4.8 Hydrology and Water Quality

This section describes the existing hydrology and water quality conditions of the project site and vicinity, identifies associated regulatory requirements, evaluates potential project and cumulative impacts, and identifies mitigation measures for any significant or potentially significant impacts related to implementation of the Santa Cruz Water Rights Project (Proposed Project). The section is based on review of the Santa Cruz Mid-County Groundwater Sustainability Plan (GSP) (MGA 2019), the Santa Cruz Integrated Regional Water Management Plan (County of Santa Cruz 2014), the City of Santa Cruz Urban Water Management Plan (City of Santa Cruz 2016), the City of Santa Cruz General Plan 2030 Draft Environmental Impact Report (EIR) (City of Santa Cruz 2011), the Central Coast Regional Water Quality Control Board (RWQCB) Basin Plan (Central Coast RWQCB 2017), the Draft City of Santa Cruz Anadromous Salmonids Habitat Conservation Plan (ASHCP) (City of Santa Cruz 2021b), and other relevant documents regarding hydrology and water quality in the study area.

A summary of the comments received during the scoping period for this EIR is provided in Table 2-1 in Chapter 2, Introduction, and a complete list of comments is provided in Appendix A. Comments were received from the State Water Resources Control Board (SWRCB), Soquel Creek Water District (SqCWD), Water for Santa Cruz County, and numerous individuals. Issues identified in public comments related to potentially significant effects on the environment under the California Environmental Quality Act (CEQA), and issues raised by responsible and trustee agencies, are identified and addressed in this EIR.

4.8.1 Existing Conditions

4.8.1.1 Study Area

The Proposed Project involves the water system and the areas served by the City of Santa Cruz (City) and the water service areas of San Lorenzo Valley Water District (SLVWD), Scotts Valley Water District (SVWD), SqCWD, and Central Water District (CWD); and the remainder of the Santa Cruz Mid-County Groundwater Basin and the Santa Margarita Groundwater Basin. The Proposed Project is located within Santa Cruz County and is generally bounded by the unincorporated communities of Aptos and Le Selva Beach on the east, Bonny Doon Road on the west, Boulder Creek on the north, and the Pacific Ocean on the south (see Figure 3-1). The study area for hydrology and water quality includes the City's surface and groundwater sources[1] (see Figure 4.8-1 and Figure 4.8-2) and the proposed project and programmatic infrastructure component sites where construction and ground disturbance could occur and where new or upgraded facilities would be located (see Figure 3-4 in Chapter 3, Project Description). These sites include the following: aquifer storage and recovery (ASR) sites where known, intertie improvement sites, Felton Diversion fish passage improvement site, and the Tait Diversion and Coast Pump Station improvement site. In addition, this section focuses on injection and extraction from ASR facilities within the Santa Cruz Mid-County Groundwater Basin, and in the Santa Margarita Groundwater Basin. ASR would include new ASR facilities at unidentified locations (referred to as "new ASR facilities" in this EIR) and Beltz ASR facilities at the existing Beltz well facilities (referred to as "Beltz ASR facilities" in this EIR). As there are no definitive sites identified to date for new ASR facilities, site-specific conditions are not available.

[1] For purposes of the Proposed Project, the City's groundwater sources include the Santa Cruz Mid-County Groundwater Basin, where the City's exiting Beltz system is located, and the Santa Margarita Groundwater Basin, where new ASR facilities could potentially be located in the future with the Proposed Project.

4.8.1.2 Regional Setting

The City is located on the central coast of California, along the northern shore of Monterey Bay. The City is in the northern portion of the Central Coast Hydrologic Region of the Central Coast RWQCB. Water service is provided to an area approximately 20 square miles in size, including the entire City, adjoining unincorporated areas of Santa Cruz County, a small part of the City of Capitola, and coastal agricultural lands north of the City. The City climate is characterized by warm, mostly dry summers and mild, wet winters. Rainfall in the City averages 31 inches annually but varies considerably from year to year. The bulk of seasonal rainfall occurs between November and March. In the watershed, topographically above the City's Loch Lomond Reservoir in the Santa Cruz Mountains, rainfall averages nearly 50 inches per year. Like other coastal communities, the marine influence on local air temperature, humidity, and cloud cover helps keep demand for water relatively low in the areas served by the City. The presence of summer fog moderates outdoor water use during peak summer season compared to inland locations within Santa Cruz County and elsewhere (City of Santa Cruz 2016).

