4.11 Hydrology and Water Quality

This section describes the environmental and regulatory setting as well as potential water quality, groundwater supply, drainage, runoff, flooding, and dam inundation impacts of development facilitated by the proposed 2022 RTP/SCS.

4.11.1 Setting

The SJCOG region encompasses approximately 1,440 square miles in central California, and includes rivers, streams, sloughs, marshes, wetlands, channels, harbors, and aquifers. Stockton is the largest city in the SJCOG region.

a. Surface Water Hydrology

The SJCOG region is contained entirely within the San Joaquin River Hydrologic Region (HR), which includes all or part of 15 counties, four groundwater basins, and eleven subbasins. The HR stretches from the Sierra Nevadas in the east to the Coastal Range in the west. The northern border of the HR roughly follows the Cosumnes River to Folsom Lake and then lies between the Cosumnes and South Fork American Rivers. Fresno County marks the southern extent of the HR (DWR 2021). The San Joaquin Valley is a broad alluvial plain which comprises the southernmost portion of the Great Valley Geomorphic Province of California. The Great Valley is a broad structural trough bounded by the tilted block of the Sierra Nevada on the east, the uplifted Klamath Mountains to the north, and the complexly folded and faulted Coast Ranges on the west (California Geological Survey 2002).

The major rivers in the San Joaquin River HR are the San Joaquin, Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno. In general, watersheds within the HR flow from the foothills of the Sierra Nevadas towards the Sacramento-San Joaquin River Delta (the 'Delta') and eventually discharge into San Francisco Bay. The Calaveras, Mokelumne, and Stanislaus Rivers flow through or border the SJCOG region and discharge directly into the Delta or into the San Joaquin River which in turn flows through the SJCOG region and to the Delta. The west and southwestern portion of the SJCOG region are part of the Delta (Eastern San Joaquin Groundwater Basin Authority [ESJGBA] 2014).

San Joaquin River

The San Joaquin River is approximately 330 miles long and originates on the western slopes of the Sierra Nevada Mountains. It drains an area of approximately 13,500 square miles including most of the area from the southern border of Yosemite, south to Kings Canyon National Park. The majority of its flow derives from the Merced, Tuolumne, and Stanislaus Rivers. It flows northwest through the SJCOG region before entering the Delta (ESJGBA 2014).

Mokelumne River

The Mokelumne River flows westward from its headwaters high in the Sierra Nevada to the eastern edge of the Delta where it combines with the Cosumnes River. It drains approximately 660 square miles with several reservoirs including the Pardee and Camanche Reservoirs which provide water supply to the East Bay Municipal Utility District (EBMUD) and the PG&E-operated Salt Springs Reservoir which is used for hydropower generation and is not in the SJCOG region (ESJGBA 2014).

Calaveras River

The Calaveras River flows southwest for approximately 80 miles and originates in northeast Calaveras County. The Calaveras River drains approximately 363 square miles and flows through San Joaquin County and the City of Stockton before flowing into the San Joaquin River. It derives almost entirely from rainfall, with virtually no snowmelt inflow, and contains the New Hogan Dam and Reservoir, operated by the United States Army Corps of Engineers (ESJGBA 2014).

Stanislaus River

The Stanislaus River is approximately 65 miles long and is extensively dammed, including the New Melones Dam which is an integral part of the Central Valley Project (CVP) water distribution system. It drains an approximately 904-square- mile watershed and is one of the largest tributaries to the San Joaquin River with an average annual runoff of one million acre-feet per year (AFY). It has a North, Middle, and South Fork and originates in the Sierra Nevada. The Stanislaus River forms the southern boundary of the SJCOG region, just north of Modesto (ESJGBA 2014).

Other Rivers

The Tuolumne River originates in the Sierra Nevada Mountains and is the largest tributary to the San Joaquin River. It has a watershed of approximately 1,500 square miles and an unimpaired annual runoff of approximately 1.8 million acre-feet. Flows in the lower reaches of the Tuolumne River are regulated by the New Don Pedro Dam, which was constructed in 1971 and is owned by Turlock and Modesto Irrigation Districts. New Don Pedro Reservoir has a capacity of approximately 2 million acre-feet and is operated for irrigation, hydroelectric generation, fish/wildlife protection, recreation, and flood control. Irrigation water is diverted downstream from New Don Pedro at La Grange into the Modesto Main Canal and Turlock Main Canal. The City and County of San Francisco operate O'Shaughnessy Dam in the Hetch Hetchy Valley, Lake Eleanor, and Cherry Lake in the upper watershed of the Tuolumne. These facilities are operated for municipal and industrial supply as well as hydropower (ESJGBA 2014).

The Cosumnes River is a tributary to the Mokelumne River, with the confluence of these two rivers located just north of the San Joaquin-Sacramento County line, near the town of Thornton.

Dry Creek is a minor tributary to the Mokelumne River and forms the northern boundary between San Joaquin and Sacramento Counties.

Reservoirs

The SJCOG region has eight reservoirs, one being the Camanche Reservoir which is located at the juncture of Amador, Calaveras, and San Joaquin counties. Table 4.11-1 lists each reservoir and provides the water source, size, and operating agency of each reservoir.

Table 4.11-1 Reservoirs in the SJCOG Region

Reservoir	River	Size (acre/feet)	Owning/Operating Agency
Pardee Reservoir	Mokelumne River	197,950	East Bay Municipal Utility District
Camanche	Mokelumne River	417,120	East Bay Municipal Utility District
New Hogan Lake	Calaveras River	317,000	US Bureau of Reclamation, US Army Corps. of Engineers, Stockton East Water District, Calaveras County Water District

Reservoir	River	Size (acre/feet)	Owning/Operating Agency
New Melones Reservoir	Stanislaus River	2,400,00	US Bureau of Reclamation, Central Valley Water Project
Beardsley Reservoir	Stanislaus River	77,600	Oakdale Irrigation District and South San Joaquin Irrigation District
Donnells Reservoir	Stanislaus River	56,893	Oakdale Irrigation District and South San Joaquin Irrigation District
Tulloch Reservoir	Stanislaus River	68,400	Oakdale Irrigation District and South San Joaquin Irrigation District
Friant Dam	San Joaquin River	520,500	US Bureau of Reclamation

Source: State of California, California Statistical Abstract, 2002 presented in the 2014 Eastern San Joaquin GBA IRWMP.

b. The Delta Hydrology

The Delta waterway system is one of the States most valuable water resources. The Delta lies within the boundaries of six counties (San Joaquin, Sacramento, Yolo, Contra Costa, Alameda, and Solano Counties) but over half of it—approximately 55%--lies within western San Joaquin County. The Delta is legally divided into the Primary Delta and Secondary Delta with differing regulations and uses. In 2016, about one-quarter of California's drinking water came from the Delta, and about two-thirds of Californians got some or all of their drinking water from the Delta. Over 7.0 million acres of agricultural land, including some of the most productive and valuable agricultural areas in the world, are irrigated using Delta water imported through the State Water Project (SWP) and federal Central Valley Project (CVP). Over 700,000 acres of land and 700 miles of interlacing waterways form the Delta. Many aspects of the Delta are managed by the Delta Protection Commission and the Delta Stewardship Council (DSC), while the water itself is managed by the Delta Watermaster (San Joaquin County 2016).

All the rivers within the SJCOG region either flow directly into the Delta or flow into the San Joaquin which in turn runs into the Delta. The hydrology of the Delta has been impacted by the vast network of canals, waterways, and levees designed to control and channel the waters to provide for transportation, flood control, and water direction into the crucial SWP and CVP aqueduct systems. The portion of the Delta within the SJCOG region consists of extensive wetlands and ecologically critical areas north of State Highway 12 fed by the Mokelumne River, the many islands and both natural and artificial waterways surrounding and formed by the San Joaquin River west of Stockton, and the wetlands of the Old and Middle Rivers northwest of Tracy. Bethel Island and Discovery Bay both lie just outside the SJCOG region to the west.

c. Groundwater Hydrogeology

Three groundwater subbasins fall within the SJCOG region, including the Eastern San Joaquin and Tracy Subbasins and the northwestern tip of the Delta-Mendota Subbasin. The information in this section is largely taken from the DWR's Bulletin 118 (California's Groundwater) entries for the respective subbasins (DWR 2006 a-c) and from the Groundwater Sustainability Plans (GSPs) for the two main Subbasins (see *Water Management Agencies,* below). The Cosumnes Subbasin was previously considered to lie within both San Joaquin and Sacramento Counties in the 2006 updates to Bulletin 118 but has since been redrawn so the border of the Cosumnes Subbasin and the Eastern San Joaquin Subbasin matches the border between the two Counties. This analysis focuses on the first two Subbasins; the Delta-Mendota Subbasin is not a primary source of groundwater within the

SJCOG region, and the area of the Subbasin overlain by the SJCOG region is comparatively small. The Delta-Mendota Subbasin is managed by the Del Puerto Water District of Stanislaus County.

Eastern San Joaquin Subbasin

The Eastern San Joaquin Subbasin is defined by DWR as the areal extent of unconsolidated and semi-consolidated sedimentary deposits and is bounded by the Mokelumne, San Joaquin, and Stanislaus Rivers as well as consolidated bedrock to the east and lies entirely within the SJCOG region. Inflow estimates indicate the primary sources of recharge are precipitation and applied water, with some seepage from surface waters. Measurements over the 40 years prior to 2006 show a fairly continuous decline in groundwater levels in eastern San Joaquin County. Groundwater levels declined at an average rate of 1.7 feet per year and dropped as much as 100 feet in some areas. It is estimated that groundwater overdraft during that period reduced storage in the basin by as much as 2 million acre feet (af). Due to the continued overdraft of groundwater within the subbasin extending to the present day, significant groundwater depressions are present below the City of Stockton, east of Stockton, and east of Lodi. Several of these groundwater depressions extend to depths of about 100 feet below ground surface (or more than 40 feet below mean sea level, DWR 2006a). This has resulted in alteration of the hydrology of the subbasin, as some groundwater now flows towards the lower depression instead of away from it towards the Delta, and greatly exacerbated existing issues to water quality from salinity, which are discussed under *Water Quality*, below.

The total available groundwater storage capacity from a depth of 20 feet to the base of the groundwater basin was estimated at about 42,400,000 af based on a total aquifer material volume of 579,900,000 af and an average specific yield of 7.3 percent. This estimate was based on a study area that encompassed approximately 586,000 acres. Since the currently defined subbasin size is over 707,000 acres, the storage value mentioned above underestimates the total storage capacity for the subbasin area as defined in Bulletin 118 (DWR 2006a). In 2015, studies estimated the current available groundwater actually in storage at approximately 50,000,000 AF, and an overdraft rate of 0.01 percent per year from 1995 to 2015 (ESJGA 2019).

The areas of the Subbasin closest to the Delta see the least pumping and levels there have been fairly stable for decades (ESJGA 2019).

Tracy Subbasin

The Tracy Subbasin also lies entirely within the SJCOG region. It is bounded by the Diablo Range to the west, the Mokelumne and San Joaquin Rivers to the north and east, and the San Joaquin County line with Stanislaus County to the south. It is adjacent to the Eastern San Joaquin Subbasin. Roughly half of the Tracy Subbasin consists of Delta islands and waterways and the rest is mixed urban and agricultural communities. 97 percent of the water used in the subbasin is surface water. There is insufficient published data to provide a groundwater budget or estimate of recharge sources (DWR 2006b). Review of hydrographs for the Tracy Subbasin indicate that, except for seasonal variation resulting from recharge and pumping, the majority of water levels in wells remained relatively stable over the period from 1996 to 2006. There are no published groundwater storage values for the entire basin; however, the groundwater storage capacity for the Tracy-Patterson Storage Unit is estimated at 4,040,000 af. This storage unit includes the southern portion of the currently defined Tracy Subbasin from approximately one-mile north of Tracy to the San Joaquin-Stanislaus County line. Since the Tracy Subbasin comprises roughly one third of the Tracy-Patterson Storage Unit, it

can be inferred that the approximate storage capacity of the southern portion of the Tracy Subbasin is on the order of 1,300,00 af (DWR 2006b).

d. Water Quality

Water quality is a concern because of its potential effect on human health, aquatic organisms, and ecosystem conditions. Quality is determined by factors such as native condition of groundwater and surface water, and sources of contamination (natural and human induced).

Urban areas of the SJCOG region are largely characterized by impervious surfaces, such as buildings, roads, sidewalks, and parking lots. These features alter the natural hydrology of their area by preventing infiltration, increasing and redirecting runoff, and ultimately increasing the risk of pollutant discharge and flooding. Agricultural land uses can cover large areas with contaminants such as fertilizer and pesticides which can infiltrate into soil or runoff into drainage channels that feed to the streams.

