliform and NH_3; Reach 1 of San Jose Creek for algae and coliform; and Reach 2 of Chino Creek for coliform (SWRCB, 2006).

Floodplains

FEMA has estimated the boundaries for 100-year floodplains for several drainages in the Southern Region, as shown in Figure 3.8-5. The floodplains in the Southern Region are relatively narrow compared to those of the Northern Region due to the extensive flood control infrastructure throughout the greater Los Angeles Basin.

Groundwater

As shown in Figure 3.8-3, the Southern Region is underlain by the Raymond and San Gabriel Valley Groundwater Basins, the Central Subbasin of the Coastal Plain of Los Angeles Groundwater Basin, and the Chino Subbasin of the Upper Santa Ana Valley Groundwater Basin. The Raymond Groundwater Basin is described above in Section 3.8.2.2.

San Gabriel Valley Groundwater Basin

The San Gabriel Valley Groundwater Basin underlies 255 square miles of eastern Los Angeles County. This basin is bounded on the north by the Raymond fault and the contact between Quaternary sediments and consolidated basement rocks of the San Gabriel Mountains. Exposed consolidated rocks of the Repetto, Merced, and Puente Hills bound the basin on the south and west, and the Chino fault and the San Jose fault form the eastern boundary (DWR, 2003).

Recharge of the San Gabriel Groundwater Basin is mainly from direct percolation of precipitation and percolation of stream flow. Stream flow is a combination of runoff from the surrounding mountains, imported water conveyed in the San Gabriel River channel to spreading grounds in the Central Subbasin of the Coastal Plain of Los Angeles Groundwater Basin, and treated sewage effluent. Subsurface flow enters from the Raymond Groundwater Basin, from the Chino Subbasin and from fracture systems along the San Gabriel Mountain front (DWR, 2003).

The water-bearing materials of this basin are dominated by unconsolidated to semi-consolidated alluvium deposited by streams flowing out of the San Gabriel Mountains. These deposits include Pleistocene and Holocene alluvium and the lower Pleistocene San Pedro Formation. Upper Pleistocene alluvium deposits form most of the productive water-bearing deposits in this basin. They consist of unsorted, angular to sub-rounded sedimentary deposits ranging from boulder-bearing gravels near the San Gabriel Mountains to sands and silts in the central and western parts of the basin. The lower Pleistocene San Pedro Formation consists of interbedded marine sand, gravel, and silt. This formation bears fresh water and may grade eastward into continental deposits indistinguishable from the overlying Pleistocene age alluvium. (DWR, 2003)

The storage capacity of the San Gabriel Valley Groundwater Basin is approximately 9,000,000 af, and approximately 8,500,000 af are currently stored in the basin (MWD, 2007). The depth to groundwater varies from about 150 to 350 feet bgs (USEPA, 2004).

In the San Gabriel Valley Groundwater basin, MCLs are exceeded in several wells throughout the basin for the following contaminants: TDS, nitrate, VOCs, perchlorate, and N-nitrosodimethylamine (NDMA) (DWR, 2003).

Central Subbasin

The Central Subbasin underlies 277 square miles in the southeastern part of the Coastal Plain of Los Angeles Groundwater Basin. This subbasin is commonly referred to as the “Central Basin” and is bounded on the north by a surface divide called the La Brea High, and on the northeast and east by emergent less permeable Tertiary rocks of the Elysian, Repetto, Merced and Puente Hills. The southeast boundary between the Central Basin and the Orange County Groundwater Basin roughly follows Coyote Creek, which is a regional drainage province boundary. The southwest boundary of the Central Basin is formed by the Newport Inglewood fault system and the associated folded rocks of the Newport Inglewood uplift (DWR, 2003).

Groundwater enters the Central Basin through surface and subsurface flow and by direct percolation of precipitation, stream flow, and applied water; replenishment of the aquifers occurs mainly in the forebay areas where permeable sediments are exposed at ground surface. Natural replenishment of the basin’s groundwater supply is largely from surface inflow through Whittier Narrows (and some underflow) from the San Gabriel Valley. Percolation into the Los Angeles Forebay Area is restricted due to paving and development of the surface of the forebay. Imported water purchased from the Metropolitan Water District (MWD) and recycled water from Whittier and San Jose Treatment Plants are used for artificial recharge in the Montebello Forebay at the Rio Hondo and San Gabriel River spreading grounds. Saltwater intrusion is a problem in areas where recent or active river systems have eroded through the Newport Inglewood uplift. A mound of water to form a barrier is formed by injection of water in wells along the Alamitos Gap (DWR, 2003).

Throughout the Central Basin, groundwater occurs in Holocene and Pleistocene age sediments at relatively shallow depths. The Central Basin is historically divided into forebay and pressure areas. The Los Angeles forebay is located in the northern part of the Central Basin where the Los Angeles River enters the Central Basin through the Los Angeles Narrows from the San Fernando Groundwater Basin.

The Montebello forebay extends southward from the Whittier Narrows where the San Gabriel River encounters the Central Basin and is the most important area of recharge in the subbasin. Both forebays have unconfined groundwater conditions and relatively interconnected aquifers that extend up to 1,600 feet deep to provide recharge to the aquifer system of this subbasin. The Whittier area extends from the Puente Hills south and southwest to the axis of the Santa Fe Springs-Coyote Hills uplift and contains up to 1,000 feet of freshwater-bearing sediments. The Central Basin pressure area is the largest of the four divisions, and contains many aquifers of permeable sands and gravels separated by semi-permeable sandy clay and impermeable clay, that extend to about 2,200 feet below the surface. Throughout much of the subbasin, the aquifers are confined, but areas with semipermeable aquicludes allow some interaction between the aquifers (DWR, 2003).

Total storage capacity of the Central Basin is approximately 13,800,000 af (DWR, 2003). The Water Replenishment District of Southern California requires that groundwater levels be maintained at a level of approximately 75 feet or more bgs (MWD, 2007).

In the Central Subbasin, MCLs are exceeded in several wells throughout the basin for the following contaminants: inorganics, radiology, nitrates, VOCs and SVOCs (DWR, 2003).

Chino Subbasin

The Chino Subbasin underlies 240 square miles of the northwestern portion of the upper Santa Ana River Watershed in San Bernardino County and portions of western Riverside and northern Los Angeles Counties (MWD, 2007). The Chino Subbasin is bounded on the east by the Rialto-Colton fault; on the southeast by the contact with impermeable rocks forming the Jurupa Mountains and low divides connecting the exposures. On the south, the Chino Subbasin is bounded by contact with impermeable rocks of the Puente Hills and by the Chino fault; on the northwest by the San Jose fault; and on the north by impermeable rocks of the San Gabriel Mountains and by the Cucamonga fault (DWR, 2003).

Groundwater recharge to this subbasin occurs by direct infiltration or precipitation on the subbasin floor, by infiltration of surface flow, and by underflow of ground water from adjacent basins (DWR, 2003).

The water-bearing units in the Chino Subbasin include Holocene and Upper Pleistocene alluvium. The Pleistocene alluvium is exposed mainly in the northern part of the subbasin and supplies most of the water to wells in the subbasin. The alluvium contains interfingering finer alluvial-fan deposits and coarser fluvial deposits. Most of the wells producing water from the eastern half of Chino Subbasin draw from the coarse portion of the Pleistocene alluvium (DWR, 2003).

Total storage within this subbasin is approximately 18,300,000 af, and approximately 5,300,000 af are currently stored in the basin (DWR, 2003). The depth to groundwater near the TRTP route is approximately 75 feet or greater bgs (CBW, 2006).

In the Chino Subbasin, MCLs are exceeded in several wells throughout the basin for the following contaminants: TDS, inorganics, radiology, nitrates, pesticides, VOCs and perchlorate (MWD, 2007).

3.8.2.3 Alternative 2: SCE's Proposed Project

This section describes specific water resources, including streams and associated underlying groundwater basins, crossed by the proposed Project. Stream crossings were identified through GIS analysis of National Hydrography Dataset High Resolution data and verified using USGS 7.5 Minute Quadrangles. Underlying groundwater basins were identified through GIS analysis of DWR Bulletin 118 groundwater data.

Northern Region

Surface Water

Streams crossed by the proposed Project within the Northern Region are listed in the *Hydrology and Water Quality Specialist Report*, Table 2.3-1. Stream channels in this region are well defined but typically ephemeral in the foothills, and become less defined washes along the desert floor. The flat topography and lack of defined channels on the desert floor can lead to unconfined overland flow during storm events. Major named drainages in this region that are crossed by the proposed Project include Amargosa Creek, Anaverde Creek, the California Aqueduct, Cottonwood Creek, the Los Angeles Aqueduct, Oak Creek, and the Upper Santa Clara River (USGS, 2007). The proposed Project also crosses approximately 50 identified unnamed streams in this region (USGS, 2007). Numerous other minor gullies and washes exist along the route.

Additionally, named and/or unnamed drainages may be crossed by new and/or upgraded access and spur roads. Although the precise location of these roads is unknown at this time, it is likely that the same named and unnamed drainages that would be crossed by the right-of-way of the proposed Project would also be crossed by the new and/or improved access and spur roads. The location of any drainage that would be crossed by access and/or spur roads will be identified prior to commencement of any construction activities. Also, the Hydrology and Water Quality analysis for the proposed Project and alternatives will address the potential impacts associated with drainage crossings by access and/or spur roads.

Santa Clara River Reach 7 is listed as impaired for coliform bacteria on the 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments (SWRCB, 2006). The upstream limits of Reach 7 are near Lang Station, which is over 15 miles downstream of the Segment 5 crossing and the Vincent Substation (SCE, 2007).

Groundwater

As described in Section 3.8.2.2, the Northern Region is underlain by the Antelope Valley Groundwater Basin and the Freemont Valley Groundwater Basin. Depth to water in the Antelope Valley Groundwater Basin ranges between 100 feet and 500 feet bgs in the areas crossed by the proposed Project (USGS, 2003). Maximum contaminant levels are exceeded in several wells throughout the Antelope Valley Groundwater Basin for inorganics, radiology, nitrates, pesticides, VOCs and SVOCs (DWR, 2003).

In the Freemont Valley Groundwater Basin, depth to groundwater near the Windhub Substation is greater than 100 feet bgs (USGS, 2003), and no primary MCLs are exceeded (DWR, 2003).

Central Region

Surface Water

Streams crossed by the proposed Project within the Central Region are listed in the *Hydrology and Water Quality Specialist Report*, Table 2.3-2. In this mountainous area, the steep canyon slopes and channel gradients promote a rapid concentration of storm runoff. Major named drainages in the region include Alder Creek, Arroyo Seco, Big Tujunga Creek, Clear Creek, Eaton Wash, Fall Creek, Monte Cristo Creek, North Fork Mill Creek, Tujunga Wash, and the West Fork San Gabriel River. The proposed Project crosses approximately 65 identified unnamed streams in this region (USGS, 2007). Also, countless small rills and gullies exist along the route.

In addition, roughly 152 named and/or unnamed drainages would be crossed by new and/or upgraded access and spur roads in the ANF. The locations of these drainage crossings by access and spur roads were mapped as part of a special survey that was conducted for the Biological Resources analysis (see Section 3.4, Biological Resources). Also, the location and a description of these drainage crossings by access and/or spur roads can be found under the discussion of Riparian Conservation Areas in the EIR/EIS Section 3.4, Biological Resources. Although the Hydrology and Water Quality analysis for the proposed Project and alternatives does not identify the location of drainage crossings by access and/or spur roads, the impacts of such crossings are addressed based on analysis of the hydrology of the Project study area, the likely construction methods for access and/or spur roads, and the likely locations of those roads, as identified in Section 3.4, Biological Resources, of the EIR/EIS, as well as in the *Riparian Conservation Area Report* (Aspen, 2008).

None of the streams or other water bodies in this region of the Project study area are listed as impaired on the 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments (SWRCB, 2006).

Groundwater

As described in Section 3.8.2.2, the edges of the Central Region are underlain by the Antelope Valley Groundwater Basin to the north and the Raymond Groundwater Basin to the south. Depth to water in the Antelope Valley Groundwater Basin ranges between 100 feet and 500 feet bgs within the areas crossed by the proposed Project (USGS, 2003). Maximum contaminant levels are exceeded in several wells throughout the Antelope Valley Groundwater Basin for inorganics, radiology, nitrates, pesticides, VOCs and SVOCs (DWR, 2003).

Depth to groundwater throughout the Raymond Groundwater Basin is 200 feet bgs or more (MWD, 2007). Maximum contaminant levels are exceeded in several wells throughout the basin for the following contaminants: total dissolved solids, nitrate, VOCs, and perchlorate (MWD, 2007).

Southern Region

Surface Water

Streams crossed by the proposed Project within the Southern Region are listed in the *Hydrology and Water Quality Specialist Report*, Table 2.3-3. Streams in this region are generally dry in the summer months, but it is common for perennial flows to be present, especially in the larger streams, which are fed by the San Gabriel Mountains or urban runoff. Many of the drainages in the Southern Region have been lined with concrete to serve as flood control channels, or otherwise altered to conform to the urban landscape; few streams remain in a natural state. Major named drainages in the region include Alhambra Wash, Avocado Creek, Chino Creek, Cucamonga Creek, Eaton Wash, La Cañada Verde Creek, Little Chino Creek, Mission Creek, Rio Hondo, Rubio Wash, the San Gabriel River, and San Jose Creek. The TRTP also crosses approximately 50 unnamed streams in this region (USGS, 2007).

Additionally, named and/or unnamed drainages may be crossed by new and/or upgraded access and spur roads, such as those in the Puente and Chino Hills. Although the precise location of these roads is unknown at this time, it is likely that the same named and unnamed drainages that would be crossed by the right-of-way of the proposed Project would also be crossed by the new and/or improved access and spur roads. The location of any drainage that would be crossed by access and/or spur roads will be identified prior to commencement of any construction activities. Also, the Hydrology and Water Quality analysis for the proposed Project and alternatives will address the potential impacts associated with drainage crossings by access and/or spur roads.

Several of the streams and other water bodies in this region are listed as impaired on the 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments, including: Reach 3 of the San Gabriel River for toxicity; Reach 2 of the Rio Hondo for coliform and NH3; Reach 1 of San Jose Creek for algae and coliform; and Reach 2 of Chino Creek for coliform (SWRCB, 2006).

Groundwater

As described in Section 3.8.2.2, the Southern Region is underlain by the Raymond Groundwater Basin, the San Gabriel Valley Groundwater Basin, the Central Subbasin of the Coastal Plain of Los Angeles Groundwater Basin, and the Chino Subbasin of the Upper Santa Ana Valley Groundwater Basin. Depth to groundwater throughout the Raymond Groundwater Basin is 200 feet bgs or more (MWD, 2007). Maximum contaminant levels are exceeded in several wells throughout the basin for the following contaminants: total dissolved solids, nitrate, VOCs, and perchlorate (MWD, 2007).

Within the San Gabriel Valley Groundwater Basin, depth to groundwater varies from about 150 to 350 feet bgs (USEPA, 2004). Maximum contaminant levels are exceeded in several wells throughout the basin for the following contaminants: TDS, nitrate, VOCs, perchlorate and NDMA (DWR, 2003).

For the Central Subbasin, the Water Replenishment District of Southern California requires that groundwater levels be maintained at a level of approximately 75 feet or more bgs (MWD, 2007). Maximum contaminant levels are exceeded in several wells throughout the basin for the following contaminants: inorganics, radiology, nitrates, VOCs and SVOCs (DWR, 2003).

For the Chino Subbasin depth to groundwater near the TRTP route is at least 75 feet bgs (CBW, 2006). Maximum contaminant levels are exceeded in several wells throughout the basin for the following contaminants: TDS, inorganics, radiology, nitrates, pesticides, VOCs and perchlorate (DWR, 2003).

3.8.2.4 Alternative 3: West Lancaster Alternative

This alternative includes one deviation from the proposed Project route, which would extend for 3.4 miles along Segment 4, between S4 MP 14.9 and MP 17.9. This re-route is located in the Northern Region of the Project Area. No other portion of the proposed Project route would be changed under Alternative 3.

Northern Region

The portion of the proposed Project that would be replaced by Alternative 3 (Segment 4, MP 14.9 - 17.9) would cross three unnamed streams. The Alternative 3 re-route would cross the same three unnamed streams, as well as two additional unnamed streams. No named streams would be crossed by the Alternative 3 re-route. All other aspects of the Affected Environment, including climate, topography, land use, floodplains, and groundwater basins, are the same as the proposed Project for the Northern Region, as described in Section 3.8.2.3.

Central Region

Affected Environment for the Central Region of Alternative 3 would be exactly the same as Affected Environment for the Central Region of the proposed Project, as described in Section 3.8.2.3.

Southern Region

Affected Environment for the Southern Region of Alternative 3 would be exactly the same as Affected Environment for the Southern Region of the proposed Project, as described in Section 3.8.2.3.

3.8.2.5 Alternative 4: Chino Hills Route Alternatives

Under Alternative 4, the proposed transmission line would follow the same route as the proposed Project through the Northern and Central Regions. In the Southern Region, Alternative 4 would diverge from the proposed Project route at S8A MP 19.2 and turn to the southeast, crossing through part of Orange County before entering San Bernardino County and the Chino Hills State Park (CHSP/Park).

Northern Region

Affected Environment for the Northern Region of Alternative 4 would be exactly the same as Affected Environment for the Northern Region of the proposed Project, as described in Section 3.8.2.3.

Central Region

Affected Environment for the Central Region of Alternative 4 would be exactly the same as Affected Environment for the Central Region of the proposed Project, as described in Section 3.8.2.3.

Southern Region

As described above, the Affected Environment of Alternative 4 is identical to the Affected Environment of the proposed Project (Section 3.8.2.3) for all Segments except Segment 8A, in the Southern Region. The Affected Environment of Segment 8A would be different than that of the proposed Project from S8A MP 19.2 to 35.2. In addition, the upgrades associated with Segments 8B and 8C would not occur; therefore Affected Environment characteristics associated with Hydrology and Water Quality for these segments would not be the same under Alternative 4.

Impacts to several surface and groundwater resources would be avoided and/or introduced under each routing option. The surface and groundwater resources that would be affected by the proposed Project but would be avoided under the routing options for Alternative 4 are listed in the *Hydrology and Water Quality Specialist Report*, Table 2.5-1.

Although the Alternative 4 routing options would avoid surface water and groundwater resources along portions of Segment 8A as well as Segments 8B and 8C, these options would likewise introduce new stream crossings. Milepost information for these routes is not available, and it is anticipated that the location of one or more of the Alternative 4 routing options could change depending on final engineering. Therefore, it is not possible to provide accurate tables of stream crossings that would occur under each Alternative 4 routing option. Instead, a rough estimate of the number of stream crossings, including any named stream crossings, is provided here for each routing option.

The proposed routes for Alternative 4 would cross through parts of Orange County and San Bernardino County, which the proposed Project (Alternative 2) would not enter. The routing options for Alternative 4 would also cross through the CHSP and would include a new switching station either within or outside the Park. The four different routing options (Routes A through D) which are included under Alternative 4 are discussed in further detail below.

Route A

This alternative would deviate from the proposed Project route at Segment 8A MP 19.2 and run parallel to the existing Mira Loma-Walnut/Olinda 220-kV transmission line for 6.2 miles, 2.3 miles of which would be within the CHSP. Route A would be situated within an existing utility corridor, but would require that the corridor be widened by 150 feet along the length of Route A. In addition, Route A would require the installation of a new switching station within the CHSP. The size of new switching station would be a minimum of four to five acres in size, using gas-insulated technology. Five unnamed streams would be crossed by Route A.

Route B

Route B would follow the same path as Route A into the CHSP, but instead of terminating at the new switching station described above, Route B would continue to just beyond the eastern Park boundary, eventually terminating at a new switching station outside of the CHSP. As with the Route A alternative, the new switching station for Route B would be a minimum of four to five acres in size. Route B would travel through the CHSP for approximately 4.3 miles. Eight streams would be crossed by Route B, including Aliso Creek and seven unnamed streams.

Route C

The proposed Route C alternative would involve the construction of a new transmission line just north of the CHSP, the re-routing of two existing lines within the CHSP, the removal of existing transmission lines from within the CHSP, and the construction of a new switching station just north of the Park. The removal of existing transmission lines would be considered part of this alternative because removal activities would affect water quality. Ten unnamed streams would be crossed by Route C.

Route D

The proposed Route D alternative would follow the same path as the proposed Route C alternative, but instead of terminating at a switching station at approximately Segment 8A MP 24.7, Route D would continue to follow the northern boundary of CHSP for approximately 4.0 miles, before crossing through part of the Park in a southeasterly direction and terminating at a new switching station just outside the eastern Park boundary. The proposed switching station for Route D would be in the same location as that proposed for the Route B alternative. Four streams would be crossed by Route D, including Aliso Creek and three unnamed streams.

3.8.2.6 Alternative 5: Partial Underground Alternative

Under Alternative 5, the proposed transmission line (T/L) would follow the same route as the proposed Project through the Northern and Central Regions. In the Southern Region, Alternative 5 would place 3.5 miles of Segment 8A underground beneath the same corridor as the proposed aboveground T/L, from MP 21.9 to MP 25.4.

Northern Region

Affected Environment for the Northern Region of Alternative 5 would be exactly the same as Affected Environment for the Northern Region of the proposed Project, as described in Section 3.8.2.3.

Central Region

Affected Environment for the Central Region of Alternative 5 would be exactly the same as Affected Environment for the Central Region of the proposed Project, as described in Section 3.8.2.3.

Southern Region

Under this alternative, the existing 220-kV T/L along Segment 8A would be left in place from MP 21.9 to MP 25.4. Several streams that would be crossed by the proposed Project along Segment 8A, between MP 21.9 to MP 25.4, would not be crossed by Alternative 5 because the transmission infrastructure would be placed well below those streams. The streams that would be avoided under this alternative are listed in the *Hydrology and Water Quality Specialist Report*, Table 2.6-1. In addition, this alternative would affect the underlying groundwater basin because the transmission infrastructure would be placed below the depth to groundwater. Table 2.6-1 from the *Hydrology and Water Quality Specialist Report* also shows the groundwater basin (Upper Santa Ana Valley) that would be affected under this alternative but avoided under the proposed Project. Please see Section 3.8.2.2 for a description of the Chino Subbasin of the Upper Santa Ana Valley groundwater basin.

3.8.2.7 Alternative 6: Maximum Helicopter Construction in the ANF Alternative

Alternative 6 includes the maximum amount of helicopter construction on the ANF (Segments 6 and 11). This alternative follows the same route for the transmission line as the proposed Project in all three regions, as described in Section 2.6. This alternative would require ten helicopter staging areas ranging in size from two acres to over four acres (Figure 2.6-1). All of the locations identified for these areas, with the exception of Site 9, appear to have well-maintained access roads leading to them and should be accessible for the delivery and staging of materials, equipment, and personnel. Site 9 would require a new access road. Improvements at each of the staging and landing areas would be required and would include clearing of vegetation, grading, and potential cut and fill activities.

Due to the weight capacities and fuel limitations for the helicopters that would be used under this alternative, only those tower locations within an approximate 2.5-mile radius of the staging areas were considered viable candidates for helicopter construction. For the purpose of obtaining a maximum number of tower locations subject to helicopter construction, all of the tower locations that occur within the 2.5-mile radius of each staging area were assumed to require helicopter construction. As a result of this alternative, the construction and/or improvements to many of the access roads and all of the spur roads associated with these tower locations that would be required under SCE's proposed Project (Alternative 2) would not occur.