The City water system relies predominantly on local surface water supplies, which include the North Coast sources, the San Lorenzo River, Newell Creek, and Loch Lomond Reservoir. Together, these surface water sources represent approximately 95% of the City's total annual water production. The balance of the City's supply is derived from groundwater, which is extracted primarily from wells in the Purisima Formation in the mid-County area, primarily during dry summer months. The City does not import water either from outside the Central Coast Hydrologic Region or outside the Santa Cruz County boundaries. In addition, the City does not anticipate importing water in the future. All water resources are obtained from local sources. The system relies entirely on rainfall, surface runoff, and groundwater infiltration occurring within watersheds located in Santa Cruz County (City of Santa Cruz 2016).

4.8.1.3 Surface Water Resources

City surface water system supplies are located both within and outside of the City, with a mix of flowing sources and the Loch Lomond Reservoir, located on Newell Creek. The following is a summary of the primary surface water features utilized by the City for water supply and/or potentially impacted by the Proposed Project.

illustrates the watersheds and other surface water features in the Santa Cruz region.

Hydrology/Watersheds

San Lorenzo River Watershed

The San Lorenzo River, located within a 138-square mile watershed in northern Santa Cruz County, is the City's largest source of water supply. Originating in the Santa Cruz Mountains, the watershed consists of a 25-mile long main stem and nine principal tributaries that include primary creeks Branciforte, Carbonera, Zayante, Bean, Fall, Newell, Bear, Boulder, Lompico, and Kings Creeks. The watershed includes the cities and communities of Santa Cruz, Scotts Valley, Felton, Ben Lomond, and Boulder Creek. Much of the watershed is forested except for these pockets of urban areas. The watershed is comprised predominantly of open space lands (41%) in the northern portion and residential neighborhoods (26%) and paved roads (13%) as the river flows south through the City. Land uses in the remaining 20% of the watershed include commercial businesses and a portion of the University of California, Santa Cruz (UCSC) campus (City of Santa Cruz 2011; County of Santa Cruz 2014).