Surface Water

Surface water quality within the SJCOG region is monitored and regulated by the Central Valley Regional Water Quality Control Board (CVRWQCB), which, under the authority of Section 303 of the Clean Water Act (see Section 4.11.2, *Regulatory Setting)* determines the beneficial uses that each water body has and has listed multiple water bodies as impaired from these uses due to one or more pollutants. The CVRWQCB Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (the 'Basin Plan') describes water quality objectives within the SJCOG region and neighboring areas (CVRWQCB 2018). Table 4.11-2 lists all 303(d) listed waterbodies within the SJCOG region. Contamination of these waterbodies is largely due to urban and agriculture runoff, as well as resource extraction. The CVRWQCB describes the Delta within the SJCOG region and all the major rivers as impaired primarily from urban and agricultural runoff, including polluted stormwater flows and septic and landfill leachate in the urban areas as well as fertilizer and pesticide runoff and uncontrolled animal waste management from the large agricultural land use. Upstream, many of the tributaries and streams that flow into the larger rivers are contaminated, especially with heavy metals from mining in the foothill and mountain areas that are the source of many of the streams. Timber harvesting is another primary source of contamination. CVRWQCB considers mining to be the largest source of copper, zinc, and cadmium to area surface waters, far exceeding natural levels (CVRWQCB 2018).

Table 4.11-2 303(d) Impaired Water Bodies in the SJCOG Region

Water Body Name	Water Body Type	Pollutant
Avena Drain	River and Stream	Ammonia, IB
Bear Creek (eastern portion)	River and Stream	Copper, Diazinon, IB, DO
Brack Tract Drain	River and Stream	Arsenic
Calaveras River, Lower	River and Stream	Toxicity, Mercury, IB, OE, Chlorpyrifos, Diazinon
Camanche Reservoir	Lake and Reservoir	Zinc, Mercury, Copper
Davis No 2 (unnamed spillway)	Lake and Reservoir	Mercury
Delta Waterways (central portion)	Estuary	Chlorpyrifos, DDT, Diazinon, Group A Pesticides, IS, Mercury, Toxicity
Delta Waterways (eastern portion)	Estuary	Chlorpyrifos, DDT, Diazinon, Group A Pesticides, IS, Mercury, Toxicity

Water Body Name	Water Body Type	Pollutant
Delta Waterways (export area)	Estuary	Chlorpyrifos, DDT, Diazinon, EC, Group A Pesticides, IS, Mercury, Toxicity
Delta Waterways (southern portion)	Estuary	Chlorpyrifos, DDT, Diazinon, EC, Group A Pesticides, IS, Mercury, Toxicity
Delta Waterways (Stockton Ship Channel)	Estuary	Chlorpyrifos, DDT, Diazinon, Furan Compounds, Group A Pesticides, IS, Mercury, OE, DO, PCBs, Temperature, Toxicity
Duck Creek (San Joaquin County)	River and Stream	Chlorpyrifos, IB, Toxicity, Mercury
Five Mile Slough (in Delta Waterways, eastern portion)	River and Stream	Chlorpyrifos, Diazinon, OE, DO
French Camp Slough (San Joaquin County)	River and Stream	Chlorpyrifos, Diazinon, IB, DO, Sediment, Toxicity
Grant Line Canal	River and Stream	EC, Salinity
Hospital Creek	River and Stream	DDE, DDT, Dieldrin, Dimethoate, IB, Pyrethroids, Salinity, Sediment, Toxicity Trifluralin, Arsenic, EC, Chlorpyrifos
Little Johns Creek	River and Stream	IB, Toxicity, Chlorpyrifos
Middle River	River and Stream	DO
Mokelumne River, Lower	River and Stream	Chlorpyrifos, Copper, Mercury, DO, Toxicity, Zinc
Mormon Slough (eastern portion)	River and Stream	OE, IB, DO
Mormon Slough (Calaveras River)	River and Stream	OE, DO, IB, Chlorpyrifos, Toxicity
Mosher Slough	River and Stream	OE, Mercury, IB, Chlorpyrifos, Diazinon
Mountain House Creek	River and Stream	Chloride, Salinity
Old River	River and Stream	EC, Sediment, Chlorpyrifos
Pixley Slough	River and Stream	Chlorpyrifos, Diazinon, E. coli, DO, IB, Toxicity
San Joaquin River (Tuolumne River to Stanislaus River)	River and Stream	Chlorpyrifos, DDT, Diazinon, EC, Group A Pesticides, Mercury, Temperature, Toxicity
San Joaquin River (Stanislaus River to Delta Boundary)	River and Stream	Chlorpyrifos, DDE, DDT , Diuron, EC, IB, Group A Pesticides Mercury, Temperature, Toxaphene, Toxicity
Smith Canal	River and Stream	OE, DO, IB, Organophosphate Pesticides
Temple Creek	River and Stream	Ammonia, IB
Tom Paine Slough	River and Stream	Chloride, DO, IB,Salinity
Walker Slough	River and Stream	IB

DO: Dissolved Oxygen; IB: Indicator Bacteria (*E. Coli*); EC: Electrical Conductivity; OE: Organic Enrichment (nutrients); IS: Invasive Species.
Source: SWRCB 2018 303(d) List

Groundwater

Localized impairments including total dissolved solids (TDS), sodium chloride, nitrate, and inorganic compounds—especially arsenic-- are common in groundwater in the SJCOG region, impairing the water quality. In many cases, sampling has indicated levels of salinity, nitrates, arsenic, and other contaminants well in excess of the Maximum Contaminant Levels (MCLs, see Section 4.11.2, *Regulatory Setting*) established for drinking water by the USEPA. However, groundwater is generally treated prior to use as drinking water, and currently all the groundwater within the SJCOG region is not considered impaired for the beneficial uses of drinking or agricultural supply (CVRWQCB 2018).

The primary constituents of concern in groundwater within the SJCOG region - and within the entire San Joaquin River Basin - are naturally occurring salinity and arsenic in addition to anthropogenic nitrates, salinity, and point-source contaminants from urban and industrial use (CVRWQCB 2018). The greatest concern is salinity, which derives from both natural and anthropogenic sources and is of concern throughout the entire HR and especially the San Joaquin River Basin.

Natural salinity increases as groundwater is depleted. The flow of dissolved solids and salts from natural sources is relatively constant into the subbasins from the Sierra Nevada foothills and from there into Delta sediments and groundwater. As the amount of groundwater is reduced, the concentration of salt ions increases accordingly. In addition, there is a deep saline aquifer underlying the freshwater aquifers of the San Joaquin Valley which originates in marine sedimentary deposited rocks which underlie the alluvial plain of the Great Valley. As it is denser it does not normally migrate upwards into the freshwater above, but both deep wells and pumping from shallower wells can cause upwelling of the deep saline waters into the shallower, lighter freshwater aquifers. A further source of salinity is agricultural runoff, which causes salinity flow both from pesticide and fertilizer runoff but also increases salinity as applied irrigation water evaporates and leaves higher concentrations of salts behind to be washed off in rain or runoff. CVRWQCB and the local Groundwater Sustainability Agencies (GSAs) have expressed great concern over the rate of increase in salinity and some estimates indicate that if left unchecked, increasing salinity could eventually render the majority of the groundwater in the entire basin unusable (CVRWQCB 2018, ESJGA 2019).

Nitrates occur both naturally and anthropogenically in groundwater but human sources, primarily from agricultural practices, are by far the greatest source. Levels have been increasing steadily even as more sampling wells have been drilled; in 1960 1% of the 240 wells sampled had nitrate concentrations above the MCL, and in 2010 17% of the 11,060 wells sampled had concentrations over the MCL (ESJGA 2019). The Groundwater Sustainability Plans (GSPs) submitted and under review for the SJCOG region contain proposed methods to reduce nitrate contamination, but also state there is no direct evidence for a causal nexus between nitrate contamination to groundwater management and cite a lack of regulatory authority over land use problems.

Arsenic is common in natural groundwaters, particularly in California, and arises both from natural sources and agricultural or industrial practices. Federal and State standards for arsenic were revised in 2006, and the number of wells with concentrations of arsenic over MCL limits has been rising steadily since data began being collected in the 1960s; it is primarily detected in the areas between Interstate 5 and State Route 99 and not as regularly in the streams flowing from the foothills, indicating a strong probability that arsenic contamination in area groundwaters may be derived more from anthropogenic agricultural sources than from mountain runoff or existing arsenic-laden subterranean strata. In 1970, 14 percent of 339 wells sampled were over the 2006 MCL, and by 2010 52% of 5,109 wells had concentrations over the MCL (ESJGA 2019).

A brief specific water quality description for each of the SJCOG region's subbasins is provided below.

Eastern San Joaquin Subbasin

As a result of declining groundwater levels, water with higher salinity has been moving east along the east side of the Delta. The degradation is particularly evident in the Stockton area where the saline front was moving eastward at a rate of 140 to 150 feet per year in a DWR study conducted in 1967. Data from 1980 and 1996 indicated that the saline front had continued to migrate eastward up to about one mile beyond its 1963 extent. This may be partially caused—and worsened—by the increasing groundwater depression east of Stockton which creates a height gradient and causes more-saline groundwater close to the Delta to flow towards it instead of away. Large areas of

elevated nitrate in groundwater also exist within the subbasin, located southeast of Lodi and south of Stockton and east of Manteca extending towards the San Joaquin – Stanislaus County line (DWR 2006a).

Tracy Subbasin

Areas of poor water quality exist throughout the subbasin. Areas of elevated chloride occur in several areas including along the western side of the subbasin, in the vicinity of the City of Tracy, and along the San Joaquin River. Areas of elevated nitrate occur in the northwestern part of the subbasin and in the vicinity of the City of Tracy. Areas of elevated boron occur over a large portion of the subbasin from south of Tracy and extending to the northwest side of the subbasin (DWR 2006b).

e. Water Supply

Water delivery in the SJCOG region is provided by dozens of agencies and projects including federal, state, regional, and local water projects and special districts (e.g., irrigation, water, and water conservation). Private water systems also account for a large percentage of the estimated water usage in the SJCOG region, including for agricultural irrigation, and many of these systems and wells are unmetered and do not report their usage to any agency. Irrigation and domestic water systems within the SJCOG region are operated and maintained by irrigation districts, water districts, and water conservation districts. The many large reservoirs within the SJCOG region which serve both the SJCOG region and other parts of the State are likewise operated by a variety of local, state, and federal agencies including USBR and USACE.

The Delta is a major source of water for the entire State through the systems of aqueducts and canals of the SWP and the CVP; the C.W. Bill Jones Pumping Plant north of the City of Tracy is a major transit point for water from the Sacramento River into the Delta-Mendota Canal and the CVP. The main water resources in the SJCOG region are provided in Table 4.11-3, presenting the primary users of these resources, and the beneficial uses associated with each source.

Table 4.11-3 Water Sources and Uses in the SJCOG Region

Water Source	IRR	MUN/IND	REC	TRANS	WLF	Primary Users
San Joaquin River	X		X	X	X	Riparian, Farmers, Shipping Industry, Irrigation
Mokelumne River	X		X		X	Irrigation
Camanche Reservoir	X		X			Local Residents
Calaveras River	X	X			X	Water Districts
Stanislaus River	X		X		X	Irrigation Districts
Delta	X		X	X	X	Recreation, Wildlife, Shipping Industry, DWR, USBR
Delta-Mendota Canal	X	X	X		X	City of Tracy, Irrigation Districts, Commercial Businesses
California Aqueduct	X	X	X		X	Commercial Businesses, Irrigation Districts
Lodi Lake			X			Local Residents
Groundwater	X	X				Private Individuals, Cities, Towns

Notes: DWR= California Department of Water Resources, USBR= US Bureau of Reclamation
Beneficial Uses: IRR=Irrigation, MUN/IND=Municipal/Industrial, REC=Recreation, TRANS=Transportation, WLF=Estuary/Wildlife Area.
Source: 2009 San Joaquin County General Plan Update, Natural Resources Element

Surface Water

Surface water supplies in the SJCOG region are subject to the complex system of riparian and appropriative rights and are further complicated by numerous agreements and water service contracts. The quantity of imported surface water delivered each year for groundwater recharge and urban or agricultural use varies significantly from year to year due to contractual and water rights conditions. The actual quantities utilized within the SJCOG region also vary significantly with climatic fluctuations, infrastructure limitations, and facility operation. In general, the SJCOG region uses both native surface waters and groundwater and imports surface water from the CVP and SWP through the Delta.

Surface water supplies are likely to decrease in the future. Several current contracts are for "interim" supplies, which are available subject to requirements of upstream or senior rights holders. Contracts on much of the Counties' surface water imports expired in 2015 and the 'interim' status reflects ongoing negotiations regarding future contracts for surface water imports. As development increases in areas with senior water rights, County surface water supplies will be correspondingly reduced. Water from the Delta through the CVP or SWP that isn't distributed locally by the three Delta Water Agencies is controlled by the Delta Watermaster, and allocations of water from the Delta are subject to reductions in contracted amounts ('Table A' amounts for the SWP) during drought years as the SWP and CVP systems must distribute water to a large number of contract-holding purveyors throughout the State; it is exceptionally rare that any contractor will receive their full legal maximum allocation of water from the SWP or CVP.

San Joaquin County has been attempting to obtain diversionary water rights to water from the American River from DWR since 1990. The most recent application denial and resubmittal was in 2010. If municipalities in the SJCOG region obtain rights to water from the American, they would only be from December 30 to June 1 of any year, and only if allocations were available. It is unlikely the American River will be a significant source of surface water to the SJCOG region even if the application is adopted by DWR.