Northern Region

Affected Environment for the Northern Region of Alternative 6 would be exactly the same as Affected Environment for the Northern Region of the proposed Project, as described in Section 3.8.2.3.

Central Region

Affected Environment for the Central Region of Alternative 6 would be very similar to the Affected Environment for the Central Region of the proposed Project, as described in Section 3.8.2.3. However, under this alternative, up to 143 towers in the ANF would be constructed by helicopter. The use of helicopters for tower construction would preclude the need for construction and/or improvements along several access and spur roads within the ANF.

Several streams that would be crossed by access and spur roads within the ANF would no longer be affected under Alternative 6. The locations of these drainage crossings by access and spur roads that would be avoided under Alternative 6 were mapped as part of the *Riparian Conservation Area Report* (Aspen Environmental Group, 2008). Also, the location and a description of these drainage crossings by access and/or spur roads that would be avoided under Alternative 6 can be found under the discussion of Riparian Conservation Areas in the EIR/EIS Section 3.4, Biological Resources. Although the Hydrology and Water Quality analysis for the proposed Project and alternatives does not identify the location of drainage crossings by access and/or spur roads, nor the drainage crossings that would be avoided under this alternative, the impacts of such crossings are addressed based on analysis of the hydrology of the Project study area, the likely construction methods for access and/or spur roads, and the likely locations of those roads, as identified in Section 3.4, Biological Resources, of the EIR/EIS.

Southern Region

Affected Environment for the Southern Region of Alternative 6 would be exactly the same as Affected Environment for the Southern Region of the proposed Project, as described in Section 3.8.2.3.

3.8.2.8 Alternative 7: 66-kV Subtransmission Alternative

Under Alternative 7, the proposed T/L would follow the same route as the proposed Project through the Northern and Central Regions. In the Southern Region, Alternative 7 would place one mile of 66-kV subtransmission line underground beneath the same corridor as the proposed aboveground T/L, from Segment 7 MP 8.9 to MP 9.9, and would re-route and place underground several sections of 66-kV subtransmission lines through the Whittier Narrows Recreation Area.

Northern Region

Affected Environment for the Northern Region of Alternative 7 would be exactly the same as Affected Environment for the Northern Region of the proposed Project, as described in Section 3.8.2.3.

Central Region

Affected Environment for the Central Region of Alternative 7 would be exactly the same as Affected Environment for the Central Region of the proposed Project, as described in Section 3.8.2.3.

Southern Region

Under this alternative, three 66-kV subtransmission line elements would be undergrounded and/or re-routed: (1) undergrounding the 66-kV subtransmission line in Segment 7 through the River Commons or Duck Farm Project (between Valley Boulevard – S7 MP 8.9 and S7 MP 9.9), (2) re-routing and undergrounding the 66-kV subtransmission line around the Whittier Narrows Recreation Area in Segment 7 (S7 MP 11.4 to 12.025), and (3) re-routing the 66-kV subtransmission line around the Whittier Narrows Recreation Area in Segment 8A between the San Gabriel Junction (S8A MP 2.2) and S8A MP 3.8.

3.8.3 Applicable Laws, Regulations, and Standards

3.8.3.1 Federal

Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. Section 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). In California, NPDES permitting authority is delegated to, and administered by, the nine RWQCBs. For the proposed Project, NPDES permits would be delegated to the Lahontan, Los Angeles, and Santa Ana RWQCBs. Projects that disturb one or more acres are required to obtain NPDES coverage under the California General Permit for Discharges of Storm Water Associated with Construction Activity. The Construction General Permits require the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP describes Best Management Practices (BMPs) the discharger will use to protect stormwater runoff. The SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. (SWRCB, 2006)

Section 401 of the CWA requires that any activity, including river or stream crossing during road, pipeline, or transmission line construction, which may result in discharges into a State waterbody, must be certified by the RWQCB. This certification ensures that the proposed activity does not violate State and/or federal water quality standards. Proposed Project activities would adhere to State and federal water quality standards and would be in compliance with Section 401 of the CWA.

Section 404 of the CWA authorizes the U.S. Army Corps of Engineers (USACE) to regulate the discharge of dredge or fill material to the waters of the U.S. and adjacent wetlands. The limits of non-tidal waters extend to the Ordinary High Water (OHW) line, defined as the line on the shore established by the fluctuation of water and indicated by physical characteristics, such as natural line impressed on the bank, changes in the character of the soil, and presence of debris. The USACE may issue either individual, site-specific permits or general, nationwide permits for discharge into US waters. A Section 404 permit would be required for the proposed Project construction activities involving excavation or replacement of fill material into waters of the United States (i.e., road construction involving cut-and-fill in streams). A Water Quality Certification pursuant to Section 401 of the CWA is required for Section 404 permit actions. If applicable, construction would also require a request for Water Quality Certification (or waiver thereof) from the applicable RWQCB. Proposed Project activities would adhere to State and federal water quality standards and would be in compliance with Section 404 of the CWA.

Section 303(d) of the CWA (CWA, 33 USC 1250, et seq., at 1313(d)) requires states to identify "impaired" water bodies as those which do not meet water quality standards. States are required to compile this information in a list and submit the list to the US EPA for review and approval. This list is known as the Section 303(d) list of impaired waters. As part of this listing process, states are required to prioritize waters and watersheds for future development of TMDL requirements. The State Water Resources Control Board (SWRCB) and RWQCBs have ongoing efforts to monitor and assess water quality, to prepare the Section 303(d) list, and to develop TMDL requirements (LARWQCB, 2004).

Wild and Scenic Rivers Act

In accordance with the Wild and Scenic Rivers Act (Public Law 90-542), certain selected rivers in the United States are to be protected and preserved in free-flowing condition because of their "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values…" Every wild, scenic, or recreational river in a free-flowing condition, or upon restoration of this condition, is eligible for inclusion in the National Wild and Scenic Rivers System. If determined to be eligible, a suitability analysis is conducted for the river's current level of development, accounting for water resource projects, shoreline development, and accessibility. A recommendation is also made that the eligible river be placed in one or more of three classes: wild, scenic, and/or recreational. Prior to official designation, eligible rivers are afforded federal protection against activities or actions that could potentially interfere with the "outstandingly remarkable values" (ORVs) of the river that make it eligible for the recommended classification/s within the National Wild and Scenic Rivers System. In the Angeles National Forest, the West Fork of the San Gabriel River is currently eligible to be included in the National Wild and Scenic River System (USDA, 2005b) as a recreational river.

USDA Forest Service Land Management Plan

The USDA Forest Service Land Management Plan for the ANF provides management direction for the ANF (USDA, 2005b). The 2005 Land Management Plan was approved on September 20, 2005, and became effective on October 31, 2005. Part 2, Appendix B, of the 2005 Land Management Plan includes a description of "Program Strategies and Tactics" that the ANF may choose to emphasize to progress toward achieving the desired conditions and goals of the Plan. The following is a list of the program strategies related to Hydrology and Water Quality that are applicable to the proposed Project:

- Watershed Function – Protect, maintain and restore natural watershed functions including slope processes, surface water and groundwater flow and retention, and riparian area sustainability.
- Water Management – Manage groundwater and surface water to maintain or improve water quantity and quality in ways that minimize adverse effects.
- Hazardous Materials – Manage known hazardous materials risks.

3.8.3.2 State

Streambed Alteration Agreement

Section 1602 of the California Fish and Game Code protects the natural flow, bed, channel, and bank of any river, stream, or lake designated by the California Department of Fish and Game (CDFG) in which there is, at any time, any existing fish or wildlife resources, or benefit for the resources. Section 1602 requires an agreement between the CDFG and a public agency proposing a project that would:

- Divert, obstruct, or change a streambed;
- Use material from the streambed; or
- Result in the disposal, or deposition of debris, waste, or other material containing crumbed, flaked, or ground pavement where it can flow into a stream.

As described in the following impact analysis, it is not expected that the proposed Project would cause or facilitate the actions listed above. However, if it is determined during final engineering and design of the proposed Project that any Project-related actions would have the potential to necessitate a Streambed Alteration Agreement, then such an agreement would be prepared and implemented prior to construction of the proposed Project, thus maintaining compliance with Section 1602 of the California Fish and Game Code.

Porter Cologne Water Quality Control Act

The Porter Cologne Water Quality Control Act of 1967, Water Code Section 13000 et seq., requires the SWRCB and the nine RWQCBs to adopt water quality criteria to protect State waters. These criteria include the identification of beneficial uses, narrative and numerical water quality standards, and implementation procedures.

California Water Code §13260

California Water Code §13260 requires that any person discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the State, other than into a community sewer system, must submit a report of waste discharge to the applicable RWQCB. Any actions related to the proposed Project that would be applicable to California Water Code §13260 would be reported to the applicable RWQCB (Lahontan, Los Angeles, or Santa Ana).

3.8.3.3 Local

Within Kern County, surface water and groundwater quality and use are regulated by the County of Kern Engineering and Survey Service (KCESS). Water quality in Kern County is also under the jurisdiction of the Lahontan RWQCB (LRWQCB). Within Los Angeles County, surface water and groundwater quality and use are regulated by the Los Angeles County Department of Public Works (LACDPW). The LACDPW has Master Plans for many of its large flood control facilities including the Los Angeles River. Water quality in Los Angeles County is also under the jurisdiction of the Los Angeles RWQCB (LARWQCB). Water quality in the eastern part of Los Angeles County is also under the jurisdiction of the Santa Ana RWQCB (SARWQCB). Within San Bernardino County, surface water and groundwater quality and use are regulated by the San Bernardino County Department of Public Works (SBCDPW) in addition to the SARWQCB (SCE, 2007).

Local water quality control plans applicable to the proposed Project include the Lahontan RWQCB Basin Plan, the Los Angeles RWQCB Basin Plan, and the Santa Ana RWQCB Basin Plan. Each of these plans defines water quality objectives for their jurisdiction. These Regional Boards regulate the sources of water quality problems which could result in the impairment of beneficial uses or degradation of water quality, including both point sources of pollution and non-point sources of pollution. These pollution sources are regulated through the issuance of NPDES permits (SCE, 2007).

SCE has also developed site-specific Storm Water Management Plans (SWMPs) for each of its attended substations and service centers. These SWMPs address operational water quality and storm water issues. The existing SWMP for Vincent Substation would be updated to reflect the planned changes. There is currently no SWMP for Antelope Substation because it is not an attended facility. Whirlwind Substation is not proposed to be an attended facility, and therefore a SWMP would not be developed for this substation (SCE, 2007).

3.8.4 Impact Analysis Approach

3.8.4.1 Criteria for Determining Impact Significance

To satisfy CEQA requirements, conclusions are made regarding the significance of each identified impact that would result from the proposed Project and alternatives. Appropriate criteria have been identified and utilized to make these significance conclusions. The following significance criteria for Hydrology and Water Quality were derived from previous environmental impact assessments and from the CEQA Guidelines (Appendix G, Environmental Checklist Form, Section IX). Impacts of the proposed Project or alternatives would be considered significant and would require mitigation if:

- Criterion HYD1: Violate any water quality standards or waste discharge requirements, create any substantial new sources of polluted runoff, or otherwise degrade water quality.
- Criterion HYD2: Substantially deplete groundwater supplies or interfere with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Criterion HYD3: Place within a watercourse or flood hazard area structures which would impede or redirect flood flows, or otherwise substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion, siltation, or other flood-related damage on- or offsite.

- Criterion HYD4: Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite, or otherwise create or contribute to runoff water which would exceed the capacity of existing or planned stormwater drainage systems.
- Criterion HYD5: Result in or be subject to damage from inundation by mudflow.

Significance conclusions for individual impacts are not required for compliance with NEPA. Therefore, conclusions presented in the following analysis regarding the significance of identified impacts are provided for the purposes of CEQA only.

3.8.4.2 Applicant-Proposed Measures (APMs)

APMs were identified by SCE in the PEA. Table 3.8-3 presents the APMs that are relevant to the issue area of Hydrology and Water Quality. APMs are a commitment by the Applicant (SCE) and are considered part of the proposed Project. Therefore, the following discussions of impact analysis assume that all APMs will be implemented as defined in the table. Additional mitigation measures are recommended in this section if it is determined that APMs do not fully mitigate the impacts for which they are presented.

Table 3.8-3. Applicant-Proposed Measures – Hydrology and Water Quality

APM HYD-1	Construction SWPPP. A Construction SWPPP would be developed for the Project. Notices of Intent (NOIs) would be filed with the SWRCB and/or the RWQCBs, and a Waste Discharge Identification Number (WDID) would be obtained prior to construction. The SWPPP would be stored at the construction site for reference or inspection review. In addition, grading permit applications would be submitted, as applicable, to local jurisdictions. Implementation of the SWPPP would help stabilize graded areas and waterways, and reduce erosion and sedimentation. The plan would designate BMPs that would be adhered to during construction activities. Erosion minimizing efforts such as straw wattles, water bars, covers, silt fences, and sensitive area access restrictions (for example, flagging) would be installed before clearing and grading begins. Mulching, seeding, or other suitable stabilization measures would be used to protect exposed areas during construction activities. During construction activities, measures would be in place to ensure that contaminates are not discharged from the construction sites. The SWPPP would define areas where hazardous materials would be stored, where trash would be placed, where rolling equipment would be parked, fueled and serviced, and where construction materials such as reinforcing bars and structural steel members would be stored. Erosion control during grading of the construction sites and during subsequent construction would be in place and monitored as specified by the SWPPP. A silting basin(s) would be established, as necessary, to capture silt and other materials, which might otherwise be carried from the site by rainwater surface runoff.
APM HYD-2	Environmental Training Program. An environmental training program would be established to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, and SWPPP measures, to all field personnel. A monitoring program would be implemented to ensure that the plans are followed throughout the period of construction.
APM HYD-3	Accidental Spill Control. The Construction SWPPP identified above would include procedures for quick and safe cleanup of accidental spills. The Construction SWPPP would prescribe hazardous materials handling procedures for reducing the potential for a spill during construction, and would include an emergency response program to ensure quick and safe cleanup of accidental spills. The SWPPP would identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, would be permitted.
APM HYD-4	Non-storm Water and Waste Management Pollution Controls. Oil-absorbent materials, tarps, and storage drums would be used to contain and control any minor releases of transformer oil. In the event that excess water and liquid concrete escapes from foundations during pouring, it would be directed to bermed areas adjacent to the borings where the water would infiltrate or evaporate and the concrete would remain and begin to set. Once the excess concrete has been allowed to set up (but before it is dry), it would be removed and transported to an approved landfill for disposal.
APM HYD-5	Hazardous Material Identification. A Phase I Environmental Site Assessment (ESA) would be performed at each new or expanded substation location and along newly acquired transmission line R-O-Ws. Depending on the results of the Phase I ESA, soil sampling would be conducted and remedial activities would be implemented, if applicable. If hazardous materials were encountered during any construction activities, work would be stopped until the material was properly characterized and appropriate measures were taken to protect human health and the environment. If excavation of hazardous materials is required, they would be handled, transported, and disposed of in accordance with federal, state, and local regulations.

Table 3.8-3. Applicant-Proposed Measures – Hydrology and Water Quality	
APM HYD-6	Drilling and Construction Site Dewatering Management. Any dewatering operations associated with drilling and LST/TSP footing installation would follow applicable state and local regulatory requirements. If groundwater were encountered while excavating or constructing the transmission line or substations, dewatering operations would be performed. These operations would include, as applicable, the use of sediment traps and sediment basins in accordance with BMP NS-2 (Dewatering Operations) from the California Stormwater Quality Association's (CASQA) California Stormwater BMP Handbook – Construction (CASQA, 2003).
APM HYD-7	Flood and Erosion Structure Damage Protection. Transmission towers or other structures would not be placed within waterway protection corridors (floodways) defined by city and county codes. Aboveground project features such as transmission line towers and substation facilities will be designed and engineered to withstand potential flooding and erosion hazards. Although some project features may need to be placed within 100-year floodplain boundaries, they will be designed per applicable floodplain development guidelines. Measures would include specially designed footings to withstand flooding due either to a 100-yr flood event or a failure of a nearby upstream dam or reservoir. The main Project facilities (i.e., substations) will be located outside of known watercourses.
APM HYD-8	Operation Storm Water Management Plan. The post-construction (Operation) Storm Water Management Plan (SWMP) for Vincent Substation would be updated. The SWMP identifies potential pollutants based on the activities that take place at the site, and discusses the appropriate Best Management Practices that should be used to prevent pollutants from entering the storm water and non-storm water runoff from the site. The SWMP also includes requirements for periodic site training for employees and inspections by onsite personnel.
APM GEO-2	Perform Geotechnical Studies. Prior to final design of substation facilities and T/L tower foundations, a geotechnical study would be performed to identify site-specific geologic conditions and potential geologic hazards in enough detail to support good engineering practice. The geotechnical study would be performed by professional civil or geotechnical engineers and engineering geologists licensed in the State of California and would provide design and construction recommendations, as appropriate, to reduce potential impacts from geologic hazards or soil conditions.
APM HAZ-2	Hazardous Materials and Waste Handling Management. Hazardous materials used and stored onsite for the proposed construction activities – as well as hazardous wastes generated onsite as a result of the proposed construction activities – would be managed according to the specifications outlined below. • Hazardous Materials and Hazardous Waste Handling: A project-specific hazardous materials management and hazardous waste management program would be developed prior to initiation of the project. The program would outline proper hazardous materials use, storage and disposal requirements as well as hazardous waste management procedures. The program would identify types of hazardous materials to be used during the project and the types of wastes that would be generated. All project personnel would be provided with project-specific training. This program would be developed to ensure that all hazardous materials and wastes were handled in a safe and environmentally sound manner. Hazardous wastes would be handled and disposed of according to applicable rules and regulations. Employees handling wastes would receive hazardous materials training and shall be trained in hazardous waste procedures, spill contingencies, waste minimization procedures and treatment, storage and disposal facility (TSDF) training in accordance with OSHA Hazard Communication Standard and 22 CCR. SCE would use landfill facilities that are authorized to accept treated wood pole waste in accordance with HSC 25143.1.4(b). • Construction Stormwater Pollution Prevention Plan (SWPPP): A project-specific construction SWPPP would be prepared and implemented prior to the start of construction of the transmission line and substations. The SWPPP would utilize Best Management Practices (BMPs) to address the storage and handling of hazardous materials and sediment runoff during construction activities (California Stormwater Quality Association, 2004). • Transport of Hazardous Materials: Hazardous materials that would be transported by truck include fuel (diesel fuel and gasoline) and oil and lubricants for equipment. Containers used to stored hazardous materials would be properly labeled and kept in good condition. Written procedures for the transport of hazardous materials used would be established in accordance with U.S. Department of Transportation and Caltrans regulations. A qualified transporter would be selected to comply with U.S. Department of Transportation and Caltrans regulations. • Fueling and Maintenance of Construction Equipment: Written procedures for fueling and maintenance of construction equipment would be prepared prior to construction. Vehicles and equipment would be refueled onsite or by tanker trucks. Procedures would include the use of drop cloths made of plastic, drip pans and trays to be placed under refilling areas to ensure that chemicals do not come into contact with the ground. Refueling stations would be located in designated areas where absorbent pad and trays would be available. The fuel tanks would also contain a lined area to ensure that accidental spillage does not occur. Drip pans or other collection devices would be placed under the equipment at night to capture drips

Table 3.8-3. Applicant-Proposed Measures – Hydrology and Water Quality	
	or spills. Equipment would be inspected daily for potential leakage or failures. Hazardous materials such as paints, solvents, and penetrants would be kept in an approved locker or storage cabinet. • Fueling and Maintenance of Helicopters: Written procedures for fueling and maintenance of helicopters would be prepared prior to construction. Helicopters would be refueled at helicopter staging areas or local airports. Procedures would include the use of drop cloths made of plastic, drip pans and trays to be placed under refilling areas to ensure that chemicals do not come into contact with the ground. Refueling areas would be located in designated areas where absorbent pad and trays are available. • Emergency Release Response Procedures: An Emergency Response Plan detailing responses to releases of hazardous materials would be developed prior to construction activities. It would prescribe hazardous materials handling procedures for reducing the potential for a spill during construction, and would include an emergency response program to ensure quick and safe cleanup of accidental spills. All hazardous materials spills or threatened release, including petroleum products such as gasoline, diesel, and hydraulic fluid, regardless of the quantity spilled would be immediately reported if the spill has entered a navigable water, stream, lake, wetland, or storm drain, if the spill impacted any sensitive area including conservation areas and wildlife preserved, or if the spill caused injury to a person or threatens injury to public health. All construction personnel, including environmental monitors, would be aware of state and federal emergency response reporting guidelines.
APM HAZ-5	Spill Prevention, Countermeasure, and Control Plan and Hazardous Materials Business Plan. • Spill Prevention, Countermeasure, and Control Plan (SPCC Plan). In accordance with Title 40 of the CFR, Part 112, SCE would prepare a SPCC for proposed and/or expanded substations. The plans would include engineered and operational methods for preventing, containing, and controlling potential releases, and provisions for quick and safe cleanup. • Hazardous Materials Business Plans (HMBPs). Prior to operation of new or expanded substations, SCE would prepare or update and submit, in accordance with Chapter 6.95 of the CHSD, and Title 22 CCR, an HMBP. The required documentation would be submitted to the CUPA. The HMBPs would include hazardous materials and hazardous waste management procedures and emergency response procedures including emergency spill cleanup supplies and equipment.

3.8.4.3 Impact Assessment Methodology

This analysis first established baseline conditions for the affected environment of Hydrology and Water Quality, presented above in Section 3.8.2, which included a description of climate, topography, surface water resources, groundwater basins, floodplains, water quality, and land use. These baseline conditions were evaluated based on their potential to be affected by construction activities as well as operation and maintenance activities related to the proposed Project and alternatives. Construction, operation, and maintenance activities were identified based on analysis provided in SCE's PEA. Results from the *Riparian Conservation Area Report* and the *Hydrology and Water Quality Specialist Report* (Aspen, 2008) were used to further identify the effects of Project activities on the affected environment. Impacts to Hydrology and Water Quality were then identified based on the predicted interaction between construction, operation, and maintenance activities with the affected environment.

3.8.5 Alternative 1: No Project/Action

Selection of the No Project/Action Alternative would mean that the proposed TRTP would not be implemented. As such, none of the associated Project activities would occur and the environmental impacts associated specifically with the proposed Project would not occur. Particularly, the construction-related water quality impacts described in Sections 3.8.6 through 3.8.11 would be avoided. No soil would be disturbed, and therefore the potential for erosion would be the same as under baseline conditions. No hazardous materials would be transported and potentially leaked into waterbodies, and the potential for water quality contamination would also be the same as under baseline conditions.

However, under the No Project/Action Alternative, some currently unknown plan would need to be developed to provide the transmission upgrades necessary to interconnect renewable generation projects in the Tehachapi area and to also address the existing transmission problems south of Lugo Substation. Similarly, other yet unspecified transmission upgrades would presumably be proposed in the future to provide the needed capacity and reliability to serve growing electrical load in the Antelope Valley. To interconnect wind projects in the Tehachapi area, it is possible that other electrical utilities with transmission facilities in the area, such as LADWP, might purchase some of the power from Tehachapi wind developers and integrate it into their system. Another possibility is the development of a private transmission line that could connect wind projects to the electrical grid. Any of these projects, which would occur as a result of the unfulfilled electrical transmission need in the absence of TRTP, are likely to produce similar impacts as those identified for the proposed Project. Transmission line construction utilizes some standard techniques such as leveling, grading, and excavation, which would have similar water quality impacts regardless of the specific configuration of the transmission line.