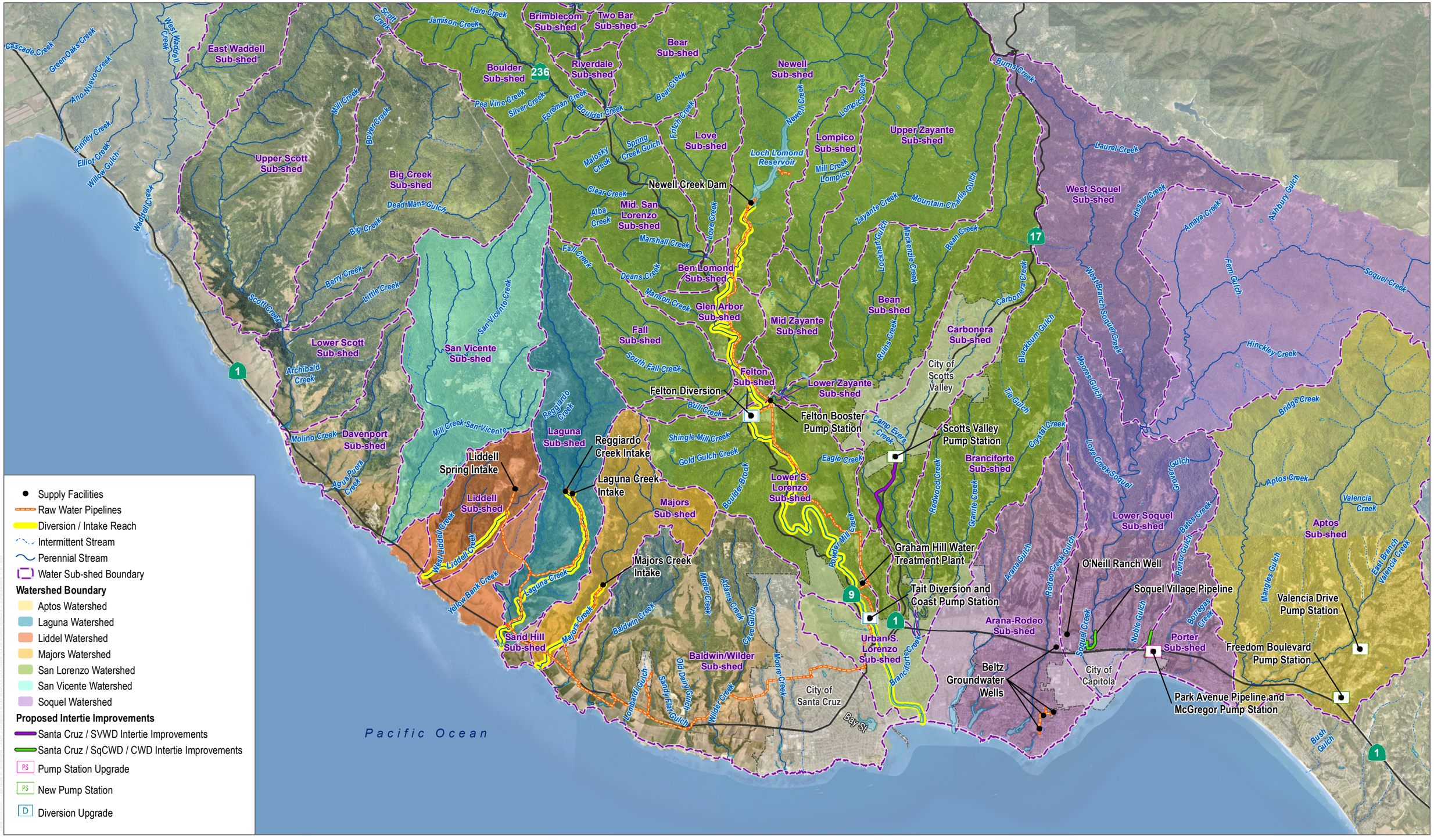
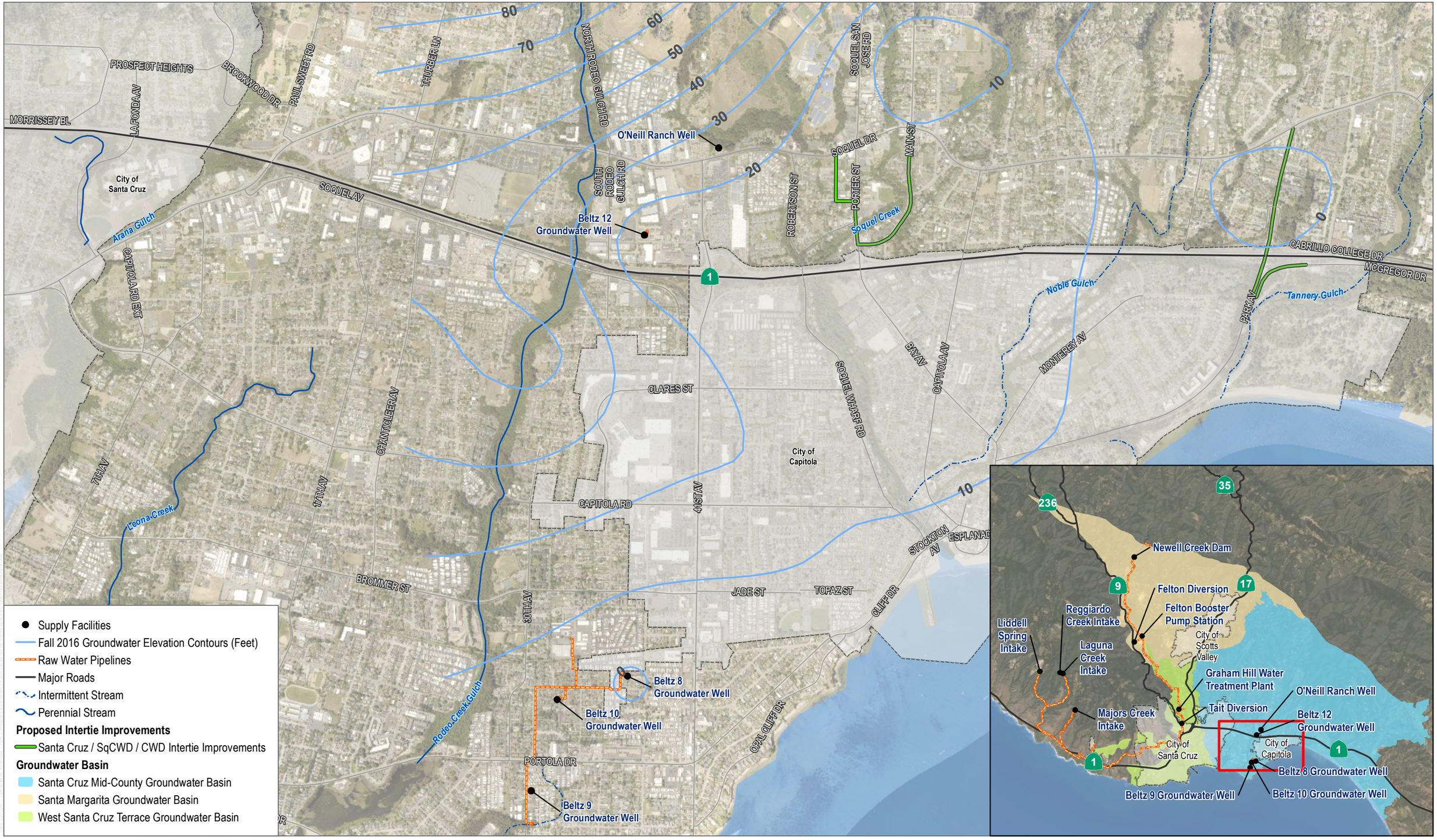