Groundwater and Groundwater Banking

Beginning in 1850 the development of groundwater for agriculture expanded rapidly. Within the Central Valley irrigated agriculture has grown from less than 1 million acres to an estimated 7 to 8 million acres at present over the last 100 hundred years, although in periods of drought the amount of land actually irrigated can be up to 1.9 million acres less (NASA 2015). In average years almost 870,000 af is pumped per year within the SJCOG region from the Eastern San Joaquin Subbasin, and 178,000 af from the Tracy Subbasin (ESJGBA 2014, TSGSA 2021). DWR designated the Eastern San Joaquin Subbasin in critical overdraft and the Tracy Subbasin was designated a medium-priority basin (DWR 2021).

Long-term overdraft has created opportunities for groundwater banking to the benefit of regional and statewide interests. Groundwater banking is the storage of excess water supplies into aquifers during wet periods for later withdrawal for use during dry periods. Historically, during wet periods, surface water imports have been substantial enough to satisfy irrigation and urban water needs and thus, excess water has been recharged to groundwater aquifers. The groundwater is then extracted through private and publicly owned wells located throughout the region during dry periods when local or imported surface water supplies are insufficient. Large portions of California rely on imported water from the Delta for use in groundwater banking programs. However, as drought periods increase in length, frequency, and severity the combination of increased groundwater

pumping and decreased supply of imported water for recharge may continue to reduce the efficacy of groundwater recharge as a tool to achieve groundwater basin stability.

f. Water Demand

The demand for water within the SJCOG region is serviced by a variety of water purveyors, including the irrigation districts and domestic water districts, investor-owned water companies, mutual water companies, municipalities and private well owners. The water demand summarized below represents data collected from multiple regional agencies and combines estimates from multiple years (from 2010 to 2020). Complete water demand in the SJCOG region is unknown due to the large number of private, un-metered wells as well as the multiple reporting water agencies.

Urban Demand

Table 4.11-4 summarizes estimated water demands for the urban areas in the SJCOG region. Annual water was summarized based on Urban Water Management Plans (UWMPs), water production data obtained from water service providers, or other general planning documents. Various factors determine how unincorporated portions of the SJCOG region receive their water; some unincorporated areas are located close enough to one of the cities to have connected to the cities' water infrastructure; estimates for the City of Stockton in particular include a large number of unincorporated areas connected to the City's infrastructure.

Table 4.11-4 Estimated Urban Water Demand in the SJCOG Region

Urban Areas	Estimated Urban Water Demand (afy)
RWCC Cities and incorporated areas	192,930
Tracy and incorporated areas	19,527
Total	**212,457**

AFY = Acre-feet per year

RWCC = Greater San Joaquin County Regional Water Coordinating Committee

Demand estimates cover a range of years from 2014 – 2020 and are not all from the same year

Source: Tracy 2020, ESJGA 2019, TSGSA 2021, RWCC 2020

Agricultural Demand

Agricultural water use is based on various crop evapotranspiration (ET) and efficiency data collected by DWR. The ET of a crop represents the total amount of water transpired by the plant, retained in the plant tissue, and evaporated from adjacent soil surfaces during the growing period. In dry years, the precipitation is less than normal, thus, the amount of applied water must be increased to meet the total ET of the crop. Also, the irrigation efficiency of applied water varies due to cultural practices, canal or ditched delivery, pressurized delivery systems, and soil drainage conditions. The majority of agricultural water use in the SJCOG region comes from private wells or sources managed by the Greater San Joaquin County Regional Water Coordinating Committee (RWCC); agricultural use in the Tracy area is either provided by the South Delta WA or accounted for in the Westside-San Joaquin IRWMP, which covers the small portion of the SJCOG region south and west of Tracy but stretches through multiple southern counties into Kings County. The 2020 RWCC Addendum to the 2014 IRWMP of the former ESJGBA estimates 2020 agricultural demand throughout the entire SJCOG region, including that for areas outside the RWCC planning area but within the South Delta WA, at 1,031,496 AFY (RWCC 2020), or roughly five times the estimated urban water use.

g. Flooding and Dam Inundation

Floodplains and Floodways

The risks of inundation in the SJCOG region are related to the failure of levees in the Delta, dam failures along the major rivers, and 100-year flood events. These risks of flooding are greatest during the rainy season, between November and April, yet snowmelt from the Sierra Nevada can also extend the period of time for water flows, typically between April and June. Not all levees within the SJCOG region have been built and/or maintained in accordance with federal standards as either federal flood control project levees or by local districts. The main levees protecting the Cities of Stockton, Manteca, Lathrop, and Tracy, as well as along the San Joaquin River south of the Delta are federally maintained or compliant; the Delta itself is filled with private levees. Many of the privately constructed levees are maintained by local landowners or local agencies and are in poor condition and have been identified for reconstruction or improvement to meet higher standards (ESJGBA 2014).

The 100-year floodplain denotes an area that has a one percent chance of being inundated during any particular 12-month period. Floodplain zones are determined by the Federal Emergency Management Agency (FEMA) and used to create Flood Insurance Rate Maps (FIRMs). These tools assist communities in mitigating flood hazards through land use planning. FEMA also outlines specific regulations for any construction located within a 100-year floodplain, including transportation infrastructure, such as mandatory height above 100-year floodplain levels. FEMA is currently undergoing a public comment period prior to beginning a review of current standards for floodplain management.

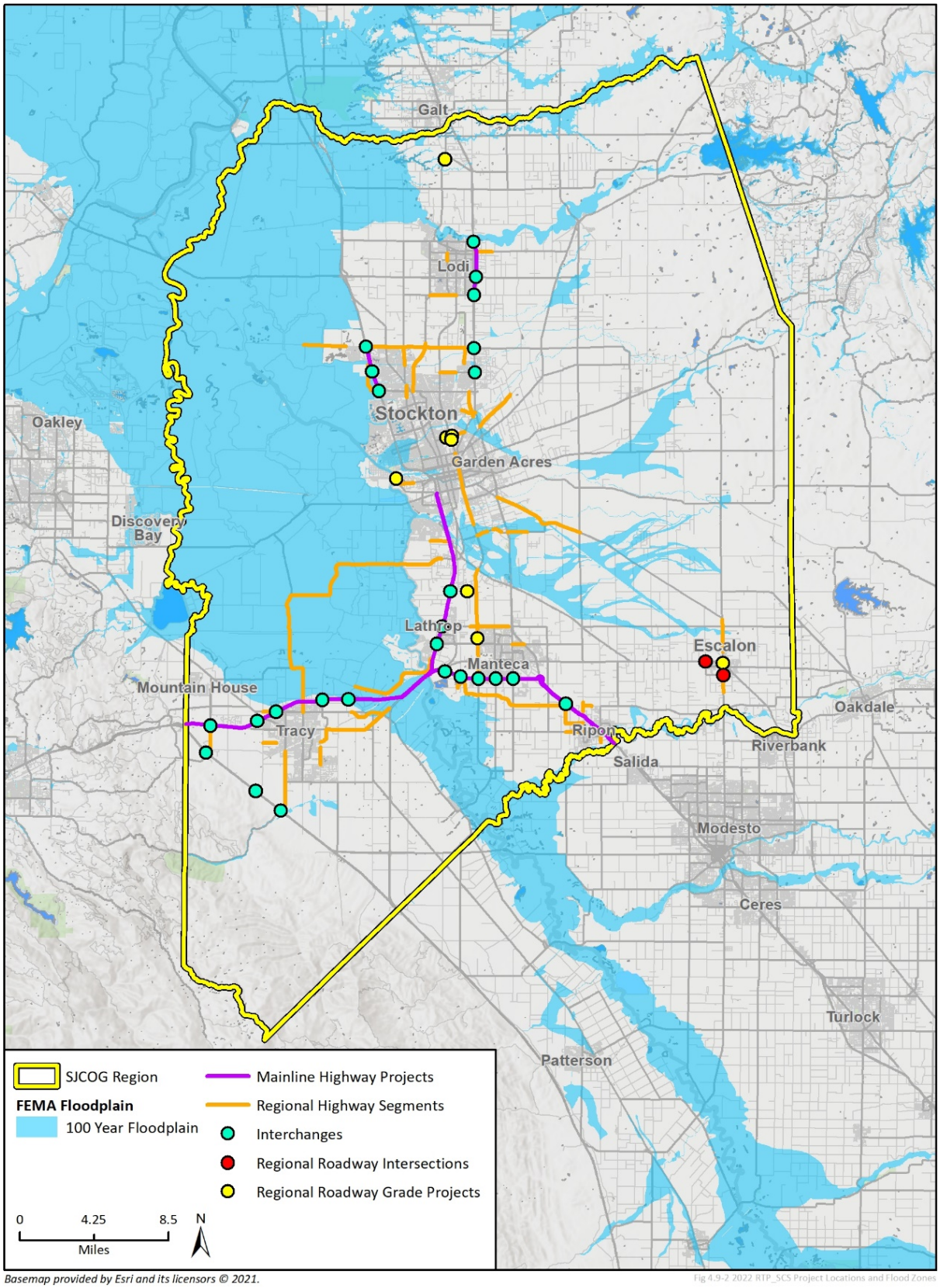
The County Office of Emergency Services (OES) has determined that over 6,600 properties within the SJCOG region are located in FEMA-designated floodplains, which are depicted on Figure 4.11-1, with over 50,000 citizens living in Special Flood Hazard Zones. In addition, most of the major highways and interstates within the SJCOG region have stretches located within flood hazard areas, including Interstates I-5, I-205, and I-580 and State Highways 4, 12, 26, 88, 99, 120, and 132. (SJCOES 2021). FEMA-declared floodways lie along all of the major watercourses in the SJCOG region, which impose further development restrictions within the designated areas designed to reduce the possibility of upstream flooding due to reduction off flood flow along the streams and rivers.

Dam Failure

The OES is responsible for developing and implementing a Flood and Dam Failure Plan that designates evacuation plans, the direction of floodwaters, and provides emergency information. The 2022 Flood and Dam Failure Plan Update is currently in draft form but does not propose major planning changes to the Flood and Dam Failure Plan. According to the OES, there are 14 dams located in and around the SJCOG region. Each of these dams has the potential to inundate portions of the SJCOG region if they were to fail. The failure of any one of these dams could result from structural instability caused by improper design or construction, instability resulting from seismic shaking, or overtopping and erosion of the dam.

Larger dams that are higher than 25 feet or with storage capacities over 50 acre-feet of water are regulated by the California Dam Safety Act, which is implemented by the California Department of Water Resources, Division of Safety of Dams (DSD). The DSD is responsible for inspecting and monitoring these dams. The Act also requires that dam owners submit to the California Office of Emergency Services inundation maps for dams that would cause significant loss of life or personal

Figure 4.11-1 100-Year Floodplains and Proposed Projects



injury as a result of dam failure. The DWR maintains Inundation Maps that depict the areas likely to be flooded in event of catastrophic dam failure and assigns the level of risk each presents. Two dams within the SJCOG region (the Gilmore Dam and New Woodbridge Diversion) are assigned a "Significant" level of risk, and the Maria Dam is assigned a "High" level of risk (DWR 2022).

4.11.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Clean Water Act

The Federal Clean Water Act (CWA), enacted by Congress in 1972 and amended several times since, is the primary federal law regulating water quality in the United States. Congress enacted the CWA, 33 U.S.C. § 1251 et seq. (formerly the Federal Water Pollution Control Act of 1972) with the intent of restoring and maintaining the chemical, physical and biological integrity of the Waters of the United States (WOTUS). The CWA requires states to set standards to protect, maintain and restore water quality through the regulation of point source and non-point source discharges to surface water (Section 402) and the setting of water quality standards (Sections 303 and 401). Point source discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process. In general, the CWA envisions a strong enforcement power given to the States, as long as they maintain standards as good as or stricter than federal standards.

Clean Water Act Section 303(d)

Under Section 303(d) of the CWA, States are required to develop and update a list of water bodies under their jurisdiction that continue to fail to meet water quality standards even after minimum levels of pollution control have been enforced. These are referred to as '303(d) impaired' bodies. States must establish priority rankings for 303(d) impaired water bodies and develop action plans to improve water quality to minimum standards. The plans include the setting of Total Maximum Daily Loads (TMDLs) for the pollutants which are impairing the water bodies, which are total amounts of the listed pollutant which can be discharged into the body. The TMDL amounts are divided up amongst dischargers; these limits are stricter than the normal minimum standards in order to bring the impaired bodies into compliance over time. The 303(d) impaired bodies within the SJCOG region are detailed above in Table 4.11-2.

Clean Water Act Section 401

Under Section 401 of the CWA, the RWQCBs have regulatory authority over actions in WOTUS and Waters of the State of California through the issuance of water quality certifications, which are issued in conjunction with any federal permit (e.g., permits issued by the USACE under Section 404 of the CWA, described below). In effect, this section requires the issuance of certification by the RWQCB as a condition of issuance of such federal permits and provides that projects for which the State does not issue water quality certification cannot obtain other federal permits.