Additionally, numerous potential developments throughout the proposed Project area that are completely unrelated to electrical transmission could impact water quality. For example, the population within the Antelope Valley was 285,000 in 2006 and is projected to reach 550,000 by the year 2025 (AVEK, 2005). In order to accommodate this large population increase, numerous large housing developments will need to be completed. Not only will these developments impact water quality during the construction phase, but once they are occupied they will be a new source of wastewater. The additional wastewater will at the least change the hydrology of the region and will most likely produce water quality impacts as well. Another example of a change to water quality under the No Project/Action Alternative that is completely unrelated to electrical transmission is the continued development of water quality regulations throughout the Project Regions. In particular, Total Maximum Daily Loads (TMDLs) are being implemented at an increasing rate. These watershed-level regulations may have substantial positive impacts on water quality. The TMDLs will continue to be implemented, regardless of whether or not TRTP is constructed. Because of the above mentioned examples as well as numerous other possible developments, Hydrology and Water Quality impacts, both negative and positive, would occur under the No Project/Action Alternative.

3.8.6 Alternative 2: SCE's Proposed Project

3.8.6.1 Direct and Indirect Effects Analysis

The following section describes potential direct and indirect impacts and mitigation measures related to Hydrology and Water Quality impacts for Alternative 2.

Water Quality Violations, Waste Discharges, or Polluted Runoff (Criterion HYD1)

Impact H-1: Construction activities would degrade surface water quality through erosion and accelerated sedimentation.

Construction and/or demolition of overhead transmission line towers and construction and/or upgrades of substations would require several types of soil disturbance that could subsequently cause localized, short-term water quality degradation. Excavation and/or grading would be required at all tower sites where new pads or footings would be required, at all tower demolition sites, and at all new and/or expanded substations. Additional clearing of vegetation and/or grading would be required for crane pads, pulling/stringing stations, staging areas, marshalling yards, concrete batch plants, helicopter staging areas, helicopter landing pads, tower wreck-out staging areas, and access and spur roads. Disturbance of soil during construction and/or demolition could result in soil erosion and temporarily lowered water quality through increased turbidity and accelerated sediment deposition into local streams. In particular, road construction for both temporary and permanent roadways has the potential to cause soil instability resulting in accelerated erosion and sedimentation, which could temporarily degrade surrounding water quality. Road construction and improvements may involve road widening up to 16 feet (SCE, 2007), and would produce large amounts of loose and disturbed soil, which, without proper management, could enter nearby streams. The water quality impact of road construction and improvement is of particular concern when that road crosses a stream channel, closely parallels a stream channel, or traverses a steep slope. In steep terrain, existing unpaved roads within the Project area show extensive evidence of overland flow, such as rills and gullies that run across and parallel to the roadways. Soil disturbance on these steep, unpaved roads would create a high potential for accelerated erosion. Land disturbance associated with road construction and improvements would include the following activities: removal of vegetation, blade grading, soil compaction, installation of drainage structures and stream crossings, installation of footings and foundations, and installation of slope-strengthening structures as needed. These activities involve soil disturbance and stockpiling of earth, which, without proper management, could wash into surrounding waterways. Construction of any type of stream crossing through an actively flowing stream channel would cause some amount of unavoidable, temporary, localized sedimentation. This impact would apply to all stream crossings along the route, including those presented in the *Hydrology and Water Quality Specialist Report*, as well as streams crossed by access and spur roads that are identified in the *Riparian Conservation Area Report* (Aspen, 2008).

Northern Region

The potential for localized, short-term degradation of surface water quality through erosion and sedimentation would be low to moderate within the Northern Region. The majority of the soil disturbance in the Northern Region would occur on very flat ground, which reduces the potential for erosion compared to soil disturbance on steeply sloped topography. Most streams crossed by the proposed Project within the Northern Region are dry except during infrequent periods of brief rainfall with sufficient intensity to produce runoff. However, these infrequent precipitation events can occur with great intensity, and can produce extensive sheet flow and flooding, which would lead to substantial erosion of unmanaged disturbed and/or stockpiled soil.

Central Region

The potential for localized, short-term degradation of surface water quality through accelerated erosion and sedimentation would be moderate within the Central Region. This Region, which includes the ANF, is characterized by steep slopes and greater precipitation than either the Northern or Southern Regions. Although soils in the Central Region generally have a high capacity for absorption, the Central Region is subject to intense storm events that generate precipitation that exceeds the soil's capacity to absorb moisture. Under these conditions, substantial runoff is probable. Without the proper implementation of soil management practices, disturbed and/or stockpiled soil, especially disturbances associated with road construction and/or improvement, would have a moderate potential for erosion during these storm events. In many cases, such as along Monte Cristo Creek, access road construction and/or improvement would occur directly adjacent to a stream channel, which, without the proper implementation of soil management practices, would have a moderate potential to temporarily accelerate sedimentation of the nearby stream should a large storm event occur. Implementation of best management practices would substantially reduce the potential for water quality degradation through accelerated erosion and sedimentation. For the Central Region, the predicted annual average increase in erosion and sedimentation as a result of construction activities associated with both the proposed Project and alternatives was analyzed using GIS-based erosion and sedimentation modeling. The results of that modeling are presented in the Hydrology and Water Quality Specialist Report (Aspen, 2008).

Southern Region

The potential for localized, short-term degradation of surface water quality through erosion and sedimentation would be low to moderate within the Southern Region. This region is highly urbanized and most of the stream crossings are channelized and lined with concrete. The vast majority of all Project work would occur outside of drainages, with the exception of Project structures that would be placed in detention basins and construction activities that could affect drainages in open areas such as the Puente Hills and Chino Hills. The topography is relatively flat compared to the Central Region. Most runoff quickly enters the municipal storm drain system. Erosion from disturbed and/or stockpiled soil would have a low to moderate potential to enter nearby streams during storm events.

APM HYD-1 (Construction SWPPP) and APM HYD-2 (Environmental Training Program) would reduce the likelihood of construction-related water quality degradation through erosion and sedimentation. APM HYD-1 requires implementation of a Construction SWPPP, which would include several BMPs to reduce erosion and sedimentation, such as straw wattles, water bars, covered stockpiles, silt fences, silting basins, and mulching or seeding to protect exposed areas as well as monitoring to ensure that the BMPs are implemented. APM HYD-2 requires establishment of an environmental training program to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, and SWPPP measures, to all field personnel. Although the APM HYD-1 and APM HYD-2 would reduce the potential for soil erosion and deposition of sediment into stream channels, erosion and sediment deposition could still occur. Additionally, site-specific requirements, such as soil management requirements within the ANF, may require BMPs beyond those specified by the RWQCBs in the SWPPP, or may prohibit specific BMPs that would otherwise be allowed by the RWQCBs. Guidance on erosion control practices within the ANF can be found in the *Water Quality Management for Forest System Lands in California, Best Management Practices* handbook (USDA, 2000).

In order to further reduce the potential for localized, short-term degradation of surface water quality through erosion and sedimentation, especially within the ANF, implementation of Mitigation Measures H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits) and H-1b (Dry weather construction), in addition to Mitigation Measure B-2 (Implement RCA Treatment Plan) as described in Section 3.4 (Biological Resources), would be required. Mitigation Measure H-1a would require that an Erosion Control Plan be submitted to the CPUC and the USDA Forest Service prior to commencement of any soil-disturbing activities. This plan would include a logbook that records major precipitation events and evaluates the effectiveness of existing BMPs. Iterative review of the logbook by the CPUC and the USDA Forest Service will provide the opportunity to employ adaptive management practices through review and modification, if necessary, of existing BMPs and their effectiveness. Evaluation of the effectiveness of the BMPs can be narrative, and need not include water quality testing unless otherwise required by the RWQCBs, CPUC, USDA Forest Service, or any other jurisdictional agency. Within the ANF, the applicant shall follow the Best Management Practice Evaluation Process set forth in the *Water Quality Management for Forest System Lands in California, Best Management Practices* (USDA, 2000). Examples of typical BMPs can be found in the California Department of Transportation's (Caltrans') *Stormwater Quality Handbooks, Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual* (Caltrans, 2007). Some of the more commonly employed BMPs include: preservation of existing vegetation, mulching, hydroseeding, soil binders, geotextiles, silt fences, sediment/desilting basins, check dams, fiber rolls, straw bale barriers, and stockpile management. Mitigation Measure H-1b (Dry weather construction) would minimize soil-disturbing activities during wet weather in the Angeles National Forest and Chino Hills State Park, and would prohibit soil-disturbing activities on those lands during major storm events, unless otherwise authorized by the Forest Service or State Park. On steeply sloped topography subject to intense precipitation, limiting construction to dry weather substantially lowers the potential to cause erosion and water quality degradation. Mitigation Measure B-2 (Implement RCA Treatment Plan) would require the applicant to receive ANF approval before constructing or modifying any structure, culvert, or bridge or modifying any habitat on NFS lands in Riparian Conservation Areas.

Mitigation Measures for Impact H-1

H-1a **Implement an Erosion Control Plan and demonstrate compliance with water quality permits.** SCE shall develop and submit to the CPUC and FS for approval 30 days prior to construction an Erosion Control Plan, and implement Best Management Practices (BMPs), as described below. (Note: The Erosion Control Plan may be part of the same document as the Stormwater Pollution Prevention Plan.) Within the Erosion Control Plan, the applicant shall identify the location of all soil-disturbing activities, including but not limited to new and/or improved access and spur roads, the location of all streams and drainage structures that would be directly affected by soil-disturbing activities (such as stream crossings by access roads), and the location and type of all BMPs that would be installed to protect aquatic resources. The Erosion Control Plan shall include a proposed schedule for the implementation and maintenance of erosion control measures and a description of the erosion control practices, including appropriate design details. As part of the Erosion Control Plan, SCE shall maintain a logbook of all precipitation events within the Project area that produce more than one inch of precipitation within a 24-hour period. The logbook shall contain the date of the precipitation event, the approximate duration of the event, and the amount of precipitation (measured as the largest amount recorded by a rain gage or weather station within one mile of the Project). Additionally, the logbook shall include a narrative evaluation (and/or a numerical evaluation, if required by the FS or other jurisdictional agency) of the erosion-prevention effectiveness of the existing BMPs, as well as a description of any post-storm modifications to those BMPs. The logbook shall be submitted to the CPUC and FS for review within 30 days following the first storm event (after construction has begun) that produces greater than one inch of precipitation within a 24-hour period. SCE shall re-submit the logbook annually after the first storm of the rainy season that produces more than one inch of precipitation within a 24-hour period. The logbook shall be retired 5 years after completion of construction. In addition to the Erosion Control Plan, the applicant shall submit to the CPUC and the FS evidence of possession of all required permits before engaging in soil-disturbing construction/demolition activities, before entering flowing or ponded water, or before constructing a crossing at flowing or ponded water. Such permits may include, but are not limited to, a Streambed Alteration Agreement from the California Department of Fish and Game, a Clean Water Act (CWA) Section 404 permit from the USACE, a CWA Section 402 NPDES General Permit for Storm Water Discharges Associated with Construction Activities (General Permit) from the applicable Regional Water Quality Control Board(s) (RWQCBs), and/or a CWA Section 401 certification from the applicable RWQCBs.

H-1b **Dry weather construction.** Any construction activities within the ANF and/or Chino Hills State Park (CHSP) [CHSP is only included as part of this measure for Alternative 4 (Routes A through D)] shall be scheduled to avoid anticipated precipitation events that are predicted to produce more than one-half inch of precipitation over a 24-hour period, unless expressly authorized by the FS and/or the California Department of Parks and Recreation (State Parks). If an unexpected precipitation event occurs while construction activities are already underway, SCE shall contact the FS and/or State Parks for guidance. The FS and/or State Parks may require cessation of construction activities within their jurisdiction during any precipitation event in order to prevent excessive erosion and to protect aquatic resources. On NFS lands, SCE shall also observe any criteria promulgated by the FS regarding construction during precipitation events. SCE shall provide documentation to the CPUC monitor of all wet-weather coordination with the FS and/or State Parks.

B-2 **Implement RCA Treatment Plan.** (See full description under Biological Resources, Section 3.4)

CEQA Significance Conclusion

Implementation of Mitigation Measures H-1a, H-1b, and B-2 would substantially reduce the potential for erosion and sedimentation by ensuring that construction activities employ the most effective erosion control practices, avoid periods of heavy precipitation, and minimize disturbance to Riparian Conservation Areas. These measures would minimize the potential for disturbed or stockpiled soil to be carried into nearby streams. Therefore, Impact H-1 would be reduced to a less-than-significant level (Class II).

Impact H-2: Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials.

Surface water and groundwater quality could be degraded through the accidental release of hazardous materials into a dry or flowing stream channel during Project-related construction activities. Such materials include: lead-based paint flakes, diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, lubricant grease, cement slurry, and other fluids required for the operation of construction vehicles and equipment. The transportation of concrete and the use of motorized equipment are examples of construction activities that would involve the use of potentially harmful materials. Motorized equipment could leak hazardous materials such as motor oil, transmission fluid, or antifreeze due to inadequate or improper maintenance, unnoticed or unrepaired damage, improper refueling, or operator error. The release of one or more hazardous materials into a stream channel could occur at any stream crossing within the Project area, or at any of the Project staging areas, such as marshalling yards and helicopter staging areas, that are crossed by or directly adjacent to a stream channel.

Surface water could be contaminated through either direct or indirect contact with potentially harmful or hazardous materials. Direct contact with these materials would result from a spill or leak that occurs directly above or within the bed and banks of a flowing stream or waterbody. An accidental release of a potentially harmful or hazardous material into a dry stream bed or wash would not directly impact water quality. Similarly, an accidental spill or release of hazardous materials outside of a stream channel would not directly impact water quality. However, accidental spills or releases of hazardous materials into a dry stream bed or wash, or outside of a stream channel, could indirectly impact water quality through runoff during a subsequent storm event, when the spilled material could come in contact with or be washed into a flowing stream or waterbody. See Section 3.6, Environmental Contamination and Hazards, for further analysis on the impact of an accidental release of hazardous materials outside the bed and bank of a stream channel.

Groundwater could be contaminated through indirect contact with potentially harmful or hazardous materials. Because depth to groundwater throughout the Project Regions is approximately 75 feet or more bgs, and the maximum construction-related excavation depth is approximately 40 feet bgs, no direct contact with groundwater would occur during construction of the proposed Project. However, accidental spills or releases of hazardous materials into a dry or flowing stream channel could indirectly impact groundwater through leaching. Stream channels often facilitate infiltration into the underlying groundwater and therefore an accidental release of hazardous materials within a stream channel would have a greater potential to indirectly impact groundwater resources than would an accidental release of hazardous materials outside the bed and banks of a stream channel. Hazardous material spills that are left on the ground surface within a dry stream channel and are followed quickly by a storm event could leach through the soil and into the groundwater, thereby resulting in the degradation of groundwater quality.

Northern Region

The potential for degradation of water quality through the accidental release of harmful or hazardous materials during Project construction would be relatively low within the Northern Region. Because almost all streams crossed by the proposed Project within the Northern Region are dry for most of the year, direct contamination of a waterbody by accidental spill or release of a hazardous material is unlikely.

Central Region

The potential for degradation of water quality through accidental release of potentially harmful or hazardous materials would be moderate within the Central Region. Several of the streams in the Central Region have a year-round base flow. In addition, topography in the Central Region is generally steep and characterized by relatively narrow canyons. An accidental release of hazardous materials during Project construction could result in direct contamination of a surface waterbody in the Central Region.

Southern Region

The potential for degradation of water quality through accidental release of potentially harmful or hazardous materials would be relatively low within the Southern Region. Most streams are channelized and lined with concrete, and most construction activities would occur outside of these concrete stream channels. Accidental release of hazardous materials could enter a surface waterbody through the storm drain system; however, except during rare periods of heavy precipitation, any accidental release of hazardous materials could be contained before entering the storm drain system.

The following APMs, which are considered to be part of the Project description, would reduce the likelihood that an accidental spill or release of hazardous materials would directly or indirectly impact water quality: HYD-1 (Construction SWPPP), HYD-2 (Environmental Training Program), HYD-3 (Accidental Spill Control), HYD-4 (Non-storm Water and Waste Management Pollution Controls), and HAZ-2 (Hazardous Materials and Waste Handling Management). APM HYD-1 requires implementation of a Construction SWPPP, which would define the following: where hazardous materials would be stored; where trash would be placed; where motorized equipment would be parked, fueled, and serviced; and where construction materials would be stored. APM HYD-2 requires establishment of an environmental training program to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, and SWPPP measures, to all field personnel. APM HYD-3 requires that the Construction SWPPP include an emergency response program to ensure quick and safe cleanup of accidental spills. APM HYD-4 requires that excess concrete and concrete slurry that is produced during tower and substation construction would be retained on-site within a bermed area and then transported to an approved landfill for disposal. APM HAZ-2 requires development of a Project-specific hazardous materials management and hazardous waste management program, which would outline proper hazardous materials use, storage and disposal requirements as well as hazardous waste management procedures. All Project personnel would be provided with Project-specific training.

Although the APMs APM HYD-1 through APM HYD-4 and APM HAZ-2 would reduce the potential for water quality degradation through the accidental release of potentially harmful or hazardous materials, these adverse effects could still occur. In order to further reduce the potential for degradation of water quality through accidental release of potentially harmful or hazardous materials, implementation of Mitigation Measure H-1b, described under the discussion for Impact H-1, would be required.

CEQA Significance Conclusion

Implementation of Mitigation Measure H-1b would substantially reduce the potential for water quality degradation through accidental release of potentially harmful or hazardous materials by minimizing the potential for such materials to directly contact surface water or leach into the groundwater, and would therefore reduce Impact H-2 to a less-than-significant level (Class II).

Impact H-3: Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials.

Surface water quality could be directly impacted through the accidental release of harmful or hazardous materials within a stream channel during Project operation and maintenance activities at stream crossings along access roads and near tower locations. Due to the use of vehicles and other motorized equipment during operations and maintenance, some of the potentially hazardous substances that could be released include: diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, and lubricant grease. These materials could contaminate surface water directly through contact with a flowing stream. Groundwater resources could be indirectly affected if the hazardous materials were left on the ground surface and allowed to leach into the groundwater. There are multiple federal, State, and local agencies and bodies of law with authority over the mitigation of hazardous materials spills. The specific authority over a spill depends on multiple factors such as the location and nature of the spill.

In contrast with construction activities, which would include more intensive use of heavy equipment for longer periods of time, operation of the proposed Project would include activities with substantially less potential to result in water quality degradation from the accidental spill of hazardous materials. Operational activities would include annual visual inspections of Project facilities via helicopter and light truck, with maintenance performed on an as-needed basis.

Northern Region

The potential for degradation of water quality through the accidental release of potentially harmful or hazardous materials during operation and maintenance activities would be low within the Northern Region. Because almost all streams crossed by the proposed Project within the Northern Region are dry for most of the year, direct contamination of a waterbody by accidental spill or release of a hazardous material is unlikely.

Central Region

The potential for degradation of water quality through accidental release of potentially harmful or hazardous materials during operation and maintenance activities would be low to moderate within the Central Region. Several of the streams in the Central Region have a year-round base flow. The topography is steep and characterized by relatively narrow canyons. An accidental release of hazardous materials could potentially come in direct contact with a surface waterbody, though this potential is reduced due to the low number of truck trips that would occur during operation and maintenance activities.

Southern Region

The potential for degradation of water quality through accidental release of potentially harmful or hazardous materials during operation and maintenance activities in the Southern Region would be low. Most streams are channelized and lined with concrete, and most operation and maintenance activities would occur outside of these concrete stream channels. Accidental releases of hazardous materials could enter a surface waterbody through the storm drain system. However, except during rare periods of heavy precipitation, any accidental release of hazardous materials could be contained before entering the storm drain system.

The following APMs, which are considered to be part of the Project description, would reduce the likelihood that an accidental spill or release of hazardous materials during operation and maintenance activities would directly or indirectly impact water quality: HYD-2 (Environmental Training Program) and HYD-3 (Accidental Spill Control). APM HYD-2 requires that all field personnel are trained on environmental concerns and appropriate work practices, including spill prevention and response measures. APM HYD-3 requires that the Construction SWPPP include an emergency response program to ensure quick and safe cleanup of accidental spills.

CEQA Significance Conclusion

Implementation of APMs HYD-2 and HYD-3 would substantially reduce the potential for water quality degradation through accidental release of potentially harmful or hazardous materials by ensuring that inspection and maintenance personnel have the knowledge and means to quickly and effectively address accidental releases of hazardous materials. Because these APMs would minimize the potential for accidental spills of potentially harmful or hazardous materials to directly contact or be carried into nearby waterways, or leach into the groundwater, Impact H-3 would be less than significant (Class III).

Depletion of Groundwater Supplies or Interference with Groundwater Recharge (Criterion HYD2)

Should groundwater be encountered during construction-related excavation, dewatering of the construction site would be required. However, depth to groundwater throughout the Project area is approximately 75 feet or more bgs, and the maximum construction-related excavation depth is approximately 40 feet bgs and therefore, no direct contact with groundwater would be expected to occur during construction of the proposed Project and no dewatering would be required. Creation of new impervious surfaces through construction of the proposed Project could interfere with groundwater recharge by reducing the amount of surface area through which precipitation and surface water percolates to underground aquifers. Impervious surfaces that would result from construction of the proposed Project include concrete tower footings, concrete pads beneath various substation elements, such as transformer banks, and paved or sealed access roads. The concrete tower footings and concrete pads beneath various substation elements would cover very small areas and would be distributed over a large geographic region, and therefore would not substantially interfere with groundwater recharge.

Operation of the proposed Project would consist of transmission of electric current though the transmission line as well as periodic maintenance which would consist of driving construction vehicles along or within the transmission ROW and would have no effect on groundwater recharge. Therefore, no depletion of groundwater supplies or substantial interference with groundwater recharge would result from operation and maintenance of the proposed Project.

Northern Region

The creation of new paved or sealed access roads would result in an incremental increase in the amount of impervious surface area within the Northern Region. However, the vast majority of these roads would be unpaved and would not interfere with groundwater recharge. No impact would occur.

Central Region

New access roads within the Central Region would be subject to requirements of the USDA Forest Service road Maintenance Level standards for the ANF and therefore would not substantially increase the amount of impervious surface area in the Central Region. Implementation of the proposed Project would not interfere with groundwater recharge in the Central Region. No impact would occur.

Southern Region

The vast majority of the Southern Region is already covered by impervious surface and groundwater recharge is accomplished through managed groundwater injection. Creation of new or improved access roads would not substantially alter the amount of impervious surface area within the Southern Region. No impact would occur.

Siltation, Erosion, or Other Flood-related Damage from Impeding or Redirecting Flood Flows through Placement of a Structure in a Stream or Flood Hazard Area (Criterion HYD3)

Impact H-4: Project structures would cause erosion, sedimentation, or other flood-related damage by impeding flood flows.