FIGURE 4.8-1

Surface Waters

Santa Cruz Water Rights Project



SOURCE: ESRI 2020, City of Santa Cruz 2020

DUDEK

0 500 1,000 Feet

FIGURE 4.8-2

Groundwater Resources

Santa Cruz Water Rights Project

Surface water flows within tributary creeks in the watershed are characterized as flashy with periodic high flow events that coincide with winter storms and low summer baseflows. This results in high-energy systems that have the potential to move a significant quantity of sediment. Stream base flow levels, sustained by groundwater flow, rise in the winter, and decline steadily through the spring and early summer months. The lowest flows occur in the late summer and fall months before winter rains. Zayante Creek is the largest tributary to the San Lorenzo River (City of Santa Cruz Water Department 2013).

Since approximately 1960, the San Lorenzo River has been impacted by increasing development within the watershed and the channelization of the lower 2.5 miles into a levee flood control structure, following a damaging flood in Santa Cruz in 1955. This flood control project, developed in cooperation with the U.S. Army Corps of Engineers (USACE), included rip-rap levee banks, removal of all vegetation from the banks, and dredging of the river channel bottom. During construction of the levee project, Jessie Street Marsh was filled, and the lower Branciforte Creek was channelized in a cement culvert. The USACE completed another levee improvement project in 2000 that improved and raised the levees (City of Santa Cruz 2011).

The Felton Diversion and Tait Diversion and Coast Pump Station are located on the San Lorenzo River. In addition, the proposed City/SVWD intertie site is located within the Branciforte Creek Subwatershed of the San Lorenzo River Watershed.