Clean Water Act Section 402

Section 402 of the CWA regulates point-source discharges to surface waters and requires that all construction sites on an acre or greater of land, as well as municipal, industrial, and commercial facilities discharging wastewater or stormwater directly from a point source (e.g., pipe, ditch, or

channel) into WOTUS must obtain an NPDES permit. All NPDES permits are written to ensure that the surface water receiving discharges will achieve specified water quality standards.

In California, the NPDES program is administered by the SWRCB through the RWQCBs and requires municipalities to obtain permits that outline programs and activities to control wastewater and stormwater pollution. The CWA prohibits discharges of stormwater or wastewater unless the discharge is in compliance with an NPDES permit. Municipal stormwater and wastewater discharges from Municipal Separate Storm Sewer Systems (MS4s) and all other discharges are regulated; most MS4 Permits are tailored versions of general USEPA permits, while many industrial discharge permits are individual permits created for the specific discharge requirements of the project.

The SWRCB is the permitting authority in California, issues general MS4 permits, and adopted an NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (Order 2009-0009, as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). The order applies to construction sites or other projects that include one or more acre of soil disturbance, as required by the CWA, but also to projects that disturb less than one acre but which, in the RWQCBs' determination, may pose a threat to water quality. Containment and spill cleanup are encompassed in the Storm Water Pollution Prevention Plan (SWPPP) which is required to be developed as a condition of permit issuance. The SWPPP must include measures to ensure that: all pollutants and their sources are controlled; non-stormwater discharges are identified and eliminated, controlled, or treated; site best management practices (BMPs) are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges; and BMPs installed to reduce or eliminate pollutants after construction are completed and maintained. Any project implementing the proposed 2022 TCAG RTP/SCS that disturbs more than an acre, or that the CVRWQCB determines presents a potential impact to water quality, would be required to obtain coverage under either a specific permit or the Construction General Permit.

Small amounts of construction-related dewatering is mostly covered under the Construction General Permit, but large amounts of dewatering would be required to comply with the CVRWQCB's General Dewatering Permit (Order R5-2013-0074). Dewatering related to projects implementing the proposed 2022 RTP/SCS is likely to be limited in scope, but larger projects or those which are longer in duration may require coverage under the Low Threat Discharge and Dewatering Permit from the CVRWQCB.

Clean Water Act Section 404

Under Section 404 of the Clean Water Act, proposed discharges of dredged or fill material into WOTUS require USACE authorization. WOTUS generally include tidal waters, lakes, ponds, rivers, streams, and wetlands. The USACE identifies wetlands using a multi-parameter approach, which requires positive wetland indicators in three distinct environmental categories: hydrology, soils, and vegetation. According to the USACE *Wetlands Delineation Manual (1987),* except in certain situations, all three parameters must be satisfied for an area to be considered a jurisdictional wetland. The *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (2008)* is also used when conducting jurisdictional wetland determinations in areas identified within the boundaries of the SJCOG region.

National Flood Insurance Act/Flood Disaster Protection Act

The National Flood Insurance Act of 1968 made flood insurance available for the first time. The Flood Disaster Protection Act of 1973 made the purchase of flood insurance mandatory for the

protection of property located in Special Flood Hazard Areas. These laws are relevant because they led to mapping of regulatory floodplains and to local management of floodplain areas according to guidelines that include prohibiting or restricting development in flood hazard zones. As shown in Figure 4.11-1 above, virtually all of the Delta area, as well as many other portions of the SJCOG region, lie in a Special Flood Hazard Area.

Federal Emergency Management Agency

FEMA administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA also issues Flood Insurance Rate Maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA. FEMA's minimum level of flood protection for new development is the 100-year flood event. Development within regulatory floodways must adhere to requirements related to the level of water surface elevation (WSE) change that may be caused by a project.

FEMA has also developed requirements and procedures for evaluating earthen levee systems and mapping the areas affected by those systems. Levee systems are evaluated for their ability to provide protection from 100-year flood events and the results of this evaluation are documented in the FEMA Levee Inventory System (FLIS). Levee systems must meet minimum standards and must be maintained according to an officially adopted maintenance plan. Other FEMA levee system evaluation criteria include structural design and interior drainage.

In 2000, FEMA adopted revisions to 44 CFR, known as the Disaster Mitigation Act (DMA) or DMA 2000. Section 322 (a-d) of the DMA 2000 requires local governments to have a Hazard Mitigation Plan (HMP) as a condition of receiving federal disaster mitigation funds. San Joaquin County's HMP includes the Flood and Dam Failure Plan Annex and the incorporated cities of San Joaquin County have adopted the County HMP.

b. State Laws, Regulations, and Policies

Porter-Cologne Water Quality Control Act

The federal CWA places the primary responsibility for the control of water pollution and planning the development and use of water resources with the states, although it does establish certain guidelines for the states to follow in developing their programs. California's primary statute governing water quality and water pollution is the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act). The Porter-Cologne Act grants SWRCB and the nine RWQCBs broad powers to protect water quality and is the primary vehicle for the implementation of California's responsibility under the federal CWA. The Porter-Cologne Act grants the SWRCB and RWQCBs the authority and responsibility to adopt plans and policies, to regulate discharges to surface water and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substance, sewage, oil, or petroleum product. Each RWQCB must formulate and adopt a water quality control plan for its region. The regional plans are to conform to the policies set forth in the Porter-Cologne Act and established by the SWRCB in its State water policy. The Porter-Cologne Act also provides that an RWQCB may include in its region a regional plan with water discharge prohibitions applicable to particular conditions, areas, or types of waste.

The CVRWQCB's 'Water Quality Control Plan for the Central Valley Region-- The Sacramento River Basin and the San Joaquin River Basin' covers the SJCOG region and is the Basin Plan considered in this analysis. It includes the water quality objectives and TMDLs for the 303(d) bodies listed in Table 4.11-2, beneficial uses of the waters within the region, and an implementation plan. Major elements of the plan address concerns and objectives regarding mercury, pesticide runoff into the Sacramento and San Joaquin, salinity of both groundwater and the Delta water directed to the state's water systems, nutrient pollution, and detailed discussions of the many interactions and agreements with state and federal agencies who are also stakeholders in the critical Delta water system.

Antidegradation Policy

California's antidegradation policy, formally known as the Statement of Policy with Respect to Maintaining High Quality Waters in California, restricts degradation of surface and ground waters. It protects waters where existing water quality is higher than necessary for the protection of beneficial uses. Any actions with the potential to adversely affect water quality must be consistent with the maximum benefit to the people of the State; not unreasonably affect present and anticipated beneficial use of the water; and not result in water quality less than prescribed in water quality plans and policies. The quality of the major streams uphill of the foothill reservoirs within the TCAG region are considered suitable for all beneficial uses and of good quality, but below the dams many beneficial uses are impaired, and all groundwaters are considered suitable or potentially suitable for agricultural and industrial supply (CVRWQCB 2018).

Caltrans Statewide NPDES Permit

The California Department of Transportation (Caltrans) was issued the nation's first statewide stormwater NPDES permit (Order 99-06-DWQ) in 1999 by the SWRCB. The Caltrans Permit requires Caltrans to regulate nonpoint source discharge from its properties, facilities, and activities. The Caltrans Permit requires development of a program for communication with local agencies and coordination with other municipal separate storm sewer system (MS4) programs where those programs overlap geographically with Caltrans facilities. As part of the permit, Caltrans is required to create and annually update a Stormwater Management Plan (SWMP) that is used to outline the regulation of pollutant discharge caused by current and future construction and maintenance activities. SWMP requirements apply to discharges from Caltrans stormwater conveyances, including catch basins and drain inlets, curbs, gutters, ditches, channels, and storm drains. The SWMP must be approved by the SWRCB, and as specified in the permit, it is an enforceable document. Compliance with the permit is measured by implementation of the SWMP. Caltrans' policies, manuals and other guidance related to stormwater are intended to facilitate implementation of the SWMP. Caltrans also requires all contractors to prepare and implement a program to control water pollution effectively during the construction of all projects.

Urban Water Management Planning Act

In 1983, the California Legislature enacted the Urban Water Management Planning Act, which requires urban water suppliers to develop Urban Water Management Plans (UWMP) to actively pursue the efficient use of available supplies as well as conduct drought assessments and planning. This Act also requires the provision of water service to be affordable to lower income households. Every five years, water suppliers are required to update their UWMPs to identify short-term and long-term water demand management measures to meet growing water demands. There are

multiple UWMPs within the SJCOG region, including at least one for each of the major urban centers.

Sustainable Groundwater Management Act

In September 2014, Governor Brown signed legislation requiring that California's critical groundwater resources be sustainably managed by local agencies. The Sustainable Groundwater Management Act (SGMA) gives local agencies the power to sustainably manage groundwater. It required DWR to establish priority levels for groundwater basins within the State based on their level of overdraft, provides for the creation of regional Groundwater Sustainability Agencies (GSA) and required Groundwater Sustainability Plans (GSP) to be developed for medium- and high-priority groundwater basins. The GSPs for high-priority basins were due by January 2020 and DWR approved or rejected all of the plans by January 31, 2022. The GSPs for medium-priority basins were submitted to DWR by January 31, 2022 and await DWR approval. As discussed under *Water Management Agencies* below, the Eastern San Joaquin Subbasin was designated high priority and submitted its GSP in 2019, and the Tracy Subbasin was designated medium priority and its GSP was submitted to DWR in 2022.

Along with mandating the formation of GSAs, SGMA provided the newly formed GSAs a set of tools to assist with groundwater management, including the ability to conduct investigations, levy fees, determine a basin's sustainable yield, and measure and limit groundwater extraction within their area. However, none of the GSPs approved to-date include actions beyond public outreach/education, conducting investigations, and levying fees; some propose voluntary extraction measurement programs and clearly envision mandatory measurement programs being implemented in regional and local codes, but none dictate groundwater limits. Such action would have to be preceded by the determination of a basins' sustainable yield through exercising of their statutory investigative powers and would have to be implemented through the promulgation of regulations in a traditional legislative process. In general, adopted GSPs call for increased data-gathering, including through expanded use of voluntary or mandated metering of individual wells. Many local governments already require metering on new wells, and where this is the case many GSPs are beginning to collect that information as part of their investigative power. SGMA requires GSAs to update their GSPs every five years once approved.

Phase II Municipal Storm Water Permit

The Municipal Storm Water Permitting Program regulates storm water discharges from Municipal Separate Storm Sewer Systems (MS4s). The NPDES MS4 permits in California are issued in two phases by the SWRCB and RWQCBs.

Phase I MS4 permits are issued by the RWQCBs to medium (i.e., serving between 100,000 and 250,000 people) and large (i.e., serving more than 250,000 people) municipalities. Most of these permits are issued to a group of co-permittees encompassing an entire metropolitan area; the Stockton Urbanized Area Phase I MS4 Permit is discussed in the *Regional and Local* Setting below.

The Phase II MS4 Permit is issued by the SWRCB and is applicable to smaller municipalities (i.e., populations of less than 100,000 people) and nontraditional small MS4s (e.g., military bases, public campuses, and prison and hospital complexes). The Phase II MS4 Permit (*Waste Discharge Requirements [WDRs] for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems [MS4s] General Permit],* Order No. 2013-0001-DWQ, NPDES No. CAS000004) became effective on July 1, 2013 and covers Phase II permittees statewide. The Phase II MS4 Permit require the permittees to develop a Storm Water Management Program and individual dischargers to

develop and implement Storm Water Quality Management Plans. MS4 permits are discussed under; *c. Regional and Local Laws, Regulations, and Policies*, below.

California Construction Stormwater Permit

As the lead permitting authority in California, the SWRCB adopted an NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (Order 2009-0009, as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). The order applies to construction sites or other projects that include one or more acre of soil disturbance, as required by the CWA, but also to projects that disturb less than one acre but which, in the RWQCBs' determination, may pose a threat to water quality. The Construction General Permit authorizes the discharge of stormwater to surface waters from construction activities. It prohibits the discharge of materials other than stormwater, authorized non-stormwater discharges, and all discharges that contain a hazardous substance in excess of reportable quantities established at 40 CFR 117.3 or 40 CFR 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

The Construction General Permit requires that all developers of land where construction activities will occur over more than one acre do the following:

- Complete a Risk Assessment to determine pollution prevention requirements pursuant to the three Risk Levels established in the General Permit
- Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters
- Develop and implement a SWPPP which specifies BMPs that will reduce pollution in stormwater discharges to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology standards
- Perform inspections and maintenance of all BMPs
- Conduct stormwater sampling, if required based on risk level.

Typical BMPs contained in SWPPPs are designed to minimize erosion during construction, stabilize construction areas, and control sediment and pollutants from construction materials. The SWPPP also includes a plan for inspection and maintenance of all BMPs, as well as procedures for altering or increasing BMPs based on changing project conditions.

Requirements for post-construction control of stormwater runoff are included in MS4 permits under Provision C.3, which allows permitting authorities to use the permit process to enforce appropriate source control and treatment measures in new development to address operational stormwater and wastewater discharges.