Encroachment of a Project structure into a stream channel or floodplain could result in flooding of or erosion damage to the encroaching structure, diversion of flows and increased flood risk for adjacent property, or increased erosion on adjacent property. As shown in Figures 3.8-2, 3.8-4, and 3.8-5, the proposed Project would traverse several individual FEMA-designated Flood Hazard Areas.

Northern Region

In the Northern Region, the proposed Project would cross through Flood Hazard Areas associated with the following canyons or waterways: Oak Creek, the Los Angeles Aqueduct, Broad Canyon, Myrick Canyon, California Aqueduct, Amargosa Creek, Anaverde Creek, and Soledad Canyon.

Central Region

In the Central Region, the proposed Project would cross one Flood Hazard Area associated with Kentucky Springs Canyon. Additional flood hazards may be associated with streams within the ANF, but FEMA does not map Flood Hazard Areas within the Forest.

Southern Region

In the Southern Region, the proposed Project would cross several Flood Hazard Areas, including those associated with the following waterways: Whittier Narrows Flood Control Basin (which includes the San Gabriel River and the Rio Hondo), Santa Fe Flood Control Basin, Little Chino Creek, Carbon Canyon, Chino Creek, Cypress Channel and Cucamonga Creek (SCE, 2007).

According to FEMA, development is permitted in Flood Hazard Areas provided that the development complies with local floodplain management ordinances (FEMA, 2005). All applicable floodplain management ordinances would be fully complied with in accordance with FEMA's regulations on development in Flood Hazard Areas. In addition to the design standards specified by FEMA's floodplain management ordinances, APM HYD-7 (Flood and Erosion Structure Damage Protection), which is part of the proposed Project design, would require that aboveground Project features such as transmission line towers and substation facilities be designed and engineered to withstand potential flooding and erosion hazards. Measures would include specially designed footings to withstand flooding due either to a 100-year flood event or failure of a nearby upstream dam or reservoir. Impact H-4 is most likely to occur where transmission towers or other permanent Project features are constructed in or closely adjacent to a watercourse. None of the infrastructure associated with the proposed Project would be situated within a watercourse (SCE 2007). However, some towers would be placed in areas subject to periodic overland flow and flooding, such as the Santa Fe Flood Control Basin, the Whittier Narrows Flood Control Basin, and some broad, ephemeral washes in the Northern Region.

Although APM HYD-7 would reduce the potential for flooding of or erosion damage to the encroaching structure, it would not address the potential for that structure to divert flood flows, increase the flood risk for adjacent property, or increase the erosion on adjacent property. In order to reduce the potential for the encroaching structure to result in these adverse effects, implementation of Mitigation Measure H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits) would be required. This mitigation measure would ensure that appropriate BMPs are employed to reduce the potential for erosion during construction activities. It would also require demonstrated compliance with all required water quality permits, including compliance with any applicable floodplain management ordinances, as required by FEMA.

CEQA Significance Conclusion

Implementation of Mitigation Measure H-1a would substantially reduce the potential for damage due to flooding or erosion of the encroaching structure, diversion of flood flows and increased flood risk for adjacent property, or increased erosion on adjacent property through implementation of an erosion control plan and demonstrated compliance with applicable permits, such as local floodplain management ordinances. Because this measure would minimize the potential for damage due to flooding or erosion of either the encroaching structure or adjacent property, Impact H-4 would be reduced to a less-than-significant level (Class II).

Flooding from Increased Rate or Amount of Surface Runoff (Criterion HYD4)

The rate and amount of surface runoff is determined by multiple factors, including the following: amount and intensity of precipitation; amount of other imported water that enters a watershed; and amount of precipitation and imported water that infiltrates to the groundwater. Infiltration is determined by several factors, including soil type, antecedent soil moisture, rainfall intensity, the amount of impervious surfaces within a watershed, and topography. The rate of surface runoff is largely determined by topography and the storm hydrograph (the intensity of rainfall over a given period of time).

The proposed Project would not alter any precipitation amounts or intensities, nor would it require any additional water to be imported into the proposed Project area. Although grading would occur at tower locations, new and/or expanded substations, crane pads, pulling and splicing stations, and access roads, this ground disturbance would be spread over a large geographic area and would not alter the overall topography of the proposed Project area. Impervious surfaces that would result from construction of the proposed Project include concrete tower footings, concrete pads beneath various substation elements such as transformer banks and paved or sealed access roads. Concrete tower footings and concrete pads beneath various substation elements would cover very small areas and would be distributed over a large geographic region, and therefore would not substantially interfere with groundwater infiltration. The proposed Project would not alter precipitation amounts or intensities, or the amount of precipitation or imported water that infiltrates into the groundwater. Therefore, the rate or amount of surface runoff resulting from the proposed Project would not change relative to existing conditions.

Northern Region

The creation of new paved or sealed access roads would increase the amount of impervious surface area within the Northern Region; however, the vast majority of these roads would be unpaved and would not substantially interfere with groundwater infiltration. No impact would occur.

Central Region

New access roads within the Central Region would be subject to regulations of the USDA Forest Service for the ANF and would comply with all road Maintenance Level requirements. Therefore, new or improved access roads within the Central Region would not increase the amount of impervious surface area and would not interfere with infiltration. No impact would occur.

Southern Region

The vast majority of the Southern Region is already covered by impervious surface, and surface runoff is managed through a system of municipal storm drains. Groundwater infiltration is accomplished either through injection wells, infiltration and retention basins, or open spaces such as the Chino and Puente Hills. Creation of new or improved access roads would not substantially alter the amount of impervious surface area within the Southern Region, and therefore would not interfere with groundwater infiltration or the conveyance of surface runoff to drainage channels through the storm drains. No impact would occur.

Damage from Inundation by Mudflow (Criterion HYD5)

Impact H-5: Project structures would be inundated by mudflow.

Mudflows are a type of mass wasting or landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result of this super-saturation, soil and rock materials become unstable and eventually slide away from their existing location.

Northern Region

The Northern Region is characterized by generally flat terrain that would not be conducive to a mudflow event.

Central Region

Although the Central Region receives heavy seasonal precipitation and contains areas of steep slopes that would increase the probability of mudflow events, the soils within the region are not prone to mudslides.

Southern Region

The majority of the Southern Region is characterized by generally flat terrain that would not be conducive to a mudflow event. However, the steeper portions of the Puente and Chino Hills do contain soils that could form a mudflow under heavy precipitation.

The potential for inundation of Project structures by mudflow is reduced by the implementation of APM HYD-1 (Construction SWPPP) and APM HYD-7 (Flood and Erosion Structure Damage Protection), which are included under the Project description. APM HYD-1 requires implementation of a Construction SWPPP, which would include several BMPs to reduce erosion and soil movement, such as straw wattles, water bars, covered stockpiles, silt fences, silting basins, and mulching or seeding to protect exposed areas as well as monitoring to ensure that the BMPs are implemented. APM HYD-7 would require that aboveground Project features such as transmission line towers and substation facilities be designed and engineered to withstand potential flooding and erosion hazards. Measures would include specially designed footings to withstand flooding due either to a 100-year flood event or failure of a nearby upstream dam or reservoir. These design features would also help proposed Project structures withstand inundation by mudflow.

Although APM HYD-1 and APM HYD-7 would reduce the potential for damage of Project structures due to inundation by mudflow, this adverse effect could still occur, especially in the Puente and Chino Hills. In order to further reduce the potential for inundation by mudflow, implementation of Mitigation Measure G-3 (Conduct geological surveys for landslides and protect against slope instability), as described in Section 3.7 (Geology, Soils, and Paleontology), would be required.

CEQA Significance Conclusion

Implementation of Mitigation Measure G-3 would substantially reduce the potential for inundation by mudflow during the construction phase of the proposed Project. By avoiding areas prone to landslide, and by installing appropriate protection where those areas cannot be avoided, Project structures will not be placed in locations that are prone to landslide and/or mudslide without proper protection. Because this measure would minimize the potential for damage due to inundation by mudflow, Impact H-5 would be reduced to a less-than-significant level (Class II).

3.8.6.2 Cumulative Effects Analysis

A cumulative impact is one that results from the incremental impact of the proposed Project when combined with other past, present, and reasonably foreseeable future actions that occur within the geographic extent of the cumulative effects analysis.

Geographic Extent

The geographic extent of this cumulative effects analysis is the same as the extent of the regional setting, as described in Section 3.8.2 (Affected Environment). As such, this cumulative effects analysis is organized into the following three geographic regions: Northern Region, Central Region, and Southern Region. The Northern Region includes all Project components located between the Windhub Substation in southern Kern County to Vincent Substation located in unincorporated Los Angeles County. The Central Region includes all portions of the TRTP extending from Vincent Substation to the southern boundary of the ANF. The Southern Region includes all Project components located south of the ANF within Los Angeles, Orange, and San Bernardino Counties.

The proposed Project would cross the South Lahontan and South Coast HRs. These Hydrologic Regions are too large to use as geographic boundaries for consideration of cumulative effects. Because Hydrology and Water Quality impacts are typically contained within watersheds associated with major drainages (Hydrologic Units), and because water quality regulations such as TMDLs are generally implemented at the Hydrologic Unit level, the geographic extent of this cumulative effects analysis will be limited to the Hydrologic Units crossed by the proposed Project. Additional significance will be given to projects that lie within the specific Hydrologic Areas and Hydrologic Sub-Areas crossed by the proposed Project and alternatives. Within the South Lahontan and South Coast HRs, the proposed Project would cross the following Hydrologic Units: the Antelope HU, the Los Angeles River HU, the San Gabriel River HU, the Santa Ana River HU, and the Santa Clara-Calleguas HU.

Existing Cumulative Conditions

This section discusses the past projects that have occurred in the cumulative analysis area described above, in addition to ongoing projects in the area. A wide variety of past and present development projects contribute to the cumulative conditions for Hydrology and Water Quality in the Project area. A discussion of cumulative projects in the Project area is provided in Section 2.9 (Cumulative Projects). Consideration of the projects identified in that section was used to develop this analysis of cumulative effects on Hydrology and Water Quality.

Several types of development projects could contribute to the cumulative impact of the proposed Project, including housing development projects, commercial and industrial development, water infrastructure projects, and water quality improvement projects. These types of past and existing projects could combine with several proposed Project impacts to affect hydrology and water quality. Some of these possible impacts include: alteration of the landscape, degradation of water quality through encroachment on stream channels, discharge of treated wastewater, and introduction of potentially hazardous substances to stormwater runoff.

A list of existing projects within the cumulative analysis area is found in Section 2.9 (Cumulative Projects). This Cumulative Impact Scenario indicates that the vast majority of ongoing projects are residential developments. Furthermore, the population growth estimates portrayed in this scenario indicate that rapid population growth has not only occurred in the past, but it is ongoing and expected to continue into the future. Therefore, it is reasonably assumed that ongoing projects within the cumulative analysis area are characterized primarily by residential developments. A few major examples of these developments include the Ritter Ranch development, the Anaverde Ranch development, and the Agua Dulce Residential Project. Hundreds of smaller residential projects are either currently being developed or have been developed in the recent past.

In addition to residential development, two important water-conveyance features exist within the Project area: the SWP's California Aqueduct and LADWP's Los Angeles Aqueduct. In the Project area and vicinity, the former is contained within concrete channels and pipes and the latter is in pipes. The California Aqueduct is 444 miles long and transports water south for both the SWP and the federal Central Valley Project. The Los Angeles Aqueduct is 223 miles long and transports water to the southern California market from the Owens Valley, to the north. The proposed Project would cross both the California Aqueduct and the Los Angeles Aqueduct, as described in Section 3.8.2.2 (Regional Setting) and Section 3.8.2.3 (setting for the proposed Project). In addition to the California Aqueduct and the Los Angeles Aqueduct, other major water development projects in the Project area include Lake Palmdale, Littlerock Reservoir, Santa Fe Flood Control Basin, Whittier Narrows Flood Control Basin, and a variety of other dams, reservoirs, and diversion projects throughout the five Hydrologic Units listed above.

Reasonably Foreseeable Future Projects and Changes

As discussed above and portrayed in Section 2.9 (Cumulative Projects), ongoing development throughout the cumulative effects area for Hydrology and Water Quality is dominated by residential developments, clustered in and around established community areas. This trend in residential development is also representative of reasonably foreseeable future projects in the cumulative effects area, as supported by the aggressive population growth forecast in the Cumulative Impact Scenario. Two examples of major foreseeable residential development include the Aera Master Planned Community near the City of Diamond Bar and the New Model Colony near the City of Ontario. Numerous other residential developments throughout the cumulative effects area are in various stages of planning.

In addition to the reasonably foreseeable residential developments, a major water infrastructure project called the Antelope Valley Water Bank Project is being planned in the Northern Region. This project proposes to develop facilities to store and recharge imported surface water and associated delivery and distribution pipelines. The 13,440-acre facility area would be bounded by the Kern/Los Angeles County border line (also known as Avenue A) to the south and Rosamond Blvd to the north, and between 170th Street West and 100th Street West in unincorporated Kern County. Segment 4 of the proposed Project would traverse the Water Bank Facility at approximately 160th Street West and Avenue A.

Cumulative Impact Analysis

Impacts of the proposed Project would be cumulatively considerable if they would have the potential to combine with impacts of other past, present, or reasonably foreseeable projects. The potential for Hydrology and Water Quality impacts of the proposed Project to combine with the effects of other projects within the geographic scope of the cumulative analysis is described below.

- **Construction activities would degrade surface water quality through erosion and accelerated sedimentation (Impact H-1).** Construction of the overhead transmission line towers and substations would require several types of soil disturbance. Excavation and/or grading would be required at all tower sites where new pads or footings would be required and at all new and/or expanded substations. Additional clearing of vegetation and/or grading would be required for crane pads, pulling/stringing stations, staging areas, marshalling yards, concrete batch plants, helicopter staging areas, tower wreck-out staging areas, and access and spur roads. Without implementation of proper soil management practices, disturbance of soil during construction could result in soil erosion and short-term impacts to water quality through increased turbidity and sediment deposition into local streams. If construction activities for other projects in the area also result in erosion and sedimentation of nearby surface waters, and such impacts occur at the same time as they would for the proposed Project's construction activities, the resulting impacts would be cumulatively considerable to Hydrology and Water Quality in the Project area. Although mitigation measures that would be implemented for the proposed Project would reduce this impact to a less-than-significant level for the proposed Project itself, several residential development projects with construction activities substantial enough to contribute to erosion and sedimentation within the cumulative effects area, such as the Aera Master Planned Community near the City of Diamond Bar and the New Model Colony near the City of Ontario, are currently scheduled to occur at the same time and in the same vicinity as the proposed Project. These residential projects would likely implement best management practices that would reduce erosion and sedimentation impacts to less-than-significant levels. However, the effectiveness of best management practice implementation for these residential projects is unknown. Therefore, if best management practices are not properly implemented, it is possible that this impact of the proposed Project could combine with similar impacts of other projects to result in a cumulatively significant and unavoidable impact (Class I).

- **Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials (Impact H-2).** Surface water and groundwater quality could be degraded through the accidental release of hazardous materials during Project-related construction activities. Such materials include: lead-based paint flakes, diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, lubricant grease, cement slurry, and other fluids. The release of one or more hazardous materials could occur at tower installation locations, tower wreck-out staging areas, substation construction locations, staging areas, pulling/stringing stations, refueling stations, helicopter staging areas, concrete batch plants, stream crossings, and other locations where construction activities would occur. If construction activities for other projects in the area also result in the accidental release of potentially harmful or hazardous materials, and such impacts occur at the same time as they would for the proposed Project's construction activities, the resulting impacts would be cumulatively considerable to Hydrology and Water Quality in the Project area. Although mitigation measures that would be implemented for the proposed Project would reduce this impact to a less-than-significant level for the proposed Project itself, several large residential development projects, such as the Aera Master Planned Community near the City of Diamond Bar and the New Model Colony near the City of Ontario, would occur at the same time and in the same vicinity as the proposed Project. It is not possible to predict the accidential release of a hazardous material during construction of these residential development projects, nor is it possible to ensure proper implementation of best management practices for these projects. Therefore, this impact of the proposed Project could combine with similar impacts of other projects to result in a cumulatively significant and unavoidable impact (Class I).
- **Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials (Impact H-3).** Surface and groundwater quality could be degraded through the accidental release of potentially harmful or hazardous materials during Project operation and maintenance activities. Potentially harmful materials could be accidentally released during operational and maintenance activities at or near tower locations and along access roads. Due to the use of vehicles and other motorized equipment, some of the potentially hazardous substances that could be released include: diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, and lubricant grease. Although unlikely due to the few number of vehicle trips required for operation and maintenance, these materials could contaminate surface water through direct contact with water in a stream channel or through runoff to local streams. Within the cumulative analysis area, several large residential development projects are already approved, and several more large residential development projects are planned, such as the Aera Master Planned Community near the City of Diamond Bar and the New Model Colony near the City of Ontario. Operational activities for a residential development would include occupancy of the development, use of the residential facilities, including use of water resources and discharge of wastewater, and vehicle trips by residents and visitors to and from the residential development. These residential development operation activities could lead to an accidental release of potentially harmful or hazardous materials. These potential impacts would affect many of the same streams that would be crossed by the proposed Project. However, existing water quality regulations would greatly reduce the potential for an accidental release of hazardous materials. Therefore, it is unlikely that this impact of the proposed Project would combine with similar impacts of other projects. This impact would be less than significant (Class III).
- **Project structures would cause erosion, sedimentation, or other flood-related damage by impeding flood flows (Impact H-4).** Encroachment of a Project structure into a stream channel or floodplain could result in flooding of or erosion damage to the encroaching structure, diversion of flows and increased flood risk for adjacent property, or increased erosion on adjacent property. Impact H-4 is most likely to occur where transmission towers or other permanent Project features are constructed in or closely adjacent to a watercourse. None of the infrastructure associated with the proposed Project would be situated within a watercourse (SCE, 2007). However, some towers would be placed in areas subject to periodic overland flow and flooding, such as the Santa Fe Flood Control Basin, the Whittier Narrows Flood Control Basin, and some broad, ephemeral washes in the Northern Region. Numerous present and foreseeable residential development projects, such as the Aera Master Planned Community near the City of Diamond Bar and the New Model Colony near the City of Ontario, could impede flood flows if proper design features were not implemented. For the Project this impact would be reduced to a less-than-significant level with implementation of mitigation measures, as would be required for present and foreseeable residential development projects.Therefore, the cumulative impact would be less than significant (Class III).

- **Project structures would be inundated by mudflow (Impact H-5).** Mudflows are a type of mass wasting or landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result, soil and rock materials become unstable and eventually slide away from their existing location, in a mudflow event. For the proposed Project, the potential for inundation of Project structures by mudflow would be reduced to a less-than-significant level through the implementation of Mitigation Measure G-3, described under the discussion for Impact H-5. While the present and reasonably foreseeable residential development projects in the cumulative effects area could potentially increase the probability that Project structures would be inundated by mudflow, this potential is likely very low because residential development projects tend to decrease the overall slope in an area through grading and earth movement. An overall decrease in slope would lower the probability that Project structures would be inundated by mudflow. Therefore, the cumulative impact of inundation of Project structures by mudflow is considered less than significant (Class III).

In summary, the proposed Project would contribute to two Hydrology and Water Quality impacts that would be cumulatively significant and unavoidable (Class I), one Hydrology and Water Quality impact that would be less than significant with mitigation (Class II), and two Hydrology and Water Quality impacts that would be considered less than significant (Class III).

Mitigation to Reduce the Project's Contribution to Significant Cumulative Effects

Mitigation measures introduced for the proposed Project in Section 3.8.6.1 (Direct and Indirect Effects Analysis) would help to reduce the proposed Project's incremental contribution to cumulative impacts. However, no additional mitigation measures have been identified that would reduce cumulative impacts to a less-than-significant level for Hydrology and Water Quality.

3.8.7 Alternative 3: West Lancaster Alternative

The following section describes Hydrology and Water Quality impacts of Alternative 3 (West Lancaster Alternative), as determined by the significance criteria listed in Section 3.8.4.1. Mitigation measures are introduced where necessary in order to reduce significant impacts to less-than-significant levels. This alternative would deviate from the proposed route along Segment 4, at approximately S4 MP 14.9, where the new 500-kV transmission line would turn south down 115th Street West for approximately 3.0 miles and turn east for approximately 0.5 mile, rejoining the proposed route at S4 MP 17.9. This re-route would increase the overall distance of Segment 4 by approximately 0.4 mile, and would cross two additional unnamed streams.

3.8.7.1 Direct and Indirect Effects Analysis

The significance criteria used to identify impacts to Hydrology and Water Quality are introduced in Section 3.8.4.1 (Criteria for Determining Impact Significance). Impacts associated with this alternative are presented below under the applicable significance criterion.

Water Quality Violations, Waste Discharges, or Polluted Runoff (Criterion HYD1)

Impacts associated with Criterion HYD1 for Alternative 3 would be the same as impacts associated with this criterion for the proposed Project. Although this alternative introduces a re-route of part of the proposed transmission line in the Northern Region, the re-route would cross three of the same unnamed streams as the proposed Project, plus two additional unnamed streams. The two additional unnamed streams do not differ in channel type or flow characteristics from the other unnamed nearby streams that are crossed by the proposed Project. Therefore, the Hydrology and Water Quality impacts of Alternative

3 would be nearly identical to the proposed Project but of a slightly greater magnitude. A list of the streams and groundwater basins that could potentially be affected by impacts of Alternative 3 (with the exception of the two additional unnamed streams) is included in the *Hydrology and Water Quality Specialist Report* (refer to Tables 2.3-1 through 2.3-3). These impacts and their associated mitigation measures that fall under Criterion HYD1 are summarized in the following paragraphs. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of these impacts, as they are nearly identical to the proposed Project.

Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) for this alternative is nearly identical to Impact H-1 for the proposed Project. Although this alternative requires a minor re-route in the Northern Region, and would cross two additional unnamed streams, the overall impact of Alternative 3 on erosion and sedimentation would remain unchanged compared to Impact H-1 for the proposed Project, and therefore would require implementation of the following mitigation measures: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits), H-1b (Dry weather construction), and B-2 (Implement RCA Treatment Plan). With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-1 for Alternative 3 would be less than significant (Class II).

Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is nearly identical to Impact H-2 for the proposed Project. Although this alternative requires a minor re-route in the Northern Region, and would cross two additional unnamed streams, the overall impact of Alternative 3 on water quality would remain unchanged compared to Impact H-2 for the proposed Project, and therefore would require implementation of the following mitigation measure: H-1b (Dry weather construction). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-2 for Alternative 3 would be less than significant (Class II).

Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is nearly identical to Impact H-3 for the proposed Project. Although this alternative requires a minor re-route in the Northern Region, and would cross two additional unnamed streams, the overall impact of Alternative 3 on water quality would remain unchanged compared to Impact H-3 for the proposed Project. As described in detail in Section 3.8.6.1, Impact H-3 for Alternative 3 would be less than significant (Class III).

No further impacts would be introduced by Alternative 3 under Criterion HYD1. As mentioned, please see Section 3.8.6.1 for a detailed description of the impacts and mitigation measures listed above.