Newell Creek and Loch Lomond Reservoir

Newell Creek and the Loch Lomond Reservoir, which is impounded by Newell Creek Dam, are located within the San Lorenzo River Watershed. Loch Lomond Reservoir is located near the town of Ben Lomond in the Santa Cruz Mountains. The reservoir was constructed in 1960 and has a maximum capacity of 2,810 million gallons. The Newell Creek watershed upstream of the reservoir is about 9 square miles (City of Santa Cruz 2016). The City-owned tract, which is predominantly upstream of the Newell Creek Dam, comprises approximately 46% of the total watershed. Newell Creek is the largest drainage within this tract, entering the reservoir at the north end. Three other tributaries, including McFarland Creek and two unnamed tributaries (northern tributary and southern tributary), enter the reservoir from the west. Terrain within the watershed consists of rugged, ridge and valley terrain, including narrow crested, steep-sided ridges and deeply incised, v-shaped valleys (City of Santa Cruz Water Department, 2013). The Newell Creek Dam impounds water to support the City's water supply production and it does not act as flood control.

Liddell Creek Watershed

Liddell Creek is a second order stream that flows into the Pacific Ocean at Bonny Doon Beach, along the North Coast area of Santa Cruz County, directly south of Davenport. Liddell Creek drains in a southwest direction off Ben Lomond Mountain. The watershed comprises approximately 4 square miles. The elevation of the watershed ranges from 0 feet at the creek mouth to approximately 1,300 feet at its headwaters near Smith Grade. Liddell Creek consists of three distinct forks, including the Middle, East, and West branches. The approximate stream channel length from the mouth of Liddell Creek to the mainstem headwaters is 3.2 miles. The Liddell Spring feeds the watershed and is the location of the City's intake in this watershed. The intake is located on a tributary to the East Branch of Liddell Creek, near its headwaters, approximately 2.5 miles upstream from the creek mouth. The channel gradient from the diversion to the creek mouth is approximately 3% along the East Branch of the creek. Debris jams form multiple partial barriers and a complete anadromous fish migration barrier 1.29 miles upstream from the creek mouth, just downstream of the confluence of the Middle and East branches (City of Santa Cruz 2020, 2021). Former CEMEX quarry operations in the upper portion of the Liddell Creek Watershed have locally affected the hydrology and water quality in the upper watershed. In addition, the CEMEX quarry operated a stream diversion on

a tributary to East Liddell Creek to support quarry operations (City of Santa Cruz 2020) and the current landowner continues to operate the diversion.

Laguna Creek Watershed

The Laguna Creek watershed drains an area of approximately 8 square miles and is comprised of Laguna Creek, Reggiardo Creek, and several unnamed streams. Laguna Creek is a second order stream that drains in a southwest direction off Ben Lomond Mountain and flows into the Pacific Ocean along the North Coast area of Santa Cruz County. The elevation of the watershed ranges from 0 feet at the creek mouth to approximately 2,420 feet at the headwaters near Empire Grade. The approximate stream length from the mouth of Laguna Creek to its headwaters is 8.5 miles. The City diversion on the creek is directly upstream (0.1 mile) of the Reggiardo Creek confluence, which is approximately 4.2 miles upstream from the mouth of Laguna Creek. The channel gradient from the diversion to the creek mouth is about 3%, and the channel gradient upstream of the diversion to the headwaters is approximately 6% (City of Santa Cruz 2020, 2021). Approximately 50% of the land use in the watershed is agriculture, with the remaining area comprised of residential and resource conservation uses (County of Santa Cruz 2014).

Majors Creek Watershed

The Majors Creek Watershed, located between the Laguna and Baldwin Wilder Watersheds, drains an area of approximately 5 square miles and is comprised of Majors Creek and three unnamed tributaries. Majors Creek is a second order stream that drains off Ben Lomond Mountain and flows into the Pacific Ocean along the North Coast area of Santa Cruz County. The elevation of the watershed ranges from 0 feet at the creek mouth to approximately 1,800 feet at its headwaters near Felton Peak. The approximate stream channel length from the creek mouth to the creek headwaters is 5.9 miles. The City diversion on Majors Creek is located approximately 2.2 miles upstream from the mouth of Majors Creek. The channel gradient from the diversion to the creek mouth is about 3%, and the channel gradient upstream of the diversion to the headwaters is approximately 6% (City of Santa Cruz 2020, 2021). Land use is predominantly parkland, with the remainder comprised of rural residential and a small area of agricultural production (County of Santa Cruz 2014).