Caltrans Statewide Stormwater Permit

Any projects funded wholly or in part by the California Department of Transportation (CalTrans) would be required to comply with the CalTrans Stormwater Management Program, which ensures CalTrans project compliance with the Statewide Storm Water Permit Waste Discharge Requirements (Order Number 2012-0011DWQ, NPDES Number CAS000003). The CalTrans Stormwater Monitoring Guidance Manual, most recently updated in 2020, provides guidance on implementing the Statewide Storm Water Permit for transportation infrastructure projects and is used by many other transportation agencies.

State Senate Bills 610 and 221

State Senate Bills (SB) 610 and SB 221 (collectively referred to as the 'show me the water' laws) were adopted in 2002 and require lead agencies to obtain a Water Supply for certain projects subject to CEQA to determine the sufficiency of the water supply for a proposed development. SB 610 applies at the time an EIR is prepared, while SB 221 applies at the time a Tentative Tract Map or other related project actions are approved. Additionally, water agencies must coordinate with land use planning agencies in the development of their UWMPs, which include projections of future water demand and water supply availability during normal and dry periods. Determination of whether a WSA is required would be made for individual projects facilitated under the proposed 2022 RTP/SCS.

Assembly Bill 1881

AB 1881, the Water Conservation in Landscaping Act of 2006, enacted many landscape efficiency recommendations of the California Urban Water Conservation Council (CUWCC) for improving the efficiency of water use in new and existing urban irrigated landscapes in California. The law requires the Energy Commission to adopt performance standards and labeling requirements for landscape irrigation equipment, including irrigation controllers, moisture sensors, emission devices, and valves to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy or water.

The Model Local Water Efficient Landscape limits the water budget for new landscapes (or rehabilitated landscapes), greater than 2,500 square feet, to 70 percent of the local reference evapotranspiration (ET). The model ordinance lays out the procedures for evaluating potential landscape water use during the land development process. In addition, the ordinance contains requirements for planting as well as the design and maintenance of irrigation systems, all with the intent of limiting outdoor water use and avoiding irrigation runoff. Municipalities and counties are required to either implement the model ordinance or one that is more stringent in their City or County Codes.

2022 Water Conservation Emergency Regulation

Due to the prolonged state of drought throughout the State, in January 2022 SWRCB adopted the Water Conservation Emergency Regulation. Requirements for the duration of the emergency regulations (currently authorized from January 18 2022 to January 18 2023) include turning off decorative water fountains, prohibiting using water hoses to clean sidewalks, and turning off irrigation systems during rain and for two days after rain. Currently the SWRCB is developing draft proposed updates to the regulation including extending the duration and banning the irrigation of non-functional turf.

Cobey-Alquist Floodplain Management Act

The Cobey-Alquist Floodplain Management Act gives support to the NFIP by encouraging local governments to plan, adopt, and enforce land use regulations for floodplain management, to protect people and property from flooding hazards. The Act also identifies requirements that jurisdictions must meet to receive State financial assistance for flood control.

California Green Building Standards Code

The California Green Building Standards Code (24 CCR, Part 11) includes mandatory measures for residential and nonresidential development. For example, Section 4.106.2 requires residential

projects that disturb less than one acre and are not part of a larger common plan of development to manage stormwater drainage during construction through on-site retention basins, filtration systems, and/or compliance with a stormwater management ordinance. Section 5.106.1 requires newly constructed nonresidential projects and additions of less than one acre to prevent the pollution of stormwater runoff from construction through compliance with a local ordinance or implementing BMPs that address soil loss and good housekeeping to manage equipment, materials, and wastes. Section 5.303 sets measures for indoor water use for non-residential development requiring metering devices to conserve water.

Delta Protection Act of 1959

The Delta Protection Act, enacted in 1959, defined the boundaries of the Delta within the Water Code of the State of California. These boundaries are often referred to as the Legal Delta. The Delta Protection Act was passed during the same legislative session as the Burns-Porter Act, which authorized construction of the State Water Project (SWP). The Delta Protection Act guarantees an adequate water supply to Delta water users and protection from increased levels of salinity due to the export of water through the CVP and SWP.

c. Regional and Local Laws, Regulations, and Policies

Water Management Agencies

The Eastern San Joaquin County Groundwater Basin Authority Integrated Regional Water Management Plan (IRWMP) formerly covered the majority of the SJCOG region and overlay the portion of the Eastern San Joaquin Subbasin that lies within the region. Currently it is inactive and the RWCC is in the process of developing a new IRWMP for the area largely based on the prior iteration. A portion of the Westside San Joaquin IRWMP area lies within the southwestern County and extends into Stanislaus County to the south. These are the two IRWMPs in the SJCOG region. The primary purpose of IRWMPs is to assist in obtaining government funding for water projects and they have no regulatory authority on their own. Management of the Delta water is performed by the Delta Watermaster who reports jointly to the SWRCB and the DSC and is facilitated by the three Delta Water Agencies who act as the water districts within the Delta itself as well as providing regulatory protection from seawater and salinity intrusion into the Delta. The Central and South Delta Water Agencies are also members of the RWCC; the South Delta Water Agency is also part of the Westside San Joaquin IRWMP.

Seventeen member GSAs came together under a Joint Exercise of Powers and formed the Eastern San Joaquin Groundwater Authority (ESJGA) which acts as the coordinator for all GSAs within the Eastern San Joaquin Subbasin. The initial agreed-upon GSP was adopted by the ESJGA in 2019 and submitted to DWR in 2020 as required by SGMA; DWR determined it incomplete in January 2022 and it is under revision.

Six GSAs formed in the Tracy Subbasin but did not sign a Joint Exercise of Powers or Memorandum of Understanding; however, they worked cooperatively to develop a single GSP and voted to appoint the County of San Joaquin as the Lead Agency and point of contact with DWR. As the Tracy Subbasin is a medium-priority basin their initial GSP was not due to DWR until January 2022; it is currently under review by DWR.

As detailed above, the Urban Water Management Planning Act requires any water provider who services more than 3,000 connections or provides over 3,000 AFY of water to prepare an UWMP every five years. There are multiple purveyors within the SJCOG region large enough to require

preparation of UWMPs but they are all members of either or both of the IRWMPs and of the two major GSA groups. As such, although urban water management in the SJCOG region occurs at the municipal level, it takes place under the umbrella of the region-wide management plans and with full co-ordination with the Delta management agencies, and the urban water needs of the SJCOG region are considered a region-wide management issue.

Delta Water Agencies

The Delta Agency was established in 1965 to maintain agricultural water quality throughout the Delta. In 1973, the agency was replaced by three distinctive agencies: North, Central, and South Delta Water Agencies. They function as water purveyors for agricultural uses within the Delta and exercise legal authority over issues related to seawater intrusion and salinity.

Delta Protection Act of 1992

The Delta Protection Act of 1992 refined the definition of the Legal Delta by designating a Primary Delta and a Secondary Delta. It also established the Delta Protection Commission (DPC) for the purpose of developing a long-term management plan for the Primary Delta, which constitutes approximately two- thirds of the Delta's area. The Land Use and Resources Management Plan for the Delta Primary Zone was adopted in 1995. The Plan provides direction for local jurisdictions in the Delta region on land use decisions. Local jurisdictions with lands in the Primary Zone are required to incorporate the Plan within their general plans and other planning activities.

Delta Reform Act

In November 2009, the California Legislature enacted the Sacramento-San Joaquin Delta Reform Act (Delta Reform Act) of 2009, also known as Sen. Bill No. 1 (SB X7-1). The Delta Reform Act created the Delta Stewardship Council (DSC). The DSC is made up of seven members that are advised by a 10-member board of scientists. The DSC is tasked with addressing the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. According to the Delta Reform Act, the coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. The DSC regulates covered actions, as statutorily defined, to address the coequal goals.

Stockton Urbanized Area NPDES Municipal Permit

The SJCOG region includes the City of Stockton and its surrounding incorporated and unincorporated urbanized areas, which contain densely settled territory containing 250,000 or more people and are grouped together as County Service Area (CSA) 54. Due to the proximity of CSA 54 to the City of Stockton, the urbanized areas' physical interconnection to the City's storm drain system, and the locations of their discharges relative to the City's system, unincorporated San Joaquin County is designated as a part of the medium MS4 for Stockton. Any MS4 designation must comply with the CWA under the NPDES program. The City of Stockton, the urbanized areas of the County that are interconnected with the City, and the urbanized areas of the unincorporated County which surround the City are therefore referred to as the Stockton Urbanized Area and are subject to Order No. RS-2015-0024 (NPDES No. CAS083470), which is a shared NPDES permit.

The implementation of the permit requires a coordinated management effort by the City of Stockton and the County. While named as co-permittees, the City and County currently have separate programs and submit documents and reports separately to the CVRWQCB. However, the

programs are essentially identical, and the co-permittees collaborate with each other to address common issues and to ensure consistency in program development and implementation. Although the co-permittees coordinate with each other, each agency is responsible for implementing within their respective jurisdictions and their infrastructure and/or watercourses.

Other City and County NPDES Permits

There are a variety of General Orders in effect in the SJCOG region which cover and permit discharges from agricultural uses, pasture and dairy facilities, landfills and waste treatment, and so forth. These include multiple non-traditional permittees under the general State Phase II MS4 Permit including the other incorporated Cities, school districts, fairgrounds, community services districts, and Universities. Parts of the unincorporated County with small MS4 systems not covered by any other permit are in general under the Region 5 Region-Wide MS4 Permit, Order No. R5-2016-0040 (NPDES No. CAS0085324). Other relevant Orders include Order No. 2003-0003-DWQ, General Waste Discharge Requirements for Discharges to Land With A Low Threat to Water Quality and the General Dewatering Permit (Order R5-2013-0074). Dewatering related to projects programmed or proposed under the proposed 2022 RTP/SCS is likely to be limited in scope, but larger projects or those which are longer in duration may require these permits.

County and City General Plans

General Plans can be described as a city or county's "blueprint" for future development. It represents the community's view of its future; a constitution made up of the goals and policies upon which the city council, board of supervisors, or planning commission will base their land use decisions. To illustrate its importance, all subdivisions, public works projects, and zoning decisions (except in charter cities) must be consistent with the general plan. If inconsistent, they must not be approved.

State law requires that each city and each county adopt a general plan containing the following seven components or "elements": land use, circulation, housing, conservation, open-space, noise, and safety (Government Code Sections 65300 et seq.). At the same time, each jurisdiction is free to adopt a wide variety of additional elements covering subjects of particular interest to that jurisdiction such as recreation, urban design, or public facilities. All the cities in the SJCOG region have created General Plans.

Due to the large number of General Plans and the variety of locations considered for projects under the proposed 2022 RTP/SCS scenarios, this analysis will not examine every General Plan nor consider the effects of General Plans on project impacts. Projects that fall within a Sphere of Influence covered by a General Plan will be required to adhere to all applicable standards, goals, and policies outlined within that Plan; every General Plan has policies and goals related to water conservation, water quality, and water supply and most also address groundwater policies where relevant.

County and City Municipal Codes

Many local stormwater and pollutant control ordinances and requirements are contained within either the San Joaquin County Ordinance Code or the many municipal city Codes. Similar to the General Plans, the multiple Codes are too numerous and detailed to discuss within this Regulatory Setting, but virtually all municipal Codes have some regulation of stormwater and other water quality issues and address many of the potential impacts through permitting and approval processes of varying levels of complexity. It is assumed that all projects falling within incorporated areas

subject to a City Municipal Code will comply with all requirements of said Code, and all projects falling in the unincorporated areas of San Joaquin County will comply with all water quality related ordinances and regulations in the County Ordinance Code.

4.11.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies criteria for determining whether a project's impacts would have a significant impact related to hydrology and water quality, namely an analysis of whether or not the proposed 2022 RTP/SCS would:

1. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.
2. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    a. Result in substantial erosion or siltation on- or off-site;
    b. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
    c. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
    d. Impede or redirect flood flows.
4. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
5. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

In order to determine the potential impacts of the programmatic issues considered in this EIR, information was gathered from a variety of sources and viewed in terms of both individual proposals discussed in the proposed 2022 RTP/SCS scenarios (where possible) and the overall, collective effects of the project as a whole. In general, the analysis compares the existing conditions to reasonably assumed conditions that would exist by 2046. These future conditions, in general, assume a full buildout of the programmed or proposed projects as it is not possible at this time to confirm which, if any, projects may end up being removed from future consideration. Reasonable future conditions and the change in such conditions from current conditions were then compared to the significance thresholds determined using the CEQA Guidelines.