Depletion of Groundwater Supplies or Interference with Groundwater Recharge (Criterion HYD2)

Should groundwater be encountered during construction-related excavation, dewatering of the construction site would be required. For Alternative 3, depth to groundwater is approximately 75 feet or more bgs, and the maximum construction-related excavation depth is approximately 40 feet bgs. Although Alternative 3 would include a minor re-route of the proposed transmission line in the Northern Region, no excavation beyond 40 feet bgs would be required along the re-routed section of the transmission line, and depth to groundwater in that area is at least 100 feet bgs. Therefore no direct contact with groundwater would be expected to occur during construction of Alternative 3 and no dewatering would be required. Creation of new impervious surfaces through construction of Alternative 3 could interfere with groundwater recharge by reducing the amount of surface area through which precipitation and surface water percolates to underground aquifers. However, impervious surfaces that would result from construction of Alternative 3 would cover very small areas and would be distributed over a large geographic region, and therefore would not substantially interfere with groundwater recharge.

Operation of Alternative 3 would consist of transmission of electric current though the transmission line as well as periodic maintenance which would consist of driving construction vehicles along or within the transmission ROW and would have no effect on groundwater recharge. Therefore, all impacts related to Criterion HYD2 would be exactly the same as those for the proposed Project and, as described under Criterion HYD2 in Section 3.8.6.1, no impact would occur.

Siltation, Erosion, or Other Flood Related Damage from Impeding or Redirecting Flood Flows through Placement of a Structure in a Stream or Flood Hazard Area (Criterion HYD3)

Impacts associated with Criterion HYD3 for Alternative 3 would be the same as impacts associated with this criterion for the proposed Project. Encroachment of a Project structure into a stream channel or floodplain could result in flooding of or erosion damage to the encroaching structure, diversion of flows and increased flood risk for adjacent property, or increased erosion on adjacent property. Although this alternative introduces a re-route of part of the proposed transmission line in the Northern Region, the re-route would not cross through or be placed within any new Flood Hazard Areas. The impediment of flood flows is most likely to occur where transmission towers or other permanent Project features are constructed in or closely adjacent to a watercourse. Alternative 3 crosses two more streams than the proposed Project, both of which are unnamed streams. It is not expected that infrastructure associated with Alternative 3 would be situated within a watercourse; however, some towers would be placed in areas subject to periodic overland flow and flooding, such as the Santa Fe Flood Control Basin, the Whittier Narrows Flood Control Basin, and some broad, ephemeral washes in the Northern Region.. Therefore, the Hydrology and Water Quality impacts of Alternative 3 that fall under Criterion HYD3 would be the same as the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is the same as for the proposed Project.

Impact H-4 (Project structures would cause erosion, sedimentation, or other flood-related damage by impeding flood flows) for this alternative is nearly identical to Impact H-4 for the proposed Project. Although this alternative requires a minor re-route in the Northern Region, and would cross two additional unnamed streams, the overall impact of Alternative 3 on flooding would remain unchanged compared to Impact H-4 for the proposed Project, and therefore would require implementation of the following mitigation measure: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-4 for Alternative 3 would be less than significant (Class II).

Flooding from Increased Rate or Amount of Surface Runoff (Criterion HYD4)

The amount of surface runoff is determined by the amount of precipitation and other imported water that enters a watershed, minus the amount of precipitation and imported water that infiltrates into the groundwater. Infiltration is determined by several factors, including soil type, antecedent soil moisture, rainfall intensity, the amount of impervious surfaces within a watershed, and topography. The rate of surface runoff is largely determined by topography and the storm hydrograph (the intensity of rainfall over a given period of time). Alternative 3 would not alter any precipitation amounts or intensities, nor would it require any additional water to be imported into the proposed Project area. Although Alternative

3 would include a minor re-route of the proposed transmission line in the Northern Region, this alternative would create the same amount and distribution of impervious surfaces as the proposed Project, and therefore would have the same effect on groundwater infiltration as described for the proposed Project under Section 3.8.6.1.

Alternative 3 would not substantially alter precipitation amounts or intensities, or the amount of precipitation or imported water that infiltrates into the groundwater. Therefore, all impacts related to Criterion HYD4 would be exactly the same as those for the proposed Project and, as described under Criterion HYD4 in Section 3.8.6.1, no impact would occur.

Damage from Inundation by Mudflow (Criterion HYD5)

Impacts associated with Criterion HYD5 for Alternative 3 would be the same as impacts associated with this criterion for the proposed Project. Mudflows are a type of mass wasting or landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result, soil and rock materials become unstable and eventually slide away from their existing location, in a mudflow event. Although this alternative introduces a re-route of part of the proposed transmission line in the Northern Region, it would still pass through the same mudslide prone areas, such as the Puente and Chino Hills. Therefore, the Hydrology and Water Quality impacts of Alternative 3 that fall under Criterion HYD5 would be the same as the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is the same as for the proposed Project.

Impact H-5 (Project structures would be inundated by mudflow) for this alternative is nearly identical to Impact H-5 for the proposed Project. Although this alternative requires a minor re-route in the Northern Region, and would cross two additional unnamed streams, the overall impact of Alternative 3 on inundation by mudflow would remain unchanged compared to Impact H-5 for the proposed Project, and therefore would require implementation of the following mitigation measure: G-3 (Conduct geological surveys for landslides and protect against slope instability). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-5 for Alternative 3 would be less than significant (Class II).

3.8.7.2 Cumulative Effects Analysis

This section addresses potential cumulative effects that would occur as a result of implementation of Alternative 3 (West Lancaster Alternative). This alternative consists of a brief re-route of the proposed transmission line just north of Antelope Substation, which would add approximately 0.4 mile to the length of the route. The remainder of this alternative route (south of Antelope Substation) would be identical to that of the proposed Project and would, therefore, result in identical impacts as the proposed Project. The rerouted portion of the Alternative 3 route generally parallels the proposed Project route to the west. As a result, this alternative traverses the same or similar land uses as the portion of the proposed Project route it is proposed to replace, would require the same types of construction activities to build, and would result in the same operational capacity as the proposed Project. Based on the substantial similarity of Alternative 3 to the proposed Project, this alternative's contribution to cumulative impacts would be identical to that of the proposed Project.

Geographic Extent

Alternative 3 only differs from the proposed Project for a very small portion of the proposed route in the City of Lancaster, near Antelope Substation. This area is still encompassed by the geographic extent of the cumulative analysis defined for Alternative 2 in Section 3.8.6.2. Therefore, the geographic extent of the cumulative analysis for Alternative 3 is exactly the same as that for Alternative 2.

Existing Cumulative Conditions

The existing cumulative conditions for Alternative 3 are exactly the same as for Alternative 2, as described in Section 3.8.6.2.

Reasonably Foreseeable Future Projects and Changes

Reasonably foreseeable future projects and changes to the cumulative scenario for Alternative 3 would be exactly the same as Alternative 2, described in Section 3.8.6.2.

Cumulative Impact Analysis

Impacts associated with Alternative 3 would be cumulatively considerable if they would have the potential to combine with impacts of other past, present, or reasonably foreseeable projects. The minor re-route of the proposed Project transmission line associated with Alternative 3 would not affect the proposed Project's contribution to cumulative impacts and therefore, cumulative impacts of Alternative 3 would be exactly the same as cumulative impacts for Alternative 2, as detailed in Section 3.8.6.2 and described below.

The following impacts would be cumulatively considerable but less than significant (Class III): Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials), Impact H-4 (Project structures would cause erosion, sedimentation, or other flood related damage by impeding flood flows), and Impact H-5 (Project structures would be inundated by mudflow).

The following impacts would be cumulatively considerable and would combine with similar impacts of other projects to result in impacts that would be significant and unavoidable (Class I): Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) and Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials).

Mitigation to Reduce the Project's Contribution to Significant Cumulative Effects

Mitigation measures introduced for Alternative 3 in Section 3.8.7.1 (Direct and Indirect Effects Analysis) would help to reduce this alternative's incremental contribution to cumulative impacts. However, no additional mitigation measures have been identified that would reduce cumulative impacts to a less-than-significant level for Hydrology and Water Quality.

3.8.8 Alternative 4: Chino Hills Route Alternatives

The following section describes the impacts to Hydrology and Water Quality of Alternative 4 (Chino Hills Route Alternatives), as determined by the significance criteria listed in Section 3.8.4.1. Mitigation measures are introduced where necessary in order to reduce significant impacts to less-than-significant levels.

3.8.8.1 Direct and Indirect Effects Analysis

The significance criteria used to identify the Hydrology and Water Quality impacts of Alternative 4 are introduced in Section 3.8.4.1 (Criteria for Determining Impact Significance). This alternative would follow the same route as the proposed Project through the Northern and Central Regions, diverging from the proposed Project route along Segment 8A in the Southern Region, at S8A MP 19.2. Therefore, any impacts of the proposed Project that would occur between S8A MP 19.2 and 35.2 (16 miles) through Chino Hills, Chino, and Ontario would not occur under Alternative 4. In addition, impacts associated with Segments 8B and 8C of the proposed Project also would not occur under Alternative 4. Where the proposed route for Alternative 4 diverges from the proposed Project route at S8A MP 19.2, it would turn to the southeast, crossing through part of Orange County, San Bernardino County, and CHSP. Therefore, Alternative 4 would introduce Hydrology and Water Quality impacts to these areas which would not be introduced through the proposed Project.

This alternative includes four separate routing options: Route A, Route B, Route C, and Route D. For the purposes of this impact analysis, the routing options for Alternative 4 are discussed in comparison to each other throughout the following section. As described, the alignment of Alternative 4 would be the same as the proposed Project west and north of S8A MP 19.2.

All Hydrology and Water Quality impacts that would occur under the proposed Project would also occur under each of the Alternative 4 routing options. However, due to differences between the proposed Project route and each of the proposed Alternative 4 routing options, different streams and/or groundwater basins would be avoided and/or affected under each routing option. Therefore, this section summarizes all impacts of Alternative 4, which are described in detail for the proposed Project in Section 3.8.6.1. Stream crossings that would occur under the proposed Project but that would be avoided under this alternative are listed in the *Hydrology and Water Quality Specialist Report*, Table 2.5-1.

All routing options for Alternative 4 would cross nine unnamed streams before they diverge near the border of Chino Hills State Park. After the four routing options for Alternative 4 diverge, they differ in terms of number of streams crossed. Route A would cross five unnamed streams. Route B would cross eight streams, including Aliso Creek and seven unnamed streams. Route C would cross ten unnamed streams. Route D would cross four streams, including Aliso Creek and three unnamed streams.

All Hydrology and Water Quality impacts that are expected to occur under the routing options for Alternative 4 are presented in the following discussions according to their corresponding significance criteria.

Water Quality Violations, Waste Discharges, or Polluted Runoff (Criterion HYD1)

As described in the introduction for this analysis of Alternative 4, impacts associated with Criterion HYD1 would be mostly the same for Alternative 4 as for the proposed Project. However, the four different routing options included under Alternative 4 would avoid some surface water and groundwater resources along the proposed Project alignment and would introduce other stream crossings associated with each of the four routing options. These surface water and groundwater resources and the associated impacts and mitigation measures that fall under Criterion HYD1 are summarized below.

Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) would be the same under Alternative 4 as it would for the proposed Project (please see Section 3.8.6.1), with the exception of the four routing options which are described below. As described in Section 3.8.6.1, Impact H-1 would result due to several types of soil disturbance. Excavation and/or grading would be required at all tower sites where new pads or footings would be required and at all new and/or expanded substations. Additional clearing of vegetation and/or grading would be required for crane pads, pulling stations, staging areas, and new and/or improved access and spur roads. Disturbance of soil during construction could result in soil erosion and lowered water quality through increased turbidity and sediment deposition into local streams. In Chino Hills State Park, where the topography is steep and the stream channels are mostly natural and unimproved, the potential for degradation of surface water quality through erosion and sedimentation is relatively high compared to the flatter, more urbanized topography of the portion of the proposed Project that would be avoided under this alternative. Therefore, Impact H-1 for Alternative 4 would be the same as Impact H-1 for the proposed Project, but of a slightly greater magnitude due to the increased potential for erosion and sedimentation through Chino Hills State Park. Impact H-1 for Alternative 4 would require the following mitigation measures, which are fully described in Section 3.8.6.1: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits), H-1b (Dry weather construction), and B-2 (Implement RCA Treatment Plan).

Route A. Several streams that would have the potential to be affected by Impact H-1 under the proposed Project would not be affected under the Route A option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route A would introduce the potential for Impact H-1 to affect five new unnamed streams. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-1 for Alternative 4, Route A, would be less than significant (Class II).

Route B. Several streams that would have the potential to be affected by Impact H-1 under the proposed Project would not be affected under the Route B option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route B would introduce the potential for Impact H-1 to affect eight new streams, including Aliso Creek and seven unnamed streams. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-1 for Alternative 4, Route B, would be less than significant (Class II).

Route C. Several streams that would have the potential to be affected by Impact H-1 under the proposed Project would not be affected under the Route C option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route C would introduce the potential for Impact H-1 to affect ten new unnamed streams. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-1 for Alternative 4, Route C, would be less than significant (Class II).

Route D. Several streams that would have the potential to be affected by Impact H-1 under the proposed Project would not be affected under the Route D option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route D would introduce the potential for Impact H-1 to affect four new streams, including Aliso Creek and three unnamed streams. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-1 for Alternative 4, Route D, would be less than significant (Class II).

Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) would be mostly the same under Alternative 4 as it would for the proposed Project (please see Section 3.8.6.1), with the exception of the four routing options which are described below. Surface water and groundwater quality could be degraded through the accidental release of hazardous materials during Project-related construction activities. Such materials include: lead-based paint flakes, diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, lubricant grease, cement slurry, and other fluids. The preparation and pouring of concrete and the use of motorized equipment are examples of construction activities that would specifically involve the use of potentially harmful materials. Impact H-2 for Alternative 4 would require the following mitigation measure, which is fully described in Section 3.8.6.1: H-1b (Dry weather construction).

Route A. Several streams that would have the potential to be affected by Impact H-2 under the proposed Project would not be affected under the Route A option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route A would introduce the potential for Impact H-2 to affect five new unnamed streams. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-2 for Alternative 4, Route A, would be less than significant (Class II).

Route B. Several streams that would have the potential to be affected by Impact H-2 under the proposed Project would not be affected under the Route B option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route B would introduce the potential for Impact H-2 to affect eight new streams, including Aliso Creek and seven unnamed streams. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-2 for Alternative 4, Route B, would be less than significant (Class II).

Route C. Several streams that would have the potential to be affected by Impact H-2 under the proposed Project would not be affected under the Route C option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route C would introduce the potential for Impact H-2 to affect three new unnamed streams. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-2 for Alternative 4, Route C, would be less than significant (Class II).

Route D. Several streams that would have the potential to be affected by Impact H-2 under the proposed Project would not be affected under the Route D option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route D would introduce the potential for Impact H-2 to affect four new streams, including Aliso Creek and three unnamed streams. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-2 for Alternative 4, Route D, would be less than significant (Class II).

Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) would be mostly the same under Alternative 4 as it would for the proposed Project (please see Section 3.8.6.1), with the exception of the four routing options which are described below. Surface and groundwater quality could potentially be degraded through the accidental release of potentially harmful or hazardous materials during Project operation and maintenance activities. Potentially harmful materials could be accidentally released during operational and maintenance activities at or near tower locations and along access roads. Due to the use of vehicles and other motorized equipment, some of the potentially hazardous substances that could be released include: diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, and lubricant grease. However, the potential for this impact to occur would be minimal due to the low number of vehicle trips required for operation and maintenance.

Route A. Several streams that would have the potential to be affected by Impact H-3 under the proposed Project would not be affected under the Route A option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route A would introduce the potential for Impact H-3 to affect five new unnamed streams. As described in detail in Section 3.8.6.1, Impact H-3 for Alternative 4, Route A, would be less than significant (Class III).

Route B. Several streams that would have the potential to be affected by Impact H-3 under the proposed Project would not be affected under the Route B option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route B would introduce the potential for Impact H-3 to affect eight new streams, including Aliso Creek and seven unnamed streams. As described in detail in Section 3.8.6.1, Impact H-3 for Alternative 4, Route B, would be less than significant (Class III).

Route C. Several streams that would have the potential to be affected by Impact H-3 under the proposed Project would not be affected under the Route C option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route C would introduce the potential for Impact H-3 to affect ten new unnamed streams. As described in detail in Section 3.8.6.1, Impact H-3 for Alternative 4, Route C, would be less than significant (Class III).

Route D. Several streams that would have the potential to be affected by Impact H-3 under the proposed Project would not be affected under the Route D option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route D would introduce the potential for Impact H-3 to affect four new streams, including Aliso Creek and three unnamed streams. As described in detail in Section 3.8.6.1, Impact H-3 for Alternative 4, Route D, would be less than significant (Class III).

No further impacts would be introduced by Alternative 4 under Criterion HYD1. As mentioned, please see Section 3.8.6.1 for a detailed description of the impacts and mitigation measures listed above.

Depletion of Groundwater Supplies or Interference with Groundwater Recharge (Criterion HYD2)

Should groundwater be encountered during construction-related excavation, dewatering of the construction site would be required. For the proposed Project, depth to groundwater is approximately 75 feet or more bgs, and the maximum construction-related excavation depth is approximately 40 feet bgs. Although Alternative 4 would include several different routing options of the proposed transmission line in the Southern Region, no excavation beyond 40 feet bgs would be required along the re-routed section of the transmission line, and depth to groundwater in that area is approximately 75 feet or more bgs. Therefore no direct contact with groundwater would be expected to occur during construction of Alternative 4 and no dewatering would be required. Creation of new impervious surfaces through construction of Alternative 4 could interfere with groundwater recharge by reducing the amount of surface area through which precipitation and surface water percolates to underground aquifers. However, impervious surfaces that would result from construction of Alternative 4 would cover very small areas and would be distributed over a large geographic region, and therefore would not substantially interfere with groundwater recharge.

Operation of Alternative 4 would consist of transmission of electric current through the transmission line as well as periodic maintenance which would consist of driving construction vehicles along or within the transmission ROW and would have no effect on groundwater recharge. Therefore, all impacts related to Criterion HYD2 would be exactly the same as those for the proposed Project and, as described under Criterion HYD2 in Section 3.8.6.1, no impact would occur.

Siltation, Erosion, or Other Flood Related Damage from Impeding or Redirecting Flood Flows through Placement of a Structure in a Stream or Flood Hazard Area (Criterion HYD3)

As described in the introduction for this analysis of Alternative 4, impacts associated with Criterion HYD3 would be mostly the same for Alternative 4 as for the proposed Project. However, the four different routing options included under Alternative 4 would avoid some surface water and groundwater resources along the proposed Project alignment and would introduce other stream crossings associated with each of the four routing options. These surface water and groundwater resources and the associated impacts and mitigation measures that fall under Criterion HYD3 are summarized below.

Impact H-4 (Project structures would cause erosion, sedimentation, or other flood-related damage by impeding flood flows) would be mostly the same under Alternative 4 as it would for the proposed Project (please see Section 3.8.6.1), with the exception of the four routing options which are described below. Encroachment of a Project structure into a stream channel or floodplain could result in flooding of or erosion damage to the encroaching structure, diversion of flows and increased flood risk for adjacent property, or increased erosion on adjacent property. Although this alternative introduces several re-route options for the proposed transmission line in the Southern Region, the re-route options would not cross through or be placed within any new Flood Hazard Areas. The impediment of flood flows is most likely to occur where transmission towers or other permanent Project features are constructed in or closely adjacent to a watercourse. The four different routing options included under Alternative 4 would avoid some surface water and groundwater resources along the proposed Project alignment and would introduce other stream crossings associated with each of the four routing options. The following mitigation measure would be required for Impact H-4 under Alternative 4: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits).

> ***Route A.*** Several streams that would have the potential to be affected by Impact H-4 under the proposed Project would not be affected under the Route A option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route A would introduce the potential for Impact H-4 to affect five new unnamed streams. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-4 for Alternative 4, Route A, would be less than significant (Class II).

> ***Route B.*** Several streams that would have the potential to be affected by Impact H-4 under the proposed Project would not be affected under the Route B option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route B would introduce the

potential for Impact H-4 to affect eight new streams, including Aliso Creek and seven unnamed streams. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-4 for Alternative 4, Route B, would be less than significant (Class II).

Route C. Several streams that would have the potential to be affected by Impact H-4 under the proposed Project would not be affected under the Route C option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route C would introduce the potential for Impact H-4 to affect ten new unnamed streams. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-4 for Alternative 4, Route C, would be less than significant (Class II).

Route D. Several streams that would have the potential to be affected by Impact H-4 under the proposed Project would not be affected under the Route D option. In addition to the unnamed streams that would be avoided, the named streams that would no longer be impacted include Little Chino Creek, Chino Creek, and Cucamonga Creek. However, Route D would introduce the potential for Impact H-4 to affect four new streams, including Aliso Creek and three unnamed streams. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-4 for Alternative 4, Route D, would be less than significant (Class II).

No further impacts would be introduced by Alternative 4 under Criterion HYD3. As mentioned, please see Section 3.8.6.1 for a detailed description of the impacts and mitigation measures listed above.

Flooding from Increased Rate or Amount of Surface Runoff (Criterion HYD4)

The amount of surface runoff is determined by the amount of precipitation and other imported water that enters a watershed, minus the amount of precipitation and imported water that infiltrates into the groundwater. Infiltration is determined by several factors, including soil type, antecedent soil moisture, rainfall intensity, the amount of impervious surfaces within a watershed, and topography. The rate of surface runoff is largely determined by topography and the storm hydrograph (the intensity of rainfall over a given period of time). Alternative 4 would not alter any precipitation amounts or intensities, nor would it require any additional water to be imported into the proposed Project area. Creation of new impervious surfaces through construction of Alternative 4 could interfere with groundwater recharge by reducing the amount of surface area through which precipitation and surface water percolates to underground aquifers. However, impervious surfaces that would result from construction of Alternative 4 would cover very small areas and would be distributed over a large geographic region, and therefore would have the same effect on groundwater infiltration as described for the proposed Project under Section 3.8.6.1.

Alternative 4 would not substantially alter precipitation amounts or intensities, or the amount of precipitation or imported water that infiltrates into the groundwater. Therefore, all impacts related to Criterion HYD4 would be exactly the same as those for the proposed Project and, as described under Criterion HYD4 in Section 3.8.6.1, no impact would occur.

Damage from Inundation by Mudflow (Criterion HYD5)

As described in the introduction for this analysis of Alternative 4, impacts associated with Criterion HYD5 would be mostly the same for Alternative 4 as for the proposed Project. However, the four different routing options included under Alternative 4 would avoid some surface water and groundwater resources along the proposed Project alignment and would introduce other stream crossings associated with each of the four routing options. These surface water and groundwater resources and the associated impacts and mitigation measures that fall under Criterion HYD5 are summarized below.

Impact H-5 (Project structures would be inundated by mudflow) would be mostly the same under Alternative 4 as it would for the proposed Project (please see Section 3.8.6.1), with the exception of the four routing options which are described below. Mudflows are a type of mass wasting or landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result, soil and rock materials become unstable and eventually slide away from their existing location, in a mudflow event. The several re-route options for the proposed transmission line in the Southern Region would pass through the steep terrain of CHSP, where soils are susceptible to mudflow. Therefore, the Hydrology and Water Quality impacts of Alternative 4 that fall under Criterion HYD5 would be similar but of a greater magnitude than the proposed Project. The following mitigation measure would be required for Impact H-5 under Alternative 4: G-3 (Conduct geological surveys for landslides and protect against slope instability).