These considerations and the magnitude of the potential change from current conditions form the basis of this analysis supplemented by area-specific conditions for individual proposed projects or groups of projects where necessary. It is not possible to compare estimated changes and adherence to requirements such as NPDES permits or GSP limitations with potential future changes in such requirements or changes in water quality regulation. For example, it is not possible at this time to compare estimates of groundwater usage and compliance with area groundwater management plans with potential future, stricter management actions or limitations as the extent and timing of

such actions are virtually unknown. Therefore, the comparisons of potential impacts to regulatory systems within this analysis assume that such regulatory systems remain in place throughout the implementation lifespan of the proposed RTP/SCS.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with projects contained within the proposed 2022 RTP/SCS. Section 4.11.3.c summarizes the impacts associated with capital improvement projects proposed in the proposed 2022 RTP/SCS. Due to the programmatic nature of proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvements and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality

Impact HYD-1 IMPLEMENTATION OF PROPOSED TRANSPORTATION PROJECTS AND FUTURE PROJECTS INCLUDED IN THE LAND USE SCENARIO ENVISIONED IN THE PROPOSED 2022 RTP/SCS WOULD NOT VIOLATE WATER QUALITY STANDARDS OR WASTE DISCHARGE REQUIREMENTS, OR OTHERWISE SUBSTANTIALLY DEGRADE SURFACE OR GROUNDWATER QUALITY. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Implementation of proposed transportation and land use projects envisioned in the proposed 2022 RTP/SCS would result in both short-term and long-term impacts to surface and groundwater water quality. For program-level analyses, water-related impacts are often similar among individual projects within project classes (e.g., constructing new roadways, widening existing roadways, etc.). For example, when a new roadway is constructed, it will tend to have a greater impact than the widening of an existing roadway as it would generate runoff and contamination issues where there previously were none, as well as tend to create a larger amount of new impermeable surfaces than a widening project would. Similarly, improvements within built-up urban areas are less likely to generate concerns over water body pollution than improvements outside the urban landscape, as urban areas frequently have better stormwater drainage (and potential treatment) than countryside roadways, where stormwater capture may consist of a ditch or swale along the road.

Ground Water Quality

Ground water quality can be impaired in a variety of ways, including through drawdown of shallow, nutrient-polluted agricultural runoff near over-pumped wells; overall untreated runoff from agricultural and animal operations that percolates directly into shallow aquifers; percolation of wastes from septic systems; and percolation into the water table from polluted surface water where such interchange occurs. The proposed 2022 RTP/SCS does not feature alterations to the region's agricultural land uses, and the land use proposals feature increased urban density which would not be likely to include septic usage. Therefore, the primary potential impact to regional ground water quality would be associated with impacts to surface water quality in areas where surface water is directly connected to underlying ground water supplies. Potential impacts associated with increased overdraft of ground water are discussed in Impact HYD-2.

Surface Water Quality

Certain transportation improvements would increase overall impervious surface area throughout the SJCOG region. For example, the multiple road and highway widening projects would introduce increased pavement in areas that are currently undeveloped, with corresponding increases in runoff. Construction activities for transportation projects facilitated by the proposed 2022 RTP/SCS may include soil disturbance, excavation, grading, and similar activities with a high potential to generate sediment and other pollutants. Sediment especially would not require stormwater to transport it into the environment; a high wind would be sufficient. Such projects would also serve to encourage increased use of the improved transportation network and facilitate the planned growth of the County population, leading to an increase in operational contamination from transportation use.

Development projects envisioned under the land use scenario could also introduce impervious surfaces, including infill sites, if the infill site is currently unpaved. However, it is likely that most infill sites are already developed, thus minimizing the increase of impervious surfaces. These and other more outlying projects that would increase impervious surfaces may generate adverse impacts to surface water quality. Pollutants and chemicals associated with urban activities would run off new roadway surfaces or other new impervious surfaces flowing into nearby bodies of water during storm events. These pollutants would include but are not limited to heavy metals from auto emissions, oil, grease, debris, and air pollution residues. Such contaminated urban runoff may result in the incremental long-term degradation of water quality.

Most transportation improvement projects would enhance and upgrade existing and outdated stormwater infrastructure, improving runoff quality: such benefits may be outweighed by the increases in current levels of pollutants caused by increase of traffic flows encouraged by better transportation systems. Similarly, any proposed 2022 RTP/SCS projects with landscaping may require fertilizer/pesticide application, which could enter nearby bodies of water and cause adverse effects to water quality.

As discussed under Section 4.11.2, *Regulatory Setting*, the federal CWA requires that coverage under an NPDES permit be obtained for construction projects that would disturb greater than one acre, or that are part of a larger plan of development that itself covers more than one acre. Acquisition of coverage under the Construction General Permit is dependent on the preparation of a SWPPP that contains project specific BMPs to control the discharge of pollutants, including sediment, into the local surface water drainages as well as post-construction measures to ensure continued permit compliance. In addition, all transportation projects for which Caltrans is the sponsor agency would comply with the Caltrans Statewide NPDES permit that regulates all stormwater discharges from Caltrans owned conveyances, maintained facilities and construction activities. Most proposed 2022 RTP/SCS transportation projects, such as state highway widenings and interchange construction, would disturb more than one acre and therefore subject to these regulations.

Coverage under the Region 5 Region-Wide MS4 Permit would be required for all projects and land uses during their operation that discharged to an MS4 system, including compliance with the general Findings and the Program Elements Part F (Planning and Land Development/Post Construction Storm Water Management Program) of Attachment J, such as all requirements for post-construction BMPs, LID features, and implementation or compliance with Stormwater Management Plans.

In addition, planning and approval of the various future projects envisioned by the proposed 2022 RTP/SCS would require the lead agencies and project sponsors to ensure compliance with existing local jurisdiction requirements, including applicable municipal code sections.

In addition, the land use scenario included in the 2022 RTP/SCS would generate new sources of wastewater, which would also be conveyed to wastewater treatment facilities in the region Discharges of treated wastewater, also called effluent, from the treatment plants are regulated as point sources by the RWQCB and must meet water quality effluent limitations established in the NPDES permit issued by the RWQCB for the treatment plant. Thus, although implementation of the 2022 RTP/SCS would increase the volume of point-source wastewater discharges in the SJCOG region, required compliance and monitoring of effluent prior to discharge from treatment facilities would ensure impacts would be less than significant.

Compliance with the various regulations and restrictions of the multiple types of permits individual projects may fall under, as well as conformity with applicable County or municipal General Plan policies, would serve to reduce impacts from project construction and operational lifespan by requiring measures to prevent runoff and pollutants from leaving a project site wherever it was located within the SJCOG Region, and ensuring all non-point and point source discharges to surface waters standards of the applicable NPDES Permits and Water Quality Control Plans. These measures and permit requirements may not serve to eliminate impacts to water quality for certain individual projects; however, permit coverage would ensure that the transportation and land use projects implementing the proposed 2022 RTP/SCS would not violate any water quality standards or waste discharge requirements; therefore, impacts from violation of water quality standards or waste discharge requirements, or other impairment of water quality, would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 2:	Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin

Impact HYD-2 IMPLEMENTATION OF PROPOSED TRANSPORTATION AND LAND USE PROJECTS ENVISIONED IN THE PROPOSED 2022 RTP/SCS WOULD SUBSTANTIALLY DECREASE GROUNDWATER SUPPLIES. AND INTERFERE WITH GROUNDWATER RECHARGE SUCH THAT IT MAY IMPEDE SUSTAINABLE GROUNDWATER MANAGEMENT OF THE BASINS. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

In undeveloped conditions, natural vegetation can intercept and retain precipitation and limit surface runoff, and runoff that occurs over large areas is often unconcentrated and able to percolate down into the ground and replenish groundwater supplies naturally. When natural areas, even bare dirt, are covered over by impermeable surfaces such as pavement, this natural infiltration is obstructed. Runoff from such areas is concentrated and may increase to volumes and flow rate greater than the natural infiltration rate of the surrounding soil, leading to saturated ground which cannot accept any more water and ultimately to impairment of natural recharge due to loss of otherwise rechargeable rainwater to evaporation or discharge to streams that flow to areas unable to assist recharge, or even to the oceans.

Major proposed 2022 RTP/SCS projects and the land use scenario envisioned by proposed 2022 RTP/SCS, could affect groundwater supplies by incrementally reducing groundwater recharge potential. This reduction in groundwater recharge could occur because the impermeable surfaces

associated with the proposed improvements would increase surface water runoff at the expense of natural infiltration. The proposed 2022 RTP/SCS encourages infill development within urbanized areas of the SJCOG region, and the land development envisioned could interfere with groundwater recharge by increasing the extent of impervious surfaces already present in this area. Urbanized areas are typically characterized by extensive impervious surfaces such as buildings and paved roads; as such, infill development would have minimal potential to further alter the rates and patterns of groundwater recharge to the overall basin. However, infill as well as any outlying development on currently unpaved sites would result in a net increase of impervious surfaces in the area and could have associated impacts on site specific runoff and infiltration patterns.

Land Use Projects

As development under the proposed 2022 RTP/SCS occurs, site specific drainage features would be designed to retain, capture, and convey increased runoff in accordance with the city or county design standards and State requirements, such as the Program Elements Part F post-construction site control features and hydromodification requirements of the Region-Wide MS4 Permit discussed under Section 4.11.2 *Regulatory Setting,* and Impact HYD-1, above. Compliance with these standards and regulations typically includes the use of LID features which, as described above, are designed to simulate natural processes of runoff and infiltration to minimize or avoid potential adverse effects associated with new development. Most land use development would not occur on currently permeable surface and uses that did would incorporate design features in order to reduce impacts to recharge; therefore, impacts to groundwater recharge from land use projects implementing the proposed 2022 RTP/SCS would be less than significant.

Transportation Projects

In addition to the development that would occur under the proposed 2022 RTP/SCS, transportation projects could also increase the extent of impervious surfaces. Many of the planned transportation projects, such as the addition of new lanes to existing roads or highways, would have negligible effect on the overall extent of impervious surfaces, as they would occur in areas already characterized by paved surfaces. In addition, transportation improvements often serve to increase infiltration and recharge as outdated (or nonexistent) runoff infrastructure and design is replaced by modern drainage and LID features. As with the infill development discussed above, transportation projects would also be implemented with project specific drainage plans for new features would be designed to retain, capture, and convey runoff in accordance with the city or county design standards, where applicable, and federal and State requirements. As many projects may serve to improve recharge in their area or would be required to implement design features to reduce impacts to groundwater recharge, impacts to groundwater recharge from transportation projects proposed by the proposed 2022 RTP/SCS would be less than significant.

Groundwater Supply Management

Implementation of transportation and land use projects envisioned in the proposed 2022 RTP/SCS would result in both short-term and long-term impacts to water supply throughout the SJCOG region.

Activities would be implemented under California regulations governing use of groundwater, including SGMA, as well as groundwater provisions of applicable local general plans. Taken as a whole, these regulations and plans are intended to reduce groundwater use and subsequent overdraft of groundwater basins.

Regional municipal UWMPs provide strategies for reducing water usage and increasing available supply, such as investing in reclaimed water infrastructure and increasing user education and awareness of conservation practices UWMPs cannot impose any mandatory regulations or limits on water use, and any improvements in future proposals are currently speculative.

During grading and general construction activities, water would be needed to suppress fugitive dust generated by construction equipment, for the mixing of concrete or other materials, for cleaning, and for a variety of other uses. Such water would most likely be provided by connections to urban water purveyors where feasible, or through the use of water trucks where such connection to water supply infrastructure is not feasible or possible. It is unlikely that many projects would require the installation and operation of additional groundwater extraction wells at the project locations. The SJCOG region does utilize surface water—both local and imported—as part of its water mix, but it is not possible to determine the individual water mix of surface, imported, or groundwater supply at a single project location and in the frequent case where surface water supply is reduced, groundwater is consistently relied on to make up the difference. Given the current state of overdraft of the groundwater basins in the study area and the likelihood that more than one project would be constructed simultaneously in areas with over-drafted basins, the short-term water supply impact of projects implementing the proposed 2022 RTP/SCS would be significant.

Over the long term, the water use of the proposed transportation projects would be primarily expected to consist of irrigation uses for project landscaping components as well as potable water use such as restrooms or water fountains for transit station expansions or new facilities (such as Projects Lo-12, M-23, and RTD-10). Such use would be incrementally minor for individual projects, and as most improvements involve modification of existing facilities and would not result in a substantial increase in landscaped areas that require irrigation, many may not feature any increased operational water use at all. But for those which propose to incorporate new or enhanced landscaping whether for aesthetic or structural considerations, including vegetating graded areas for slope stability and maintenance or for use as noise barriers or as part of stormwater control, or that will require permanent potable water facilities like restrooms, such water use may constitute a significant draw on regional supplies by full buildout at 2046. Although there is some current use of reclaimed water for transportation facility landscaping, this is not common region-wide. Further, in more remote areas, reclaimed water sources are not located within a reasonable distance. As such, it may not be economically feasible to convey reclaimed water to outlying areas.

The proposed land use scenario features increased projected density of municipal areas, especially near transportation hubs, as well as potential increases in the population served by projects such as when a current transit hub is increased in size and gains a large number of new users. Such increase in urban density would be accompanied by increased usage of water, potentially past that envisioned by applicable, local planning documents. As groundwater is a major source of municipal water within the region, increases in urban density would have a corresponding effect on the use of groundwater supplies throughout the region, and for much of this potential increased usage reclaimed or recycled water would not be a potential source (e.g.; drinking water).