Route A. As described above, the eastern portion of Segment 8A (starting at mile post 19.3), as well as all of Segments 8B and 8C would not be included as part of this alternative route. Therefore, the mudflow hazards associated with those segments of the proposed Project route would not affect this alternative route. However, Route A would introduce new steep terrain and soils susceptible to mudflow near Chino Hills State Park, which could produce potential new mudflow hazards that would not be introduced under the proposed Project. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-5 for Alternative 4, Route A, would be less than significant (Class II).

Route B. As described above, the eastern portion of Segment 8A (starting at mile post 19.3), as well as all of Segments 8B and 8C would not be included as part of this alternative route. Therefore, the mudflow hazards associated with those segments of the proposed Project route would not affect this alternative route. However, Route B would introduce new steep terrain and soils susceptible to mudflow near Chino Hills State Park, which could produce potential new mudflow hazards that would not be introduced under the proposed Project. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-5 for Alternative 4, Route B, would be less than significant (Class II).

Route C. As described above, the eastern portion of Segment 8A (starting at mile post 19.3), as well as all of Segments 8B and 8C would not be included as part of this alternative route. Therefore, the mudflow hazards associated with those segments of the proposed Project route would not affect this alternative route. However, Route C would introduce new steep terrain and soils susceptible to mudflow near Chino Hills State Park, which could produce potential new mudflow hazards that would not be introduced under the proposed Project. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-5 for Alternative 4, Route C, would be less than significant (Class II).

Route D. As described above, the eastern portion of Segment 8A (starting at mile post 19.3), as well as all of Segments 8B and 8C would not be included as part of this alternative route. Therefore, the mudflow hazards associated with those segments of the proposed Project route would not affect this alternative route. However, Route D would introduce new steep terrain and soils susceptible to mudflow near Chino Hills State Park, which could produce potential new mudflow hazards that would not be introduced under the proposed Project. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-5 for Alternative 4, Route D, would be less than significant (Class II).

No further impacts would be introduced by Alternative 4 under Criterion HYD5. As mentioned, please see Section 3.8.6.1 for a detailed description of the impacts and mitigation measures listed above.

3.8.8.2 Cumulative Effects Analysis

This section addresses potential cumulative effects that would occur as a result of implementation of Alternative 4 (Chino Hills Route Alternatives). This alternative consists of four different routing options which would diverge from the proposed Project route in the City of Chino Hills. The route for Alternative 4 would be exactly the same as that of the proposed Project for all segments except Segment 8, where the Alternative 4 routing options (Routes A through D) would diverge from the proposed Project alignment at S8A MP 19.2. Furthermore, Alternative 4 would require the same types of construction activities to build, and would result in the same operational capacity as the proposed Project. Based on the substantial similarity of Alternative 4 to the proposed Project, this alternative's contribution to cumulative impacts would be similar or identical to that of the proposed Project. However, when compared to the proposed Project, each alternative's contribution to certain cumulative impacts may be incrementally increased or decreased as a result of the rerouted portion of the alternative. With regards to Alternative 4, any incremental increases or decreases in the Project's contribution to the cumulative scenario would result from the location of the alternative alignments associated with Routes A, B, C, and D.

Geographic Extent

Alternative 4 differs from the proposed Project in the southwestern portion of the proposed route, near the cities of Chino, Chino Hills, and Ontario. This area is still encompassed by the geographic extent of the cumulative analysis defined for Alternative 2 in Section 3.8.6.2. Therefore, the geographic extent of the cumulative analysis for Alternative 4 is exactly the same as that for Alternative 2 and would include all of the Northern, Central, and Southern Regions.

Existing Cumulative Conditions

The existing cumulative conditions for Alternative 4 are exactly the same as for Alternative 2, as described in Section 3.8.6.2.

Reasonably Foreseeable Future Projects and Changes

Reasonably foreseeable future projects and changes to the cumulative scenario for Alternative 4 would be exactly the same as Alternative 2, described in Section 3.8.6.2.

Cumulative Impact Analysis

As described in Section 3.8.6.2, impacts associated with Alternative 4 would be cumulatively considerable if they would have the potential to combine with impacts of other past, present, or reasonably foreseeable projects. The proposed re-route options of Alternative 4 would have the potential to incrementally increase or decrease the proposed Project's contribution to cumulative impacts because they would have the potential to affect surface water and groundwater resources that would not be affected by the proposed Project, and they would likewise avoid effects to some surface water and groundwater resources that would be impacted by the proposed Project. The analysis of the Alternative 4 routing options provided in Section 3.8.8.1 indicates that although there would be some location-specific differences between the proposed Project and the Alternative 4 routing options, such location-specific differences are limited to a portion of the Southern Region and across the entirety of the proposed routes (including the proposed Project), the nature of impacts that would occur are the same between the proposed Project and Alternative 4. As such, the contribution of Alternative 4 to cumulative impacts would be the same as the proposed Project's contribution, as summarized below. Please see Section 3.8.6.2 (Cumulative Effects Analysis: Alternative 2) for a detailed discussion of these cumulative Project impacts.

The following impacts would be cumulatively considerable but less than significant **(**Class III**)**: Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials), Impact H-4 (Project structures would cause erosion, sedimentation, or other flood related damage by impeding flood flows), and Impact H-5 (Project structures would be inundated by mudflow).

The following impacts would be cumulatively considerable and would combine with similar impacts of other projects to result in impacts that would be significant and unavoidable **(**Class I**)**: Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) and Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials).

Mitigation to Reduce the Project's Contribution to Significant Cumulative Effects

Mitigation measures introduced for Alternative 4 in Section 3.8.8.1 (Direct and Indirect Effects Analysis) would help to reduce this alternative's incremental contribution to cumulative impacts. However, no additional mitigation measures have been identified that would reduce cumulative impacts to a less-than-significant level for Hydrology and Water Quality.

3.8.9 Alternative 5: Partial Underground Alternative

The following section describes Hydrology and Water Quality impacts of Alternative 5 (Partial Underground), as determined by the significance criteria listed in Section 3.8.4.1. Mitigation measures are introduced where necessary in order to reduce significant impacts to less-than-significant levels. This alternative would follow the same route as the proposed Project through the Northern and Central Regions. In the Southern Region, Alternative 5 would place 3.5 miles of Segment 8A underground beneath the same corridor as the proposed aboveground T/L, from MP 21.9 to MP 25.4. Under this alternative, the existing 220-kV T/L along Segment 8A would be left in place from MP 21.9 to MP 25.4. Several streams that would be crossed by the proposed Project along Segment 8A, between MP 21.9 to MP 25.4, would not be crossed by Alternative 5 because the transmission infrastructure would be placed well below those streams. In addition, this alternative would come in contact with the underlying groundwater basin because the transmission infrastructure would be placed below the depth to groundwater.

3.8.9.1 Direct and Indirect Effects Analysis

The significance criteria used to identify impacts to Hydrology and Water Quality are introduced in Section 3.8.4.1 (Criteria for Determining Impact Significance). Impacts associated with this alternative are presented below under the applicable significance criterion.

Water Quality Violations, Waste Discharges, or Polluted Runoff (Criterion HYD1)

Impacts associated with Criterion HYD1 for Alternative 5 would be similar to the impacts associated with this criterion for the proposed Project. This alternative places a portion of the proposed transmission line underground through the City of Chino Hills. This alternative would avoid eight stream crossings that would otherwise be crossed by the proposed Project, including three unnamed streams and five crossings of Little Chino Creek. Aside from the eight stream crossings that would be avoided, all remaining stream crossings for Alternative 5 are the same as for the proposed Project. Additionally, because this alternative would place transmission infrastructure between 100 and 400 feet below ground, the Chino Subbasin of the Upper Santa Ana Valley Groundwater Basin would be encountered. These impacts and their associated mitigation measures that fall under Criterion HYD1 are summarized in the following paragraphs. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for additional description of these impacts, as they are similar to the proposed Project.

Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) for this alternative is nearly identical to Impact H-1 for the proposed Project. Although this alternative places a portion of Segment 8A underground in the Southern Region, through the City of Chino Hills, the vast majority of the surface water resources that would be impacted by the proposed Project would also be impacted by Alternative 5, with the exception of the eight stream crossings listed in Table 2.6-1 of the *Hydrology and Water Quality Specialist Report*. The overall impact of Alternative 5 on erosion and sedimentation would remain unchanged compared to Impact H-1 for the proposed Project, and therefore would require implementation of the following mitigation measures: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits), H-1b (Dry weather construction), and B-2 (Implement RCA Treatment Plan). With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-1 for Alternative 5 would be less than significant (Class II).

Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is very similar to Impact H-2 for the proposed Project, with the exception of the undergrounded portion of Segment 8A. Although this alternative would avoid eight stream crossings in the Southern Region, the vast majority of the water resources that could be degraded through the accidental release of potentially harmful or hazardous materials under the proposed Project could also be degraded under this alternative. The most substantial difference between Impact H-2 as described for the proposed Project and Impact H-2 for this alternative is the increased potential for degradation of the groundwater in the Chino Subbasin through the accidental release of potentially harmful or hazardous materials. Depth to groundwater along the eastern portion of the undergrounded section is approximately 75 feet bgs, and the planned excavation depth for the eastern access shaft is approximately 100 feet. Therefore, construction activities will likely come in direct contact with the groundwater in that area, which would increase the potential for degradation of groundwater quality through release of potentially harmful or hazardous materials, such as hydraulic fluid, engine oil, and lubricants. Dewatering of the eastern access shaft construction site may be necessary to reduce the potential for contamination of the groundwater through the accidental release of potentially harmful or hazardous materials. Contact with the groundwater would be limited to construction of the eastern access shaft. Groundwater would not be encountered at the western access shaft because no groundwater underlies that shaft. Additionally, no groundwater would be encountered during construction of the horizontal tunnel because tunnel construction would utilize pressurized-face tunnel boring machines, which would prevent groundwater intrusion. Although construction of the underground portion of

Alternative 5 could degrade groundwater through accidental release of potentially harmful or hazardous materials, the overall impact of Alternative 5 on water quality would remain mostly unchanged compared to Impact H-2 for the proposed Project.Impact H-2 for Alternative 5 would require implementation of the following mitigation measures: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits) and H-1b (Dry weather construction). By requiring demonstrated compliance with water quality permits (such as the NPDES General Permit or other required dewatering discharge permits), Mitigation Measure H-1a would ensure proper design and implementation of any dewatering activities, and would substantially reduce the likelihood that groundwater supplies would be contaminated. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-2 for Alternative 5 would be less than significant (Class II).

Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is nearly identical to Impact H-3 for the proposed Project. Although this alternative requires undergrounding a small portion of Segment 8A in the Southern Region, and would result in eight fewer stream crossings, the overall operational impact of Alternative 5 on water quality would remain unchanged compared to Impact H-3 for the proposed Project. Although construction of the underground portion of Alternative 5 would likely come in contact with groundwater, the completed tunnel and access shafts would be impervious to groundwater; therefore, operation and maintenance activities would not have the potential to degrade groundwater quality through the accidental release of potentially harmful or hazardous materials. Impact H-3 for Alternative 5 would be less than significant (Class III).

Impact H-6: Discharge of contaminated groundwater during dewatering operations would degrade surface water quality.

Impact H-6 (Discharge of contaminated groundwater during dewatering operations would degrade surface water quality) for Alternative 5 would result from the improper discharge of dewatered contaminated groundwater. As described in Section 3.8.2.2, the Chino Subbasin exceeds MCLs for TDS, inorganics, radiology, nitrates, pesticides, VOCs and perchlorate. Construction of the eastern access shaft for this alternative would require excavation down to 100 feet, and the groundwater level is at approximately 75 feet bgs in that area. Therefore, dewatering likely would be required. Improper design and/or implementation of a dewatering plan could result in discharge of contaminated groundwater to a surface waterbody, which would subsequently lead to degradation of surface water quality. A proper dewatering plan would include testing of the groundwater to be dewatered, and subsequent treatment of that groundwater prior to discharge if contamination is discovered. Discharge of the dewatered effluent would be regulated under the NPDES permit required by the appropriate Regional Water Quality Control Board. Compliance with the conditions of the NPDES permit would ensure that contaminated groundwater is properly tested and treated, if necessary, prior to discharge to any surface water. See Section 3.8.3 for more information on the NPDES permit requirements.

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Impact H-6 for Alternative 5 would require implementation of the following mitigation measure: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits). Mitigation Measure H-1a would ensure proper design and implementation of any dewatering activities through demonstrated compliance with NPDES requirements, and would substantially reduce the likelihood that surface water would be contaminated. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-6 for Alternative 5 would be less than significant (Class II).

No further impacts would be introduced by Alternative 5 under Criterion HYD1. As mentioned, please see Section 3.8.6.1 for a detailed description of Impacts H-1 through H-3 and the associated mitigation measures.

Depletion of Groundwater Supplies or Interference with Groundwater Recharge (Criterion HYD2)

Should groundwater be encountered during construction-related excavation, dewatering of the construction site would be required. For Alternative 5, depth to groundwater is approximately 75 feet bgs in the southwestern portion of the Chino Subbasin, and the eastern access shaft will be excavated to 100 feet. Therefore excavation of the eastern access shaft would likely require dewatering of the construction site. However, this dewatering activity would involve very low quantities of groundwater relative to the Chino Subbasin's storage and capacity, would occur at the edge of the groundwater basin, would continue for a short period of time, and would not substantially change groundwater levels. No other portion of Alternative 5 would encounter groundwater or require dewatering.

Creation of new impervious surfaces through construction of Alternative 5 could interfere with groundwater recharge by reducing the amount of surface area through which precipitation and surface water percolates to underground aquifers. However, impervious surfaces that would result from construction of Alternative 5 would cover very small areas and would be distributed over a large geographic region, and therefore would not substantially interfere with groundwater recharge.

Operation of Alternative 5 would consist of transmission of electric current though the transmission line as well as periodic maintenance which would consist of driving construction vehicles along or within the transmission ROW and underground tunnel, and would have no effect on groundwater recharge. Therefore, all impacts related to Criterion HYD2 would be very similar to those for the proposed Project and, as described under Criterion HYD2 in Section 3.8.6.1, no impact would occur.

Siltation, Erosion, or Other Flood Related Damage from Impeding or Redirecting Flood Flows through Placement of a Structure in a Stream or Flood Hazard Area (Criterion HYD3)

Impacts associated with Criterion HYD3 for Alternative 5 would be very similar to the impacts associated with this criterion for the proposed Project, but of a slightly greater magnitude. Encroachment of a Project structure into a stream channel or floodplain could result in flooding of or erosion damage to the encroaching structure, diversion of flows and increased flood risk for adjacent property, or increased erosion on adjacent property. Although this alternative introduces an undergrounded portion of Segment 8A in the Southern Region, the existing aboveground towers would be left in place and would have a similar potential to impede or redirect flood flows compared to the towers that would be installed under the proposed Project. The impediment of flood flows is most likely to occur where transmission towers or other permanent Project features are constructed in or closely adjacent to a watercourse. Alternative 5 crosses a stream eight fewer times than the proposed Project. It is not expected that infrastructure associated with Alternative 5 would be situated within a watercourse; however, some towers would be placed in areas subject to periodic overland flow and flooding, such as the Santa Fe Flood Control Basin, the Whittier Narrows Flood Control Basin, and some broad, ephemeral washes in the Northern Region. Additionally, the aboveground structure associated with the eastern access shaft for the underground portion of Segment 8A would be placed within a Flood Hazard Area. If not properly designed, this structure could impede or redirect flood flows. However, placement of the eastern access shaft aboveground structure within a Flood Hazard Area would not substantially alter the overall potential for the impediment or redirection of flood flows, compared to the proposed Project. Therefore, the Hydrology and Water Quality impacts of Alternative 5 that fall under Criterion HYD3 would be very similar to the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is mostly the same as for the proposed Project.

Impact H-4 (Project structures would cause erosion, sedimentation, or other flood-related damage by impeding flood flows) for this alternative is nearly identical to Impact H-4 for the proposed Project. Although this alternative undergrounds a small portion of Segment 8A in the Southern Region, and would place an additional structure in a Flood Hazard Area, the overall impact of Alternative 5 on flooding would remain unchanged compared to Impact H-4 for the proposed Project, and therefore would require implementation of the following mitigation measure: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-4 for Alternative 5 would be less than significant (Class II).

Flooding from Increased Rate or Amount of Surface Runoff (Criterion HYD4)

The amount of surface runoff is determined by the amount of precipitation and other imported water that enters a watershed, minus the amount of precipitation and imported water that infiltrates into the groundwater. Infiltration is determined by several factors, including soil type, antecedent soil moisture, rainfall intensity, the amount of impervious surfaces within a watershed, and topography. The rate of surface runoff is largely determined by topography and the storm hydrograph (the intensity of rainfall over a given period of time). Alternative 5 would not alter any precipitation amounts or intensities, nor would it require any additional water to be imported into the proposed Project area. Although Alternative 5 would include an underground portion of the proposed transmission line in the Southern Region, this alternative would create mostly the same amount and distribution of impervious surfaces as the proposed Project, and therefore would have the same effect on groundwater infiltration as described for the proposed Project under Section 3.8.6.1.

Alternative 5 would not substantially alter precipitation amounts or intensities, or the amount of precipitation or imported water that infiltrates into the groundwater. Therefore, all impacts related to Criterion HYD4 would be exactly the same as those for the proposed Project and, as described under Criterion HYD4 in Section 3.8.6.1, no impact would occur.

Damage from Inundation by Mudflow (Criterion HYD5)

Impacts associated with Criterion HYD5 for Alternative 5 would be the same as impacts associated with this criterion for the proposed Project. Mudflows are a type of mass wasting or landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result, soil and rock materials become unstable and eventually slide away from their existing location, in a mudflow event. Although this alternative introduces an underground portion of the proposed transmission line in the Southern Region, it would still pass through the same steep terrain and soils susceptible to mudflow through the Puente and Chino Hills. Therefore, the Hydrology and Water Quality impacts of Alternative 5 that fall under

Criterion HYD5 would be mostly the same as the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is mostly the same as for the proposed Project.

Impact H-5 (Project structures would be inundated by mudflow) for this alternative is nearly identical to Impact H-5 for the proposed Project. Although this alternative requires an underground portion of Segment 8A in the Southern Region, and would cross a stream eight fewer times, the overall impact of Alternative 5 on inundation by mudflow would remain unchanged compared to Impact H-5 for the proposed Project, and therefore would require implementation of the following mitigation measure: G-3 (Conduct geological surveys for landslides and protect against slope instability). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-5 for Alternative 5 would be less than significant (Class II).

3.8.9.2 Cumulative Effects Analysis

This section addresses potential cumulative effects that would occur as a result of implementation of Alternative 5 (Partial Underground Alternative). This alternative consists of a short underground portion of the proposed transmission line just east of the Puente and Chino Hills, which would lead to eight fewer stream crossings. The remainder of this alternative route would be identical to that of the proposed Project and would, therefore, result in nearly identical impacts as the proposed Project. The undergrounded portion of the Alternative 5 route follows the exact same ROW as the proposed Project. As a result, this alternative traverses the same land uses as the portion of the proposed Project route it is proposed to replace, and would result in the same operational capacity as the proposed Project. Based on the substantial similarity of Alternative 5 to the proposed Project, this alternative's contribution to cumulative impacts would be nearly identical to that of the proposed Project, with the exception of potential impacts to groundwater.

Geographic Extent

Alternative 5 only differs from the proposed Project for a very small portion of the proposed route in the City of Chino Hills. This area is still encompassed by the geographic extent of the cumulative analysis defined for Alternative 2 in Section 3.8.6.2. Therefore, the geographic extent of the cumulative analysis for Alternative 5 is exactly the same as that for Alternative 2.

Existing Cumulative Conditions

The existing cumulative conditions for Alternative 5 are exactly the same as for Alternative 2, as described in Section 3.8.6.2.

Reasonably Foreseeable Future Projects and Changes

Reasonably foreseeable future projects and changes to the cumulative scenario for Alternative 5 would be exactly the same as Alternative 2, described in Section 3.8.6.2.

Cumulative Impact Analysis

Impacts associated with Alternative 5 would be cumulatively considerable if they would have the potential to combine with impacts of other past, present, or reasonably foreseeable projects. The small underground portion of the proposed transmission line associated with Alternative 5 would not affect this alternative's contribution to cumulative impacts other than potential impacts to groundwater and therefore, cumulative impacts of Alternative 5 would be very similar to cumulative impacts for Alternative 2, as detailed in Section 3.8.6.2 and described below.

This alternative would introduce one new impact compared to the proposed Project, Impact H-6 (Discharge of contaminated groundwater during dewatering operations would degrade surface water quality). However, Impact H-6 would not be cumulatively considerable because implementation of Mitigation Measure H-1a would require demonstrated compliance with NPDES discharge permits and therefore any dewatered groundwater would be tested and treated prior to discharge. The discharge of clean and/or treated groundwater would not have the potential to combine with impacts from other projects because the clean and/or treated discharge would not contribute to the degradation of surface water.

The following impacts would be cumulatively considerable but less than significant **(**Class III**)**: Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials), Impact H-4 (Project structures would cause erosion, sedimentation, or other flood related damage by impeding flood flows), and Impact H-5 (Project structures would be inundated by mudflow).

The following impacts would be cumulatively considerable and would combine with similar impacts of other projects to result in impacts that would be significant and unavoidable **(**Class I**)**: Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) and Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials).

Mitigation to Reduce the Project's Contribution to Significant Cumulative Effects

Mitigation measures introduced for Alternative 5 in Section 3.8.9.1 (Direct and Indirect Effects Analysis) would help to reduce this alternative's incremental contribution to cumulative impacts. However, no additional mitigation measures have been identified that would reduce cumulative impacts to a less-than-significant level for Hydrology and Water Quality.

3.8.10 Alternative 6: Maximum Helicopter Construction in the ANF Alternative

The following section describes Hydrology and Water Quality impacts of Alternative 6 (Maximum Helicopter Construction in the ANF Alternative), as determined by the significance criteria listed in Section 3.8.4.1. Mitigation measures are introduced where necessary in order to reduce significant impacts to less-than-significant levels. This alternative would differ from the proposed Project in that up to 143 towers in the ANF would be constructed by helicopter. The use of helicopters for tower construction would preclude the need for construction and/or improvements along several access and spur roads within the ANF.

3.8.10.1 Direct and Indirect Effects Analysis

The significance criteria used to identify impacts to Hydrology and Water Quality are introduced in Section 3.8.4.1 (Criteria for Determining Impact Significance). Impacts associated with this alternative are presented below under the applicable significance criterion.

Water Quality Violations, Waste Discharges, or Polluted Runoff (Criterion HYD1)

Impacts associated with Criterion HYD1 for Alternative 6 would be similar to impacts associated with this criterion for the proposed Project, but of a lesser magnitude. Although this alternative introduces helicopter construction of up to 143 towers in the ANF, the majority of the streams that are crossed by the proposed Project would also be crossed by Alternative 6. Several streams that are crossed by access and spur roads associated with the proposed Project would be avoided by this alternative. See Section 3.4, Biological Resources, for a description of the streams that would be avoided under this alternative. Because Alternative 6 is identical to the proposed Project outside of the ANF, and because many of the same streams within the ANF that are affected by the proposed Project are also affected by Alternative 6, the Hydrology and Water Quality impacts of Alternative 6 would be similar to the proposed Project, but of a lesser magnitude. A list of the streams and groundwater basins that could potentially be affected by impacts of Alternative 6 is included in the *Hydrology and Water Quality Specialist Report*, Tables 2.3-1 through 2.3-3. However, several streams that would be impacted by access road construction and/or improvement under the proposed Project would not be impacted under Alternative 6. For a list of streams within the ANF that would be affected by access and spur roads (both under the proposed Project and this alternative), see Section 3.4, Biological Resources. The impacts and their associated mitigation measures that fall under Criterion HYD1 are summarized in the following paragraphs. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of these impacts, as they are similar to the proposed Project, but of a lesser magnitude.

Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) for this alternative is similar to Impact H-1 for the proposed Project, but of a lesser magnitude. Although this alternative introduces helicopter construction of up to 143 towers within the ANF, and would cross several fewer streams, the overall impact of Alternative 6 on erosion and sedimentation would be very similar compared to Impact H-1 for the proposed Project, and therefore would require implementation of the following mitigation measures: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits), H-1b (Dry weather construction), and B-2 (Implement RCA Treatment Plan). With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-1 for Alternative 6 would be less than significant (Class II).

Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is very similar to Impact H-2 for the proposed Project. Although this alternative introduces helicopter construction of up to 143 towers within the ANF, and would cross several fewer streams, the overall impact of Alternative 6 on water quality would remain nearly unchanged compared to Impact H-2 for the proposed Project, and therefore would require implementation of the following mitigation measure: H-1b (Dry weather construction). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-2 for Alternative 6 would be less than significant (Class II).

Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is very similar to Impact H-3 for the proposed Project. Although this alternative introduces helicopter construction of up to 143 towers within the ANF, and would cross several fewer streams, the overall impact of Alternative 6 on water quality would remain nearly unchanged compared to Impact H-3 for the proposed Project. As described in detail in Section 3.8.6.1, Impact H-3 for Alternative 6 would be less than significant (Class III).

No further impacts would be introduced by Alternative 6 under Criterion HYD1. As mentioned, please see Section 3.8.6.1 for a detailed description of the impacts and mitigation measures listed above.

Depletion of Groundwater Supplies or Interference with Groundwater Recharge (Criterion HYD2)

Should groundwater be encountered during construction-related excavation, dewatering of the construction site would be required. For Alternative 6, depth to groundwater is approximately 75 feet or more bgs, and the maximum construction-related excavation depth is approximately 40 feet bgs. Although Alternative 6 would introduce helicopter construction of up to 143 towers within the ANF, no excavation beyond 40 feet bgs would be required, and depth to groundwater throughout the affected environment for Alternative 6 is at least 75 feet bgs. Therefore no direct contact with groundwater would be expected to occur during construction of Alternative 6 and no dewatering would be required. Creation of new impervious surfaces through construction of Alternative 6 could interfere with groundwater recharge by reducing the amount of surface area through which precipitation and surface water percolates to underground aquifers. However, impervious surfaces that would result from construction of Alternative 6 would cover very small areas and would be distributed over a large geographic region, and therefore would not substantially interfere with groundwater recharge.

Operation of Alternative 6 would consist of transmission of electric current though the transmission line as well as periodic maintenance which would consist of driving construction vehicles along or within the transmission ROW and would have no effect on groundwater recharge. Therefore, all impacts related to Criterion HYD2 would be exactly the same as those for the proposed Project and, as described under Criterion HYD2 in Section 3.8.6.1, no impact would occur.

Siltation, Erosion, or Other Flood Related Damage from Impeding or Redirecting Flood Flows through Placement of a Structure in a Stream or Flood Hazard Area (Criterion HYD3)

Impacts associated with Criterion HYD3 for Alternative 6 would be the same as impacts associated with this criterion for the proposed Project, but of a slightly lesser magnitude. Encroachment of a Project structure into a stream channel or floodplain could result in flooding of or erosion damage to the encroaching structure, diversion of flows and increased flood risk for adjacent property, or increased erosion on adjacent property. Although this alternative introduces helicopter construction of up to 143 towers within the ANF, and would cross several fewer streams, this alternative would cross through or be placed within the same Flood Hazard Areas as the proposed Project. The impediment of flood flows is most likely to occur where transmission towers or other permanent Project features are constructed in or closely adjacent to a watercourse. Alternative 6 crosses several fewer streams than the proposed Project, and it is not expected that infrastructure associated with Alternative 6 would be situated within a watercourse; however, some towers would be placed in areas subject to periodic overland flow and flooding, such as the Santa Fe Flood Control Basin, the Whittier Narrows Flood Control Basin, and some broad, ephemeral washes in the Northern Region. Therefore, the Hydrology and Water Quality impacts of Alternative 6 that fall under Criterion HYD3 would be the same as the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is the same as for the proposed Project.

Impact H-4 (Project structures would cause erosion, sedimentation, or other flood-related damage by impeding flood flows) for this alternative is nearly identical to Impact H-4 for the proposed Project.

Although this alternative introduces helicopter construction of up to 143 towers within the ANF, and would cross several fewer streams, the overall impact of Alternative 6 on flooding would remain unchanged compared to Impact H-4 for the proposed Project, and therefore would require implementation of the following mitigation measure: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-4 for Alternative 6 would be less than significant (Class II).

Flooding from Increased Rate or Amount of Surface Runoff (Criterion HYD4)

The amount of surface runoff is determined by the amount of precipitation and other imported water that enters a watershed, minus the amount of precipitation and imported water that infiltrates into the groundwater. Infiltration is determined by several factors, including soil type, antecedent soil moisture, rainfall intensity, the amount of impervious surfaces within a watershed, and topography. The rate of surface runoff is largely determined by topography and the storm hydrograph (the intensity of rainfall over a given period of time). Alternative 6 would not alter any precipitation amounts or intensities, nor would it require any additional water to be imported into the proposed Project area. Although Alternative 6 would introduce helicopter construction of up to 143 towers within the ANF, and would cross several fewer streams, this alternative would create a very similar amount and distribution of impervious surfaces as the proposed Project, and therefore would have the same effect on groundwater infiltration as described for the proposed Project under Section 3.8.6.1.

Alternative 6 would not substantially alter precipitation amounts or intensities, or the amount of precipitation or imported water that infiltrates into the groundwater. Therefore, all impacts related to Criterion HYD4 would be exactly the same as those for the proposed Project and, as described under Criterion HYD4 in Section 3.8.6.1, no impact would occur.

Damage from Inundation by Mudflow (Criterion HYD5)

Impacts associated with Criterion HYD5 for Alternative 6 would be the same as impacts associated with this criterion for the proposed Project. Mudflows are a type of mass wasting or landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result, soil and rock materials become unstable and eventually slide away from their existing location, in a mudflow event. Although this alternative introduces helicopter construction of up to 143 towers within the ANF, and would cross several fewer streams, it would still pass through the same steep terrain and soils susceptible to mudflow within the Puente and Chino Hills. Therefore, the Hydrology and Water Quality impacts of Alternative 6 that fall under Criterion HYD5 would be the same as the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is the same as for the proposed Project.

Impact H-5 (Project structures would be inundated by mudflow) for this alternative is nearly identical to Impact H-5 for the proposed Project. Although this alternative introduces helicopter construction of up to 143 towers within the ANF, and would cross several fewer streams, the overall impact of Alternative 6 on inundation by mudflow would remain unchanged compared to Impact H-5 for the proposed Project, and therefore would require implementation of the following mitigation measure: G-3 (Conduct geological surveys for landslides and protect against slope instability). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-5 for Alternative 6 would be less than significant (Class II).

3.8.10.2 Cumulative Effects Analysis

This section addresses potential cumulative effects that would occur as a result of implementation of Alternative 6 (Maximum Helicopter Construction in the ANF Alternative). This alternative introduces helicopter construction of up to 143 towers within the ANF, and would cross several fewer streams. The remainder of this alternative (outside of the ANF) would be identical to that of the proposed Project and would, therefore, result in identical impacts as the proposed Project. The Alternative 6 route is the exact same as the proposed Project route. As a result, this alternative traverses the same land uses as the proposed Project route, would require the same types of construction activities to build (with the exception of the use of helicopters in the ANF), and would result in the same operational capacity as the proposed Project. Based on the substantial similarity of Alternative 6 to the proposed Project, this alternative's contribution to cumulative impacts would be nearly identical to that of the proposed Project.

Geographic Extent

The geographic extent for Alternative 6 is exactly the same as the geographic extent of the cumulative analysis defined for Alternative 2 in Section 3.8.6.2.

Existing Cumulative Conditions

The existing cumulative conditions for Alternative 6 are exactly the same as for Alternative 2, as described in Section 3.8.6.2.

Reasonably Foreseeable Future Projects and Changes

Reasonably foreseeable future projects and changes to the cumulative scenario for Alternative 6 would be exactly the same as Alternative 2, described in Section 3.8.6.2.

Cumulative Impact Analysis

Impacts associated with Alternative 6 would be cumulatively considerable if they would have the potential to combine with impacts of other past, present, or reasonably foreseeable projects. The introduction of helicopter construction within the ANF associated with Alternative 6 would not affect the proposed Project's contribution to cumulative impacts and therefore, cumulative impacts of Alternative 6 would be nearly identical to cumulative impacts for Alternative 2, as detailed in Section 3.8.6.2 and described below.

The following impacts would be cumulatively considerable but less than significant (Class III): Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials), Impact H-4 (Project structures would cause erosion, sedimentation, or other flood related damage by impeding flood flows), and Impact H-5 (Project structures would be inundated by mudflow).

The following impacts would be cumulatively considerable and would combine with similar impacts of other projects to result in impacts that would be significant and unavoidable (Class I): Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) and Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials).

Mitigation to Reduce the Project's Contribution to Significant Cumulative Effects

Mitigation measures introduced for Alternative 6 in Section 3.8.10.1 (Direct and Indirect Effects Analysis) would help to reduce this alternative's incremental contribution to cumulative impacts. However, no additional mitigation measures have been identified that would reduce cumulative impacts to a less-than-significant level for Hydrology and Water Quality.

3.8.11 Alternative 7: 66-kV Subtransmission Alternative

The following section describes Hydrology and Water Quality impacts of Alternative 7 (66-kV Subtransmission Alternative), as determined by the significance criteria listed in Section 3.8.4.1. Mitigation measures are introduced where necessary in order to reduce significant impacts to less-than-significant levels. This alternative would follow the same route as the proposed Project through the Northern and Central Regions. In the Southern Region, this alternative is comprised of three 66-kV subtransmission line elements, including the following: (1) undergrounding the 66-kV subtransmission line in Segment 7 through the River Commons or Duck Farm Project (between Valley Boulevard – S7 MP 8.9 and S7 MP 9.9), (2) re-routing and undergrounding the 66-kV subtransmission line around the Whittier Narrows Recreation Area in Segment 7 (S7 MP 11.4 to 12.025), and (3) re-routing the 66-kV subtransmission line around the Whittier Narrows Recreation Area in Segment 8A between the San Gabriel Junction (S8A MP 2.2) and S8A MP 3.8.

3.8.11.1 Direct and Indirect Effects Analysis

The significance criteria used to identify impacts to Hydrology and Water Quality are introduced in Section 3.8.4.1 (Criteria for Determining Impact Significance). Impacts associated with this alternative are presented below under the applicable significance criterion.

Water Quality Violations, Waste Discharges, or Polluted Runoff (Criterion HYD1)

Impacts associated with Criterion HYD1 for Alternative 7 would be similar to the impacts associated with this criterion for the proposed Project. This alternative places a portion of the 66-kV subtransmission line underground in Segments 7 and 8A. All stream crossings for Alternative 7 are the same as for the proposed Project. Additionally, because this alternative would place subtransmission infrastructure below ground, the San Gabriel Valley Groundwater Basin would be encountered. These impacts and their associated mitigation measures that fall under Criterion HYD1 are summarized in the following paragraphs. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for additional description of these impacts, as they are similar to the proposed Project.

Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) for this alternative is nearly identical to Impact H-1 for the proposed Project. Although this alternative places sections of 66-kV subtransmission line associated with Segments 7 and 8A underground in the Southern Region, the vast majority of the surface water resources that would be impacted by the proposed Project would also be impacted by Alternative 7. The overall impact of Alternative 7 on erosion and sedimentation would remain unchanged compared to Impact H-1 for the proposed Project, and therefore would require implementation of the following mitigation measures: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits), H-1b (Dry weather construction), and B-2 (Implement RCA Treatment Plan). With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-1 for Alternative 7 would be less than significant (Class II).

Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is very similar to Impact H-2 for the proposed Project, with the exception of the undergrounded sections of the subtransmission lines. The vast majority of the water resources that could be degraded through the accidental release of potentially harmful or hazardous materials under the proposed Project could also be degraded under this alternative. The most substantial difference between Impact H-2 as described for the proposed Project and Impact H-2 for this alternative is the increased potential for degradation of the groundwater in the San Gabriel Valley Groundwater Basin through the accidental release of potentially harmful or hazardous materials. Although depth to groundwater in this Basin is approximately 150 feet bgs or more, locally elevated pockets of groundwater could be encountered while routing the subtransmission line under the San Gabriel River. Dewatering may be necessary. Therefore, this alternative would increase the potential for degradation of groundwater quality through release of potentially harmful or hazardous materials, such as hydraulic fluid, engine oil, and lubricants. Although construction of the underground portion of Alternative 7 could degrade groundwater through accidental release of potentially harmful or hazardous materials, the overall impact of Alternative 7 on water quality would remain mostly unchanged compared to Impact H-2 for the proposed Project. Impact H-2 for Alternative 7 would require implementation of the following mitigation measures: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits) and H-1b (Dry weather construction). By requiring demonstrated compliance with water quality permits (such as the NPDES General Permit or other required dewatering discharge permits), Mitigation Measure H-1a would ensure proper design and implementation of any dewatering activities, and would substantially reduce the likelihood that groundwater supplies would be contaminated. With implementation of the mitigation measures listed above and described in detail in Section 3.8.6.1, Impact H-2 for Alternative 7 would be less than significant (Class II).

Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials) for this alternative is nearly identical to Impact H-3 for the proposed Project. Although this alternative requires undergrounding sections of subtransmission lines in Segments 7 and 8A in the Southern Region, the overall operational impact of Alternative 7 on water quality would remain unchanged compared to Impact H-3 for the proposed Project. Although construction of the underground portion of Alternative 7 could come in contact with groundwater, the completed underground sections of subtransmission line would be impervious to groundwater; therefore, operation and maintenance activities would not have the potential to degrade groundwater quality through the accidental release of potentially harmful or hazardous materials. Impact H-3 for Alternative 7 would be less than significant (Class III).

Impact H-6 (Discharge of contaminated groundwater during dewatering operations would degrade surface water quality) for Alternative 7 would result from the improper discharge of dewatered contaminated groundwater. As described in Section 3.8.2.2, the San Gabriel Valley Groundwater Basin exceeds MCLs for TDS, nitrate, VOCs, perchlorate and NDMA. Construction of the undergrounded sections of subtransmission line for this alternative would require excavation below the San Gabriel River. Therefore, dewatering likely would be required. Improper design and/or implementation of a dewatering plan could result in discharge of contaminated groundwater to a surface waterbody, which would subsequently lead to degradation of surface water quality. A proper dewatering plan would include testing of the groundwater to be dewatered, and subsequent treatment of that groundwater prior to discharge if contamination is discovered. Discharge of the dewatered effluent would be regulated under the NPDES permit required by the appropriate Regional Water Quality Control Board. Compliance with the conditions of the NPDES permit would ensure that contaminated groundwater is properly tested and treated, if necessary, prior to discharge to any surface water. See Section 3.8.3 for more information on the NPDES permit requirements. Impact H-6 for Alternative 7 would require implementation of the following mitigation measure: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits). Mitigation Measure H-1a would ensure proper design and implementation of any dewatering activities through demonstrated compliance with NPDES requirements, and would substantially reduce the likelihood that surface water would be contaminated. With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-6 for Alternative 7 would be less than significant (Class II).

No further impacts would be introduced by Alternative 7 under Criterion HYD1. As mentioned, please see Section 3.8.6.1 for a detailed description of Impacts H-1 through H-3 and the associated mitigation measures.

Depletion of Groundwater Supplies or Interference with Groundwater Recharge (Criterion HYD2)

Should groundwater be encountered during construction-related excavation, dewatering of the construction site would be required. For Alternative 7, excavation beneath the San Gabriel River would likely require dewatering of the construction site. However, this dewatering activity would involve very low quantities of groundwater relative to the San Gabriel Valley Groundwater Basin's storage and capacity, would continue for a short period of time, and would not substantially change groundwater levels.

Creation of new impervious surfaces through construction of Alternative 7 could interfere with groundwater recharge by reducing the amount of surface area through which precipitation and surface water percolates to underground aquifers. However, impervious surfaces that would result from construction of Alternative 7 would cover very small areas and would be distributed over a large geographic region, and therefore would not substantially interfere with groundwater recharge.

Operation of Alternative 7 would consist of transmission of electric current though the transmission line as well as periodic maintenance which would consist of driving construction vehicles along or within the transmission ROW, and would have no effect on groundwater recharge. Therefore, all impacts related to Criterion HYD2 would be very similar to those for the proposed Project and, as described under Criterion HYD2 in Section 3.8.6.1, no impact would occur.

Siltation, Erosion, or Other Flood Related Damage from Impeding or Redirecting Flood Flows through Placement of a Structure in a Stream or Flood Hazard Area (Criterion HYD3)

Impacts associated with Criterion HYD3 for Alternative 7 would be very similar to the impacts associated with this criterion for the proposed Project, but of a slightly lesser magnitude. Although this alternative undergrounds sections of subtransmission line in Segments 7 and 8A, the vast majority of above-ground structures associated with the proposed Project would remain under this alternative. Encroachment of a Project structure into a stream channel or floodplain could result in flooding of or erosion damage to the encroaching structure, diversion of flows and increased flood risk for adjacent property, or increased erosion on adjacent property. The impediment of flood flows is most likely to occur where transmission towers or other permanent Project features are constructed in or closely adjacent to a watercourse. It is not expected that infrastructure associated with Alternative 7 would be situated within a watercourse; however, some towers would be placed in areas subject to periodic overland flow and flooding, such as the Santa Fe Flood Control Basin, the Whittier Narrows Flood Control Basin, and some broad, ephemeral washes in the Northern Region. The undergrounding of subtransmission lines within the Whittier Narrows Flood Control Basin will only slightly reduce the overall potential for impeding or redirecting flood flows compared to the proposed Project, because the vast majority of large transmission towers would remain unchanged under this alternative compared to the proposed Project. Therefore, the Hydrology and Water Quality impacts of Alternative 7 that fall under Criterion HYD3 would be very similar to the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is mostly the same as for the proposed Project.

Impact H-4 (Project structures would cause erosion, sedimentation, or other flood-related damage by impeding flood flows) for this alternative is nearly identical to Impact H-4 for the proposed Project. Although this alternative undergrounds sections of subtransmission lines in Segments 7 and 8A, the overall impact of Alternative 7 on flooding would remain unchanged compared to Impact H-4 for the proposed Project, and therefore would require implementation of the following mitigation measure: H-1a (Implement an Erosion Control Plan and demonstrate compliance with water quality permits). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-4 for Alternative 7 would be less than significant (Class II).

Flooding from Increased Rate or Amount of Surface Runoff (Criterion HYD4)

The amount of surface runoff is determined by the amount of precipitation and other imported water that enters a watershed, minus the amount of precipitation and imported water that infiltrates into the groundwater. Infiltration is determined by several factors, including soil type, antecedent soil moisture, rainfall intensity, the amount of impervious surfaces within a watershed, and topography. The rate of surface runoff is largely determined by topography and the storm hydrograph (the intensity of rainfall over a given period of time). Alternative 7 would not alter any precipitation amounts or intensities, nor would it require any additional water to be imported into the proposed Project area. Although Alternative 7 would include underground sections of subtransmission lines in the Southern Region, this alternative would create the same amount and distribution of impervious surfaces as the proposed Project, and therefore would have the same effect on groundwater infiltration as described for the proposed Project under Section 3.8.6.1.

Alternative 7 would not substantially alter precipitation amounts or intensities, or the amount of precipitation or imported water that infiltrates into the groundwater. Therefore, all impacts related to Criterion HYD4 would be exactly the same as those for the proposed Project and, as described under Criterion HYD4 in Section 3.8.6.1, no impact would occur.

Damage from Inundation by Mudflow (Criterion HYD5)

Impacts associated with Criterion HYD5 for Alternative 7 would be the same as impacts associated with this criterion for the proposed Project. Mudflows are a type of mass wasting or landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result, soil and rock materials become unstable and eventually slide away from their existing location, in a mudflow event. Although this alternative introduces underground sections of subtransmission lines in the Southern Region, it would still pass through the same steep terrain soils susceptible to mudflow through the Puente and Chino Hills. Therefore, the Hydrology and Water Quality impacts of Alternative 7 that fall under Criterion HYD5 would be the same as the proposed Project. This impact and its associated mitigation measures are summarized in the following paragraph. Please see Section 3.8.6.1 (Direct and Indirect Effects Analysis) for a detailed description of this impact, as it is mostly the same as for the proposed Project.

Impact H-5 (Project structures would be inundated by mudflow) for this alternative is nearly identical to Impact H-5 for the proposed Project. Although this alternative requires undergrounding sections of subtransmission lines in Segments 7 and 8A, the overall impact of Alternative 7 on inundation by mudflow would remain unchanged compared to Impact H-5 for the proposed Project, and therefore would require implementation of the following mitigation measure: G-3 (Conduct geological surveys for landslides and protect against slope instability). With implementation of the mitigation measure listed above and described in detail in Section 3.8.6.1, Impact H-5 for Alternative 7 would be less than significant (Class II).

3.8.11.2 Cumulative Effects Analysis

This section addresses potential cumulative effects that would occur as a result of implementation of Alternative 7 (66-kV Subtransmission Alternative). This alternative consists of several undergrounded sections of subtransmission line in the Southern Region. The remainder of this alternative route would be identical to that of the proposed Project and would, therefore, result in nearly identical impacts as the proposed Project. The undergrounded sections of subtransmission line under Alternative 7 follow a very similar ROW as the proposed Project. As a result, this alternative traverses the same land uses as the portion of the proposed Project route it is proposed to replace, and would result in the same operational capacity as the proposed Project. Based on the substantial similarity of Alternative 7 to the proposed Project, this alternative's contribution to cumulative impacts would be nearly identical to that of the proposed Project.

Geographic Extent

Alternative 7 only differs from the proposed Project for a very small portion of the proposed route in the Southern Region near the San Gabriel River and the Whittier Narrows Flood Control Basin. This area is still encompassed by the geographic extent of the cumulative analysis defined for Alternative 2 in Section 3.8.6.2. Therefore, the geographic extent of the cumulative analysis for Alternative 7 is exactly the same as that for Alternative 2.

Existing Cumulative Conditions

The existing cumulative conditions for Alternative 7 are exactly the same as for Alternative 2, as described in Section 3.8.6.2.

Reasonably Foreseeable Future Projects and Changes

Reasonably foreseeable future projects and changes to the cumulative scenario for Alternative 7 would be exactly the same as Alternative 2, described in Section 3.8.6.2.

Cumulative Impact Analysis

Impacts associated with Alternative 7 would be cumulatively considerable if they would have the potential to combine with impacts of other past, present, or reasonably foreseeable projects. The small underground portion of subtransmission line associated with Alternative 7 would not affect this alternative's contribution to cumulative impacts and therefore, cumulative impacts of Alternative 7 would be exactly the same as cumulative impacts for Alternative 2, as detailed in Section 3.8.6.2 and described below.