For many of the projects, measures contained within the applicable regulatory structures or planning documents may serve to reduce or eliminate water use impacts. Most municipal NPDES permits would require implementation of LID features such as stormwater reuse (through the C.3 provision or others), and the Region-wide MS4 NPDES Permit would require projects covered under it to incorporate similar LID strategies under the general Findings and the Program Elements Part F (Planning and Land Development/Post Construction Storm Water Management Program) of Attachment J. General Plan policies and ordinances at the local and regional level, such as Green

Building Codes, would encourage or require consideration of reclaimed water and drought-resistant landscaping , and AB 1881 would apply to most landscaped areas over 2,500 sf. However, these and similar measures may not apply to every planned improvement under the proposed 2022 RTP/SCS.

Conformity with applicable GSPs in specific project areas is discussed under Impact HYD-5, below, and as discussed in Section 4.11.2, *Regulatory Setting,* and further under Impact HYD-5, the two regional GSPs in the SJCOG region do not currently contain regulatory groundwater extraction limits. In addition, neither GSP has been approved by DWR; the ESJGA GSP was determined to be incomplete and the GSP for the Tracy Subbasin is under review with a decision by DWR not due until January 31, 2024. The multiple GSAs within each basin are working cooperatively to develop their unified groundwater management strategies, and this cooperation will undoubtedly serve to assist in future comprehensive management actions, but at present the regional GSAs lack an approved GSP operational system.

Many of the regional municipal UWMPs and IRWMPs propose a variety of potential strategies for reducing water usage or increasing available supply, such as investing in reclaimed water infrastructure and increasing user education and awareness of conservation practices. Neither type of planning document, however, contains enforceable regulation. IRWMPs serve as vehicles for regional water infrastructure funding, and therefore future iterations of these documents are likely to include the upcoming transportation and land use projects envisioned by the proposed 2022 RTP/SCS scenario in their planning and may assist in continuing to propose and potentially fund improvements to the regional water supply. Similarly, UWMPs will be required to take into account growth projected from the proposed 2022 RTP/SCS in their future updates, which are required every five years, and may assist in proposing additional conservation measures based on this data. Water supply assessments under SB 610 and 221 will likewise need to take these projections into account and may serve to inform future approval of projects for which they are required based on continuing drought status (in general, water supply assessments are required to provide estimates of supply under multiple drought scenarios for 20-year horizons). But these documents cannot impose any mandatory regulations or limits on water use, and any improvements in future proposals are currently speculative.

Due to the current over-drafted state of the basins, and especially within the Eastern San Joaquin subbasin, the magnitude of change from the current conditions caused by any additional overdraft of groundwater supply would be considered significant. Therefore, short- and long-term water uses associated with the 2022 RTP/SCS would substantially decrease groundwater supplies and thereby impede sustainable groundwater management. The below mitigation measures would reduce this impact as they are not included in most LID or conservation regulatory schemes that apply within the region.

Mitigation Measures

Transportation project sponsor agencies can and should implement the following mitigation measures for applicable transportation projects. The County and cities in the SJCOG region can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

HYD-2(a) Construction Dust Suppression Water Supply

For all proposed 2022 RTP/SCS projects, where feasible, reclaimed and/or recycled water shall be used for dust suppression during construction activities. This includes use of such reclaimed water in

water trucks utilized for project construction occurring outside developed areas and away from water infrastructure which would otherwise provide such reclaimed water. It should be noted that use of reclaimed water in water trucks is generally no different than use of potable water, and therefore use of reclaimed water in projects that will require the use of water trucks should be given extra consideration as a measure which can enable use of reclaimed water in areas where it would otherwise be impossible due to lack of infrastructure. This measure shall be noted on construction plans and shall be spot checked by the local jurisdiction.

HYD-2(b) Landscape Watering

In jurisdictions that do not already have an appropriate local regulatory program related to landscape watering, or for proposed 2022 RTP/SCS projects that are not required to comply with AB 1881, projects that include landscaping shall be designed with drought tolerant plants and drip irrigation. When feasible, native plant species shall be used. In addition, landscaping associated with proposed improvements shall be maintained using reclaimed water when feasible. If reclaimed water could feasibly be utilized for project landscape watering due to proximity of reclaimed water sources but is unavailable due to lack of connecting infrastructure, local agencies or transportation sponsors shall conduct an analysis of the upgrades needed to provide such infrastructure, which will include the potential for new connections to existing reclaimed water systems to provide reclaimed water to other nearby sources besides the proposed project in the analysis, and shall perform such steps as necessary to utilize available reclaimed water if feasible.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are SJCOG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Implementation of the above measures would reduce proposed Project impacts on water supply and groundwater overdraft in the SJCOG region. However, due to the programmatic nature of this proposed 2022 RTP/SCS EIR, a precise, project-level analysis of specific water demand and supply impacts associated with individual transportation and land use projects is not possible. The land use scenario envisioned by the proposed 2022 RTP/SCS along with transportation projects would result in the need for additional water supply, even with the implementation of mitigation measures listed above. Given the overdraft conditions of area groundwater basins, impacts would remain significant and unavoidable. No additional feasible mitigation measures to reduce this impact to a less than significant levels is available.

Threshold 3:	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or impede or redirect flood flows

Impact HYD-3 TRANSPORTATION AND FUTURE LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD NOT SUBSTANTIALLY ALTER THE EXISTING DRAINAGE PATTERN OF A SITE OR AREA THROUGH ALTERATION OF THE COURSE OF A STREAM OR RIVER OR THROUGH THE ADDITION OF IMPERVIOUS SURFACES IN A MANNER WHERE DRAINAGE CHANGES WOULD RESULT IN FLOODING ON- OR OFF-SITE, REDIRECT OR IMPEDE FLOOD FLOWS, EXCEED THE CAPACITY OF STORMWATER SYSTEMS, OR PROVIDE ADDITIONAL POLLUTED RUNOFF. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Construction of transportation and development projects under the proposed 2022 RTP/SCS could result in the change of existing drainage patterns on individual project sites or within a project area, which could impact water quality. Project grading and construction of impervious surfaces for transportation projects may alter existing drainage patterns by altering slopes, increasing impervious surface and reducing infiltration. Additionally, infill development projects included in the SCS land use scenario could also increase impervious surfaces and develop structures that may alter existing drainages. Projects that include improvements on or near bridges may result in fill material being placed within the stream channel, although it is unlikely that any of the proposed projects would necessitate or result in actual alteration of a streambed or course. Additionally, many projects would feature some level of risk of sediment loading and erosion which could further alter drainage patterns within the immediate area. Implementation of proposed transportation and land use projects implementing the proposed 2022 RTP/SCS may increase or redirect stormwater flows, resulting in increased volume and/or velocity of stormwater runoff. Potential increases in stormwater volume and/or velocity could result in on- or off-site flooding.

However, planned transportation and land use projects would be designed to comply with existing State and local jurisdiction requirements, included applicable County and municipal code sections related to stormwater runoff and drainages, such as curb and gutter design, and would be required to build drainage infrastructure if necessary to control and accommodate the increase in stormwater flows. Effects of increased polluted runoff have already been examined in this EIR, including under Impact HYD-1 specifically, and runoff from drainage changes would be included under those overall runoff impacts. Any streambed filling would be required to comply with the terms of any applicable USACE 404 or RWQCB permit which would include an analysis of any impacts from flooding or drainage alteration. Oversight of projects within flood areas or affecting flood control infrastructure would be provided by the San Joaquin County Flood Control and Water Conservation District (or the San Joaquin Area Flood Control Agency in the Stockton Urbanized Area) and would ensure potential impacts related to alteration of future flood flows were minimized.

Land use projects under proposed 2022 RTP/SCS in incorporated areas would require drainage control and hydromodification measures required either under an individual MS4 NPDES Permit or under the Region-Wide NPDES MS4 permit and would include implementation of LID drainage control features if required under Program Requirement Part F or under a C.3 provision, as well as any hydromodification requirements related to drainage flow rate control, stormwater system capacity, and similar hydrologic concerns. These measures would typically include incorporation of

permeable paving, vegetated swales, infiltration retention basins and other features that would minimize stormwater runoff or velocity and are selected from sets of feasible options based on project-specific site or engineering characteristics. Similar sets of requirements may further be imposed by local regulatory programs as discussed under Section 4.11.2, *Regulatory Setting,* above.

Compliance with the existing suite of applicable regulations minimize impacts related to on- or off-site flooding, stormwater drainage capacity, polluted flood runoff, and redirection or impedance of flood flows, and such impacts would therefore be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 4:	In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation

Impact HYD-4 TRANSPORTATION S AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD NOT RISK RELEASE OF POLLUTANTS DUE TO PROJECT INUNDATION IN FLOOD HAZARD, TSUNAMI, OR SEICHE ZONES. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

In the SJCOG region, the dam inundation areas lie within the natural floodplains and therefore this analysis considers the effects of flooding and dam failure to be similar. There is virtually no risk of tsunami within the SJCOG region, due to its distance from the coast. Seiche behavior could be possible in the larger reservoirs after a major earthquake or similar event that causes large-scale disturbance to the waters. Due to the size of the reservoirs within the SJCOG region, seiche waves which topped the dams and flowed downstream would be expected to be much smaller than the flood from a dam failure or flooding from heavy rains. Therefore, regulatory requirements which serve to reduce impacts on floodplains or from dam failure would apply equally to seiche impacts within the SJCOG region.

There are several federal, state and local programs to reduce flooding and control the flow of floodwaters, as well as to encourage proper flood planning in project design within the region as discussed in the Regulatory Setting. The National Flood Insurance Act makes the purchase of flood insurance mandatory for properties in Special Flood Hazard Areas. The Cobey-Alquist Floodplain Management Act encourages local governments to plan, adopt and enforce land use regulations for floodplain management. The California Division of Dam Safety inspects dams across the State, including in the SJCOG region, on a yearly schedule to ensure that they are performing and being maintained in a safe manner. The San Joaquin Flood Control and Water Conservation District manages flood control projects in the unincorporated County, currently operating flood control repair and maintenance projects in the two largest flood districts (Zone 9 and Zone 10). In addition, the San Joaquin Area Flood Agency (of which the Flood Control and Water Conservation District is a member agency) covers the City of Stockton, the Urbanized Area, and since 2017, has covered the Cities of Lathrop and Manteca. While many private levees and flood control infrastructure throughout the SJCOG region are in poor condition, those maintained by either of the main flood control agencies fulfill FEMA standards and qualify for federal and state funding under the appropriate regulations.

Land use changes envisioned within the SCS could occur within flood zones, especially in the City of Stockton and the Urbanized Area. These would mostly occur within developed areas or on the edges of such areas and would therefore be connected to existing or planned stormwater and flood control infrastructure and be required to conform with applicable regulations regarding runoff

control and pollution control, including the mitigation measures proposed in this EIR. Such development would not substantially interfere with existing flood infrastructure without separate project-specific analysis of such impacts and the impacts of potential runoff to water quality have already been examined and mitigated to the greatest extent feasible. The impacts of urban development increase the risk of flood inundation and the release of pollutants due to such inundation due to the increase in impermeable surfaces. This impact would be less than significant. A greater risk of impact would arise from the transportation projects in less developed areas with less extensive flood protection or capability to deal with potential polluted runoff from roadways during a flood event. Locations of transportation improvements proposed in the proposed 2022 RTP/SCS within floodplain areas of the region are depicted in Figure 4.11-1.

However, all such projects within floodplain or dam inundation areas would be required to adhere to any development restrictions or regulations enforced by the two primary flood control agencies, and projects within municipal areas would need to comply with hydromodification regulations of the municipal Flood Control or Public Works Department for drainage and stormwater flooding. The implementation of SWPPP plans and BMPs imposed through these or other regulatory plans, as well as the requirements to improve local stormwater flow capacity if needed, would serve to mitigate the risks of flooding to these projects to the greatest extent feasible. Unlike in an urban area, where floodwaters might put pollutants normally safe from rain flows at risk, except in extraordinary circumstances, the amount of pollution being washed off a roadway in a flood would be the same as that washed off in a heavy rain, as most pollutants on roads are contaminants like motor oil, metals from brake pads, trash, and similar debris. It is possible floodwaters would rise high enough to overcome drainage ditches, bioswales and similar pollution-capturing systems alongside roadways and bridges but such situations would distribute relatively few pollutants (those immediately extant on the road stretch being flooded) over a large area and would have a lesser impact than the long-term impacts of constant runoff from the roadways that is already mitigated by runoff control devices.

Although individual projects implementing the proposed 2022 RTP/SCS have the potential to adversely affect water quality at a project-specific level due to floodwater inundation, projects would adhere to existing regulations regarding risks from water quality pollutants and flood surges. The risks from polluted runoff during flood events would be similar to those of rain events on countryside roadways, and while greater in developed areas, would likewise be more regulated and surrounded by infrastructure better able to deal with such flows.