This alternative would introduce one new impact compared to the proposed Project, Impact H-6 (Discharge of contaminated groundwater during dewatering operations would degrade surface water quality). However, Impact H-6 would not be cumulatively considerable because implementation of Mitigation Measure H-1a would require demonstrated compliance with NPDES discharge permits and therefore any dewatered groundwater would be tested and treated prior to discharge. The discharge of clean and/or treated groundwater would not have the potential to combine with impacts from other projects because the clean and/or treated discharge would not contribute to the degradation of surface water.

The following impacts would be cumulatively considerable but less than significant **(**Class III**)**: Impact H-3 (Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials), Impact H-4 (Project structures would cause erosion, sedimentation, or other flood related damage by impeding flood flows), and Impact H-5 (Project structures would be inundated by mudflow).

The following impacts would be cumulatively considerable and would combine with similar impacts of other projects to result in impacts that would be significant and unavoidable **(**Class I**)**: Impact H-1 (Construction activities would degrade surface water quality through erosion and accelerated sedimentation) and Impact H-2 (Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials).

Mitigation to Reduce the Project's Contribution to Significant Cumulative Effects

Mitigation measures introduced for Alternative 7 in Section 3.8.11.1 (Direct and Indirect Effects Analysis) would help to reduce this alternative's incremental contribution to cumulative impacts. However, no additional mitigation measures have been identified that would reduce cumulative impacts to a less-than-significant level for Hydrology and Water Quality.

3.8.12 Impact Significance Summary

Table 3.8-4 summarizes the direct and indirect environmental impacts of the proposed Project (Alternative 2) and the other alternatives on Hydrology and Water Quality. The direct and indirect effects of the Project and alternatives have been fully described in Sections 3.8.6 through 3.8.11 above. Alternative 1 (No Project/No Action) impacts are fully described in Section 3.8.5; however, since no potential future project information is available an impact significance level for Alternative 1 is not included in the table below.

Table 3.8-4. Summary of Impacts and Mitigation Measures – Hydrology and Water Quality

Impact	Impact Significance								Mitigation Measures
	Alt. 1+	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	NFS Lands*	
H-1: Construction activities would degrade surface water quality through erosion and accelerated sedimentation.	N/A	Class II	Class II	Class II	Class II	Class II	Class II	Yes	H-1a: Implement an Erosion Control Plan and demonstrate compliance with water quality permits. H-1b: Dry weather construction. B-2: Implement RCA Treatment Plan.
H-2: Construction activities would degrade water quality through the accidental release of potentially harmful or hazardous materials.	N/A	Class II	Class II	Class II	Class II	Class II	Class II	Yes	H-1a (See Impact H-1) [applicable to Alternatives 5 and 7] H-1b (See Impact H-1)
H-3: Operation and maintenance activities would degrade water quality through the accidental release of potentially harmful or hazardous materials.	N/A	Class III	Class III	Class III	Class III	Class III	Class III	Yes	None recommended.
H-4: Project structures would cause erosion, sedimentation, or other flood-related damage by impeding flood flows.	N/A	Class II	Class II	Class II	Class II	Class II	Class II	Yes	H-1a (See Impact H-1)
H-5: Project structures would be inundated by mudflow.	N/A	Class II	Class II	Class II	Class II	Class II	Class II	Yes	G-3: Conduct geological surveys for landslides and protect against slope instability.
H-6: Discharge of contaminated groundwater during dewatering operations would degrade surface water quality.	N/A	No Impact	No Impact	No Impact	Class II	No Impact	Class II	No	H-1a (See Impact H-1)

N/A = Not Available.

* Indicates whether this impact is applicable to the portion of the Project on National Forest System lands.

+ Potential projects would likely traverse the same geographic regions as either the proposed Project or Alternatives 3 through 7, and subsequently introduce similar types of impacts.

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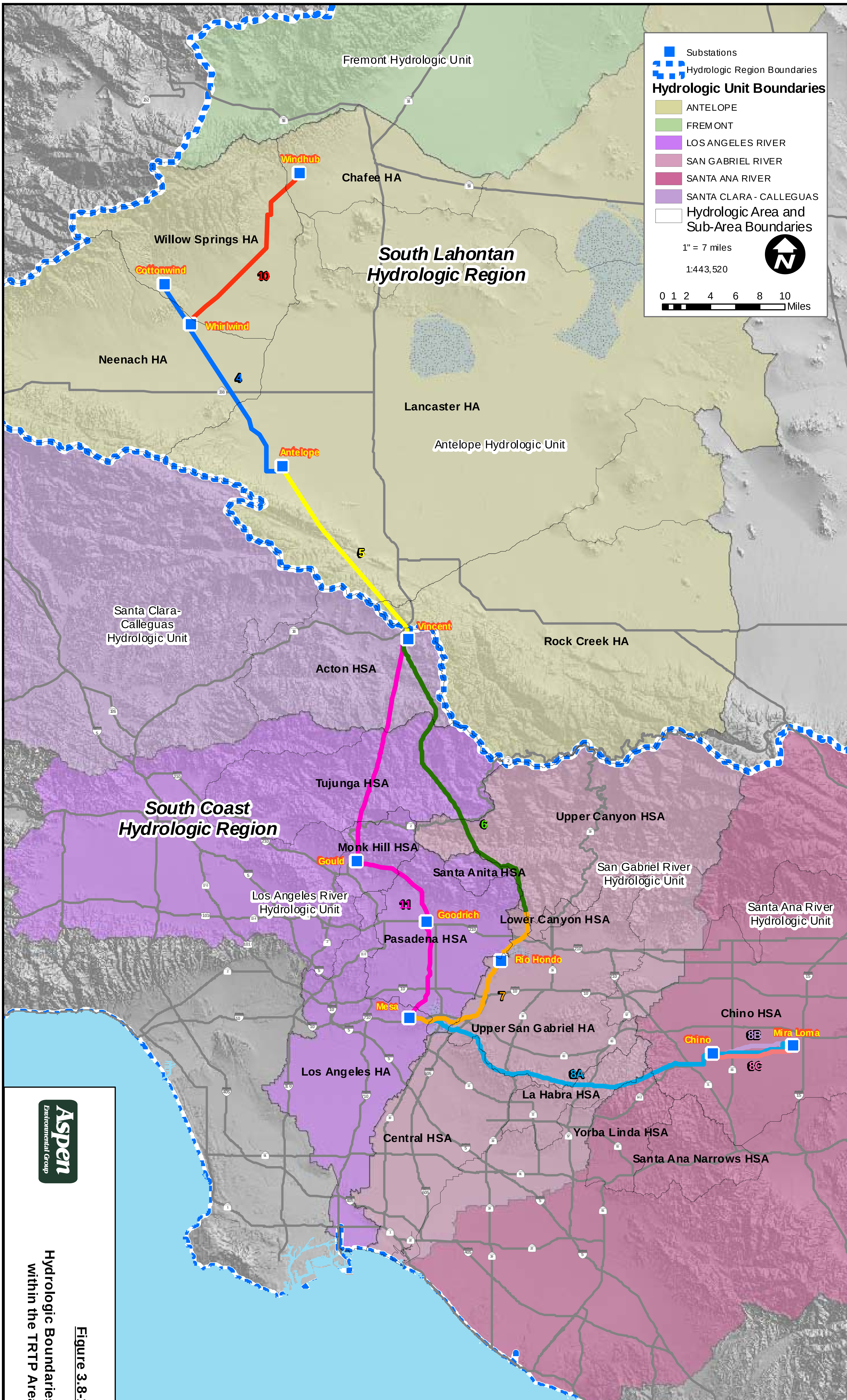


Figure 3.8-1
Hydrologic Boundaries within the TRTP Area

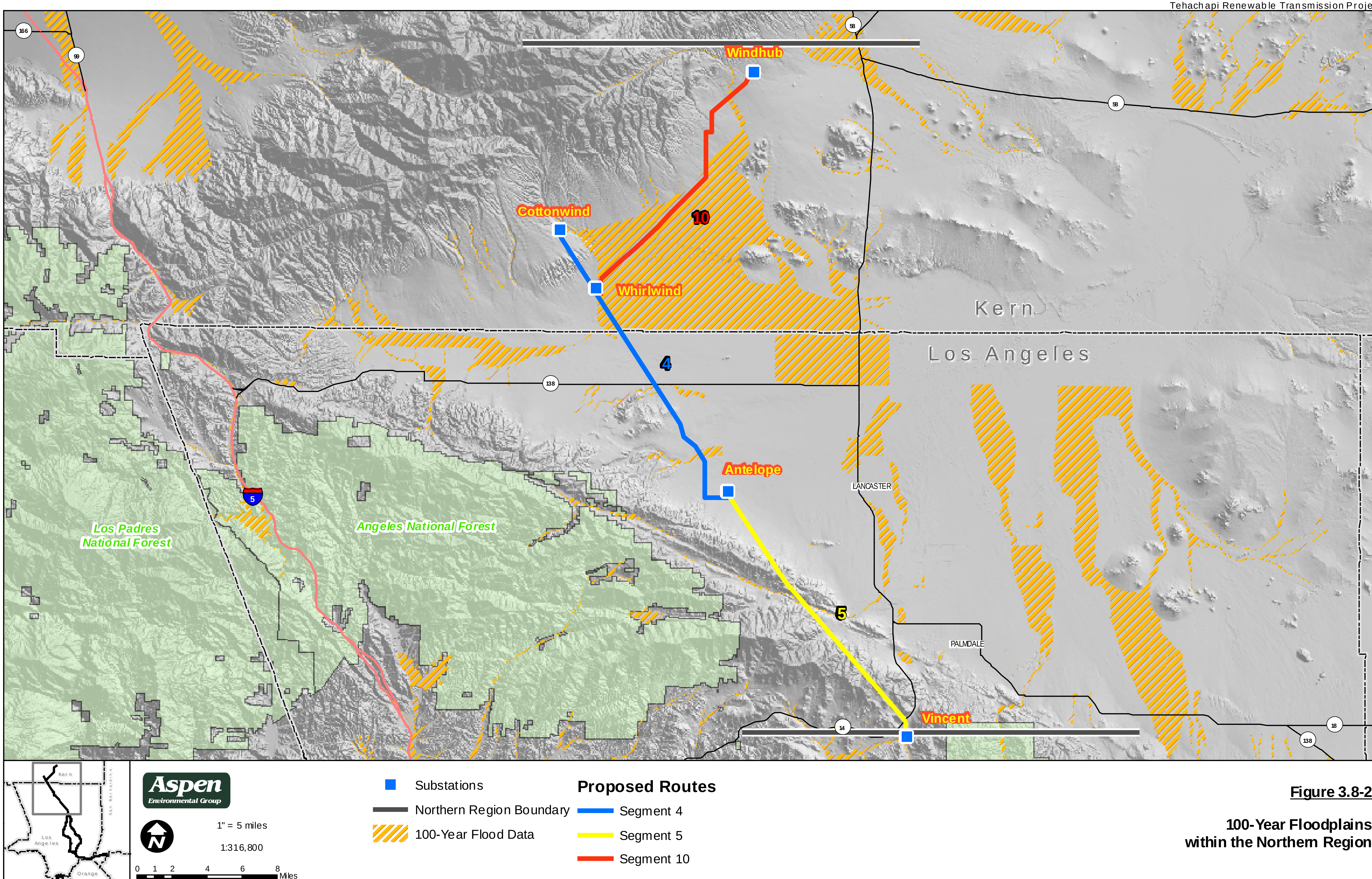
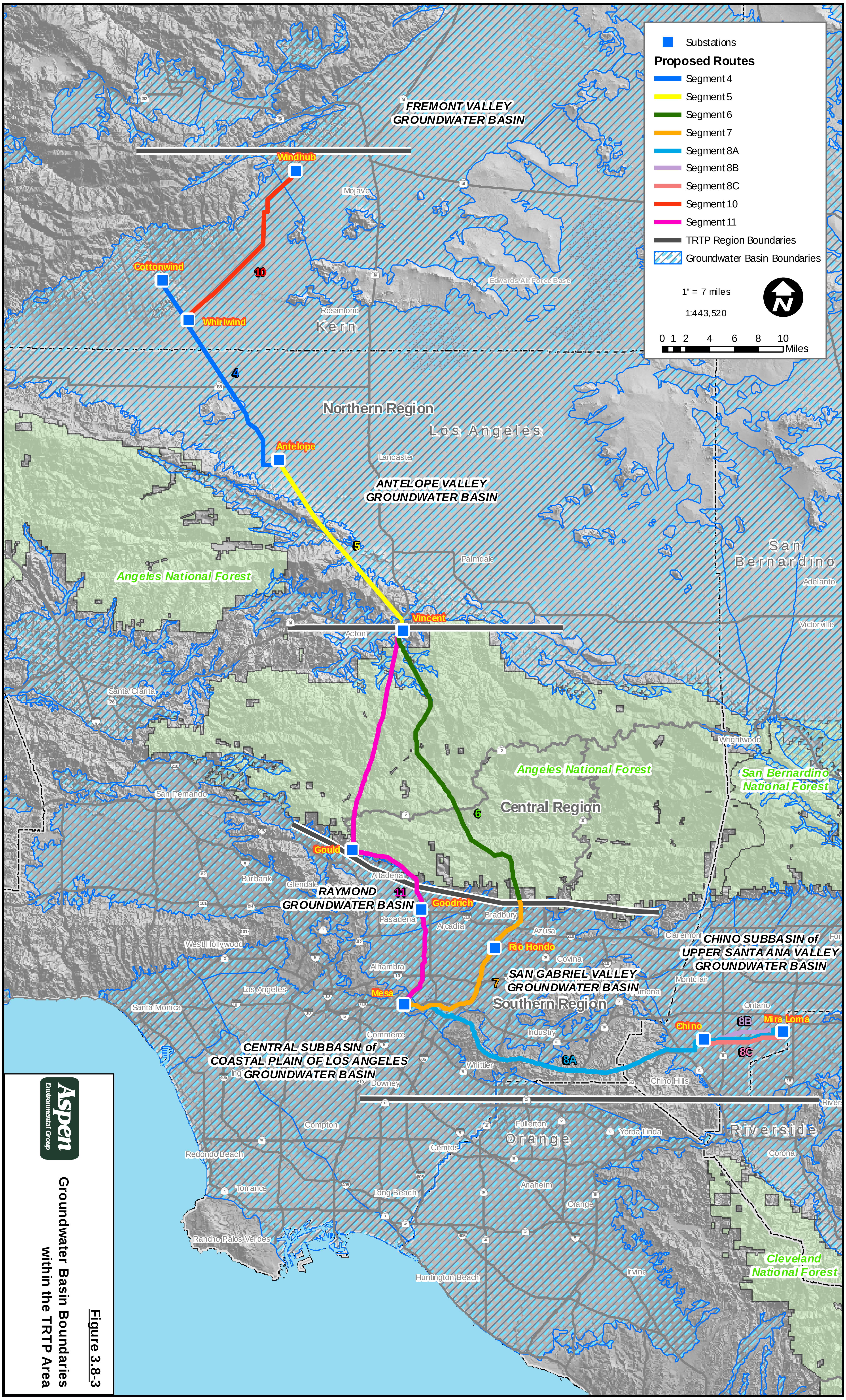


Figure 3.8-2

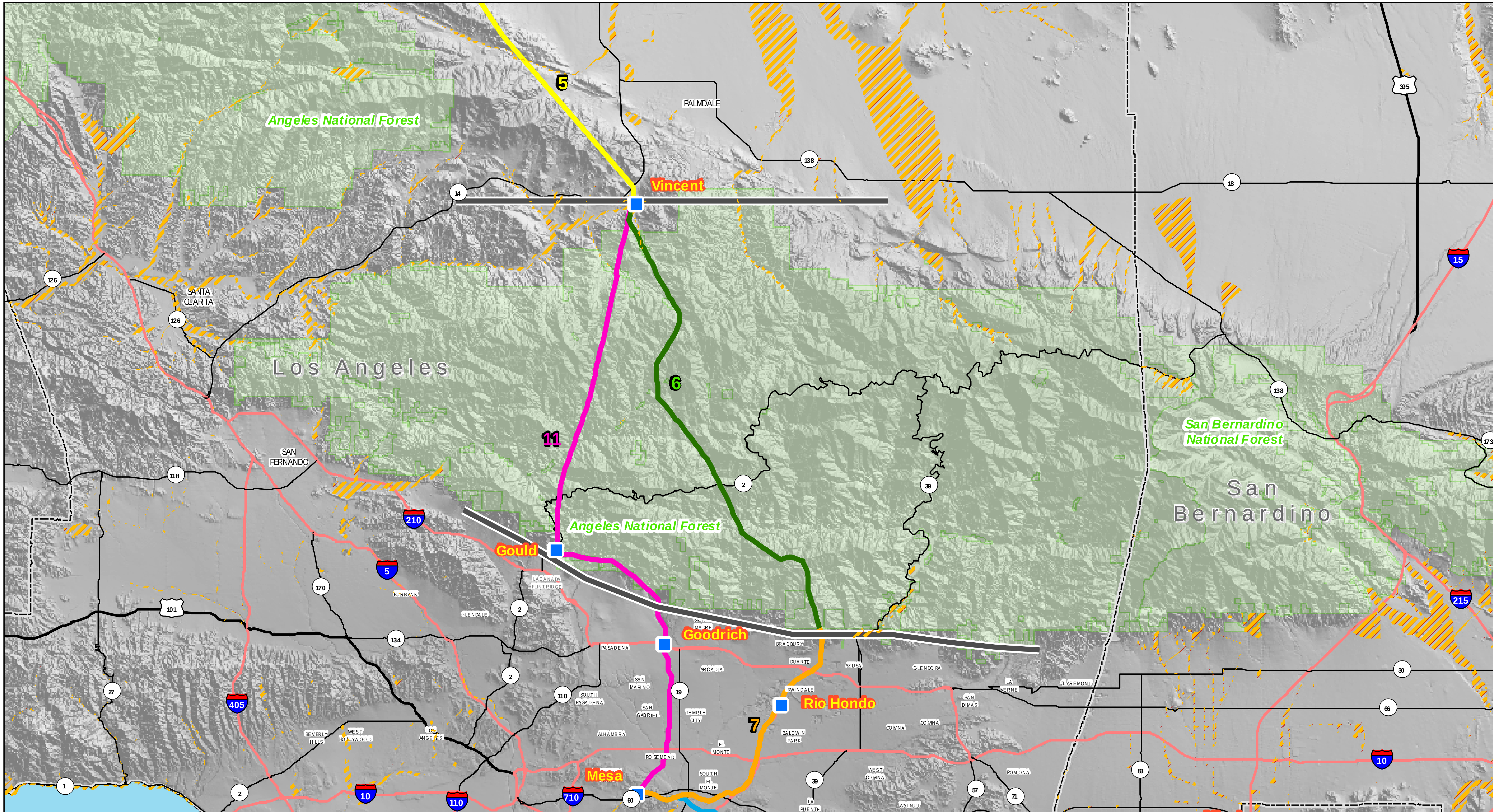
100-Year Floodplains within the Northern Region



Aspen Environmental Group

Figure 3.8-3

Groundwater Basin Boundaries within the TRTP Area



Substations

Central Region Boundary

100-Year Flood Data

USFS Boundary

Proposed Route

Segment 5

Segment 6

Segment 7

Segment 8A

Segment 10

Segment 11

Aspen Environmental Group

1" = 5 miles

1:316,800

0 1 2 4 6 8 Miles

Figure 3.8-4

100-Year Floodplains within the Central Region

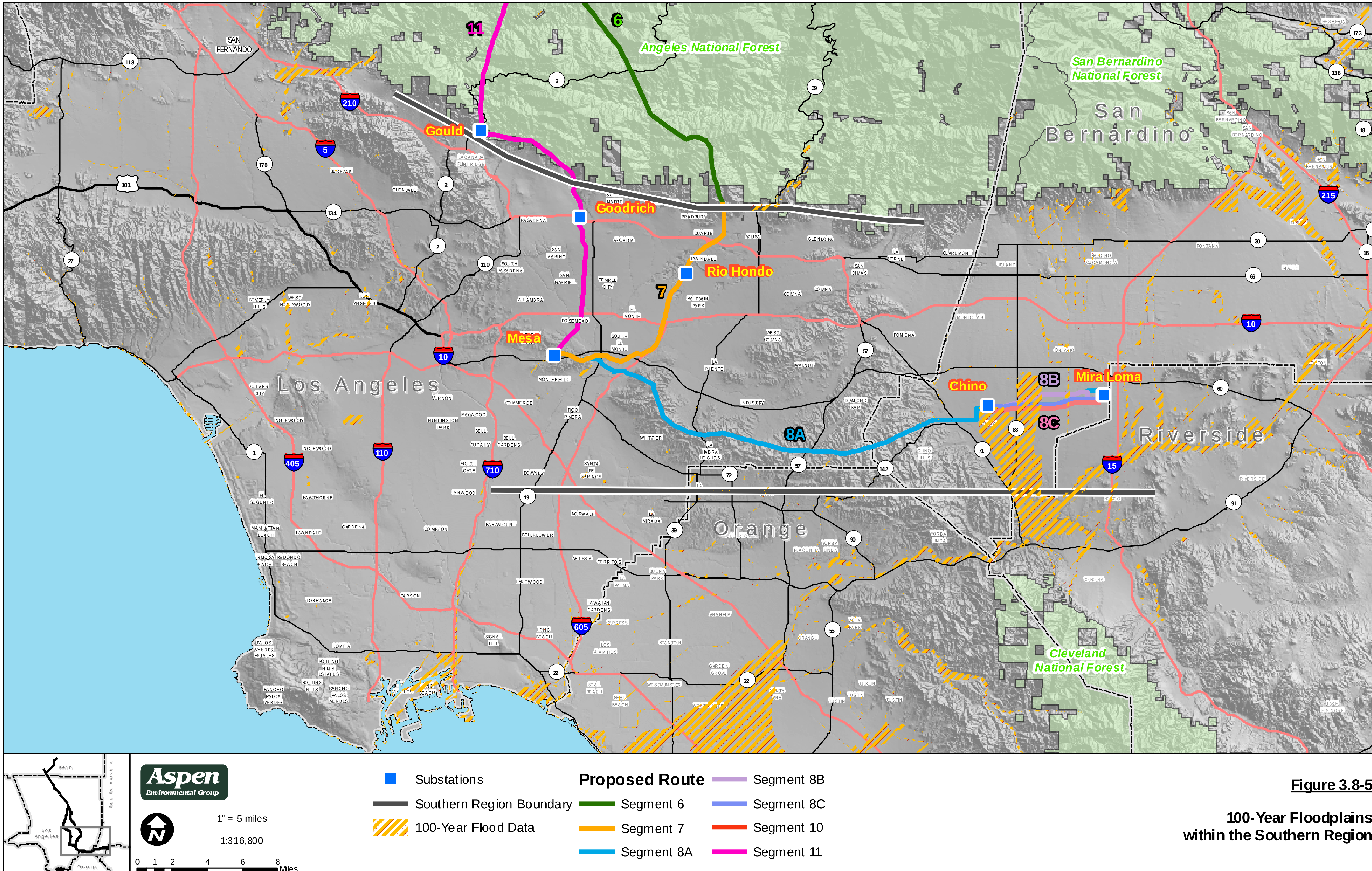


Figure 3.8-5

100-Year Floodplains within the Southern Region