The types of development that would be most likely to result in release of pollutants during inundation include uses such as wastewater treatment plants, chemical manufacturing plants, or hazardous materials landfills. Generally, the proposed 2022 RTP/SCS envisions land development in already urbanized areas where wastewater treatment plants, landfills, and chemical manufacturing plants already exist to serve existing development. Accordingly, the land use projects envisioned in the proposed 2022 RTP/SCS would not substantially increase the risk of release of pollutants into the environment as a result of inundations.

Based on the above analysis, water quality impacts of the proposed 2022 RTP/SCS due to flooding or dam failure would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 5:	Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan

Impact HYD-5 TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD NOT CONFLICT WITH OR OBSTRUCT IMPLEMENTATION OF A WATER QUALITY CONTROL PLAN OR SUSTAINABLE GROUNDWATER MANAGEMENT PLANS. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Implementation of transportation and land use projects implementing the proposed 2022 RTP/SCS would affect water quality, but there is nothing in the proposed 2022 RTP/SCS which would prevent the CVRWQCB or any applicable local agency from carrying out the regulatory provisions of the Basin Plan. The transportation projects included in the proposed 2022 RTP/SCS would not conflict with the beneficial uses for water identified in the Basin Plan. For example, transportation projects would not interfere with the beneficial use of water for municipal and domestic supplies, agricultural supply, or wildlife habitat supply. Likewise, the land use scenario envisioned in the proposed 2022 RTP/SCS would not obstruct or conflict with beneficial uses of water in the water quality control plan. The land use scenario in the proposed 2022 RTP /SCS focuses on infill development and locating people and employment near transit. The infill characteristics of the land use scenario would generally be consistent with the past use of water in these areas, and supportive of the beneficial uses identified in the water quality control plan, such as municipal and domestic supplies.

Primary goals of the Basin Plan include management of the 303(d) listed bodies, maintenance of water throughout the SJCOG region for designated beneficial uses, and management of salt concentrations within the groundwater subbasins (CVRWQCB 2018). It is unlikely that project implementation would have any effect on the attainment of these main goals at this time, and new development and improvements facilitated by the project would be required to maintain adherence with changes in the Basin Plan as they are planned in the future. Transportation projects with a potential for affecting 303(d) impaired water bodies (listed in Table 4.11-2) would be strictly regulated and are unlikely in general to produce the kinds of pollutants for which the bodies are mostly impaired, which tend to be the result of agricultural and urban pollution. Although the project buildout may affect groundwater supplies, as detailed above, it is not likely to cause a change in the ability of County groundwater to maintain its beneficial use. Impacts to beneficial uses of 303(d) impaired bodies would be expected to be less than significant in the same vein as impacts to listed pollutant levels. Should individual projects be likely to cause substantial impacts to water quality, the CVRWQCB would have authority to mandate limitations or monitoring of discharges under the applicable SWPPP required by an NPDES Permit or imposed by CVRWQCB for smaller projects deemed a threat to water quality. Finally, the Basin Plan in general monitors salt concentrations through specific conductivity measurements and sets maximum conductivity levels for the San Joaquin, Feather, Sacramento, and American Rivers at various checkpoints, as well as at several area lakes and with separate requirements for the Delta. Similarly, to constituents of concern in the 303(d) bodies, various salts and constituents increasing ionic content and specific conductivity in receiving waters are more commonly associated with agriculture than with transportation (in areas that do not regularly freeze and require heavy applications of road salts). Should individual projects be likely to cause potential substantial impacts to the salinity of receiving waters, the CVRWQCB would have authority to mandate limitations or monitoring of discharges for salinity under the SWPPP required by the General Permit (or imposed by CVRWQCB for smaller projects deemed a threat for salinity).

The land use pattern included in the proposed 2022 RTP/SCS would generate new sources of wastewater, which would also be conveyed to wastewater treatment facilities in the region for secondary or tertiary treatment. Discharges of treated wastewater, also called effluent, from the treatment plants are regulated by the CVRWQCB and must meet water quality effluent limitations established in the applicable NPDES/WDR permits for point source discharges, as also discussed under Impact HYD-1, above. Thus, although implementation of the proposed 2022 RTP/SCS would increase the volume of point-source wastewater discharges in the SJCOG region, required compliance and monitoring of effluent prior to discharge from treatment facilities would ensure Basin Plan compliance and impacts would be less than significant.

Implementation of the proposed 2022 RTP/SCS will not obstruct or hinder CVRWQCB or municipal agencies from fulfilling their regulatory duties and would be required to comply with all statues, codes, and regulations that applied. Further, the scenarios envisioned in the proposed 2022 RTP/SCS would not conflict with the stated goals of the Basin Plan. Therefore, impacts of the proposed project to implementation of any water quality control plan would be less than significant and no mitigation is required.

Regarding impacts on sustainable groundwater management plans, as discussed under Impact HYD-2, implementation of the proposed 2022 RTP/SCS would likely have an impact on groundwater levels and supply. As detailed under the *Regulatory Setting*, groundwater management within California in general falls under SGMA. Of the two primary GSPs in the SJCOG region. The ESJGA was submitted for DWR review and has been determined incomplete and must undergo further revision, while that for the TSGSA is currently in the process of undergoing DWR review with approval or disapproval anticipated by 2024.

As discussed under Section 4.11.2, *Regulatory Setting,* along with information-gathering, setting of fees, and determining sustainable yields, the primary regulatory tool provided to GSAs under SGMA is the ability to set and enforce area-specific mandatory groundwater pumping limitations through regular updates to GSPs for medium- and high-priority groundwater basins. DWR-approved GSPs are required to provide mechanisms that allow the sustainable use of groundwater, with growth projections considered, and the first set of adopted and DWR-approved GSPs are focused on measuring extractions to obtain the necessary data to determine sustainable yields. This is also the emphasis in the two GSPs proposed for the SJCOG region, along with determination of applicable fees and numerous proposed public outreach and conservation policies.

After gaining DWR approval and then determining sustainable yields through the next planning cycles, the GSPs may begin to incorporate mandatory monitoring, pumping limitations, or other groundwater sustainability policies based on their determined sustainable yields. Projects being implemented under the proposed 2022 RTP/SCS would be required to conform with any new applicable regulations supporting groundwater use and sustainable groundwater management. Therefore, water use facilitated by the proposed 2022 RTP/SCS would not obstruct any current GSP in the SJCOG region, as any increase in water demand that would result from the proposed 2022 RTP/SCS land use plan would be subject to monitoring requirements or other limitations as set forth in the applicable GSPs, including the addition of new monitoring devices as needed on existing or new wells utilized by any projects if required by the GSAs. This impact would be less than significant.

Further, the existing regulations and permit requirements regarding water usage, LID, stormwater recapture and similar water conservation issues serve to ensure that projects implemented under any of the various proposed 2022 RTP/SCS scenarios will conform as best possible with the overall stated goals of the multiple GSPs in terms of water conservation and monitoring as well. Therefore,

impacts of the proposed project to sustainable groundwater management goals and plans will be less than significant and mitigation will not be required.

Mitigation Measures

No mitigation measures are required.

c. Specific proposed 2022 RTP/SCS Projects That May Result in Impacts

All proposed 2022 RTP/SCS transportation projects that require new construction or landscaping would result in at least some of the impacts discussed in impacts HYD-1 through HYD-5; and therefore, are not specifically identified as having individual potential impacts. The proposed 2022 RTP/SCS projects are listed in Chapter 2. Additional specific analysis would be required as individual projects are implemented to determine the project specific magnitude of impact.

4.11.4 Cumulative Impacts

The cumulative impact analysis area for hydrology and water quality encompasses the watersheds and groundwater basins affected by the transportation projects and land use pattern envisioned in the proposed 2022 RTP/SCS, including creeks and drainages, floodplains, and aquifers. Therefore, the cumulative impact assessment area consists of the SJCOG region and the adjoining counties, which encompasses the applicable watersheds and basins.

Cumulative development would increase erosion and sedimentation resulting from grading and construction, as well as changes in drainage patterns which could degrade surface and ground water quality. In addition, new development would increase the generation of urban pollutants that may adversely affect water quality in the long term. As with the proposed 2022 RTP/SCS, individual construction projects within the cumulative impact area would be required to comply with applicable water quality regulations. Compliance with these existing requirements would reduce project level impacts throughout the cumulative impact area; as such, cumulative impacts related to water quality would be less than significant, and the proposed 2022 RTP/SCS contribution to this impact would not be cumulatively considerable.

Development within the cumulative impact area would increase impervious surfaces and reduce groundwater infiltration. However, counties and cities in the cumulative impact area have regulatory requirements for stormwater management, effectively requiring minimization of stormwater runoff. Because the volume of runoff would be reduced by these regulations, as well as State and federal regulations, precipitation would be retained on individual project sites and infiltrated or treated and discharged to swales, creeks, or other drainages. The proposed 2022 RTP/SCS contribution to cumulative groundwater recharge impacts would not be cumulatively considerable. Development within the cumulative impact area would substantially decrease groundwater supplies by increasing the amount of overdraft throughout critically over-drafted basins, impeding sustainable groundwater management. In addition, as the various watersheds and subbasins within the SJCOG region are part of the larger San Joaquin River HR, and basin delineations are often based on political divisions and not hydrologic connectivity, impacts on groundwater levels in the SJCOG region would be expected to have corresponding impacts on levels in basins outside of the SJCOG region, and vice versa, as a result of buildout of the proposed 2022 RTP/SCS, with corresponding impacts to water management. Therefore, cumulative impacts related to groundwater supply would be significant and the proposed 2022 RTP/SCS contribution to this impact would be cumulatively considerable pre -mitigation. Mitigation measures HYD-2(a) and HYD-2(b) would reduce this impact, but it would remain cumulatively considerable after mitigation.

Development within the cumulative impact area could result in incremental modifications over time that can have cumulative adverse effects on drainage in the cumulative impact area by impeding and displacing flood flows, contributing incrementally to surface drainage runoff or degrading water quality, and the capacity of a drainage way to carry flood flows and/or the overall quality of the water may be cumulatively affected. New development envisioned under the proposed 2022 RTP/SCS and associated impervious cover could also be potentially significant on a cumulative basis if it would contribute to a significant increase in the overall net impervious surface throughout the region which leads to changes in regional drainage patterns. As discussed in Impact HYD-3, projects implementing the proposed 2022 RTP/SCS would be required to maintain pre-project hydrology and projects that would disturb more than one acre would be subject to requirements that prevent increase in runoff flows. These drainage requirements would minimize the contribution of the proposed 2022 RTP/SCS to cumulative drainage impacts, and the contribution of the proposed 2022 RTP/SCS to these impacts would not be cumulatively considerable.

Development within the cumulative impact area may occur within floodplains and floodways and may include development of projects such as industrial parks, wastewater treatment plants, hazardous materials storage, or other infrastructure which may pose a release of pollutants as a result of inundation. Implementing agencies would conduct or require project-specific hydrology studies for projects proposed to be constructed within floodplains to demonstrate compliance with Executive Order 11988 (for federally funded projects), the NFIP, the National Flood Insurance Act, and the Cobey-Alquist Floodplain Management Act, as well as any further FEMA or State requirements that are adopted at the local level. These studies would identify project design features that reduce impacts on either floodplains or flood flows that would be required through the permitting process, as well as requiring measures to reduce the risk of pollutant release from inundation. Therefore, the cumulative effects of risk of polluted runoff from flood inundation is less than significant. The land use development envisioned in the proposed 2022 RTP/SCS would not substantially increase the risk of release of pollutants into the environment as a result of inundations, as it would have to comply with the local, state, and federal requirements described above and there are no projects proposed which pose a release of pollutants as a result of inundation. Therefore, the contribution of the proposed 2022 RTP/SCS to these impacts would not be cumulatively considerable.

All of the cumulative impact area lies within the CVRWQCB and falls under the Basin Plan. All development within the Basin Plan area must comply with the goals, beneficial uses, and 303(d) limitations outlined in the Plan, as well as falling under the authority of any Orders issued by CVRWQCB. Therefore, the cumulative impact to obstruction of the Basin Plan is less than significant, and the proposed 2022 RTP/SCS's contribution to this impact would not be cumulatively considerable. There are multiple individual GSAs within the cumulative impact area. Each development within the cumulative area would only fall under management actions required by the GSA approved within its individual area. By its nature, SGMA emphasizes local action and not regional management. Although some of the groundwater basins within the cumulative impact area are hydrologically connected, individual GSAs only have authority over their defined geographic areas, and although each basin in the SJCOG area falls generally under a single joint GSP, many other basins have multiple GSAs covering different portions of the basin. Therefore, cumulative impacts throughout the analysis area could not serve to obstruct any GSPs other than those in effect in their immediate area (for example, a project exclusively using water generated by purveyors in one GSA area with its specific available yield could not obstruct the monitoring or pumping limitations of a GSP in effect in a different area, with a different sustainable yield, even if they were both within the same groundwater basin), and cumulative impacts to obstruction of GSPs is less than significant. The

proposed 2022 RTP/SCS could not obstruct or interfere with any GSP in effect outside of its own area and would be required to adhere to all requirements of the individual GSPs within its area based on individual project location, and therefore its contribution to impacts to obstruction of GSPs in the cumulative area would not be cumulatively considerable.