Soquel Creek Watershed

Located between the cities of Santa Cruz and Watsonville, the Soquel Creek Watershed drains an area of 42 square miles. Major tributaries include the West Branch and Main Branch Creeks. Principal land use in the watershed includes urban development, rural residential development, agriculture, parks and recreation, and mining and timber harvesting. The unincorporated town of Soquel and the City of Capitola are in the southern reaches of the watershed (County of Santa Cruz 2014). Beltz 12 ASR site is located within the Rodeo Creek Subwatershed of the Soquel Creek Watershed and Beltz 8, 9, and 10 ASR sites are located within the subwatershed of short intermittent Stream 472, located upstream of Moran Lake, within the Soquel Creek Watershed. However, Rodeo Creek and Stream 472 do not actually drain into Soquel Creek. Rather, these creeks drain directly into Monterey Bay. The proposed Soquel Village pipeline would traverse Soquel Creek. In addition, the proposed Park Avenue pipeline and McGregor Drive pump station upgrade sites are located within the Tannery Gulch Creek Subwatershed of the Soquel Creek Watershed. However, Tannery Gulch Creek does not drain toward Soquel Creek, but rather flows directly into Monterey Bay.

Aptos Creek Watershed

The Aptos Creek Watershed drains an area of approximately 25 square miles in southern Santa Cruz County. Aptos Creek and Valencia Creek are the principal tributaries in the watershed. Aptos Creek converges with Valencia Creek approximately 1 mile inland of Monterey Bay. Land use in this watershed is comprised of forested lands, state parks, and some rural residential areas. More than half of the Aptos Creek portion of the watershed is forested, with most of the creek running through the southern portion of the Nisene Marks State Park. Land use in the Valencia Creek portion of the watershed is primarily rural residential and urban development. Historical and modern-day logging sites are in both subwatersheds (County of Santa Cruz 2014). The proposed Valencia Drive Pump Station and Freedom Boulevard Pump Station are located within the Aptos Creek Watershed.

Water Quality

The RWQCB establishes beneficial uses and characterizes the water quality of surface water bodies based on watershed boundaries. A watershed identifies an area of land that contains a common set of streams and rivers that all drain into a single larger body of water, such as a larger creek, river, lake, or an ocean. Stormwater pollutants present in all five City watersheds include metals, solvents, paint, concrete, masonry products, detergents, vehicle fuels and fluids, oil and grease, pesticides and herbicides (organic compounds and nutrients), debris and litter, bacteria, pathogens and oxygen demanding compounds, and sediment and silt. However, the primary pollutants of concern in the City watersheds are sediment, silt, and fecal indicator bacteria. The City has targeted these primary pollutants of concern in the City's Stormwater Management Plan (SWMP) (see Section 4.8.2.3, Local, for more information) because certain water bodies within the City are listed on the Clean Water Act (CWA) Section 303(d) list of Impaired Water Bodies (City of Santa Cruz 2011).

Turbidity, a measure of the ability of light to pass through water, which is affected by the amount of fine sediment suspended within the water column, is high during peak flow events for streams in the Santa Cruz Mountains, even in areas that have not been affected by development and ground disturbance. Existing and new development activity occurring in steep and remote areas of the watersheds increase runoff and erosion, leading to increases in sedimentation and persistent turbidity in water supply streams. The resulting water quality issues also impact riparian corridors and can thus be attributed both to activities at the level of individual lots, with respect to grading and land clearing, as well as cumulative impacts of widespread development. Similarly, activities and development in the riparian areas can also impact water quality in a manner like those in steep and remote areas. Turbidity can also have an impact on the availability and treatment cost of municipal water (City of Santa Cruz 2013; City of Santa Cruz and SLVWD 2018).

The Porter-Cologne Water Quality Control Act of 1969 is California's statutory authority for the protection of water quality. Under the Act, the State must adopt water quality policies, plans, and objectives that protect the State's waters for the use and enjoyment of the people. The Act sets forth the obligations of the SWRCB and RWQCBs to adopt and periodically update water quality control plans for all the waters of an area. The water quality control plan is defined as having three components: beneficial uses which are to be protected, water quality objectives which protect those uses, and an implementation plan which accomplishes those objectives. See Section 4.8.2, Regulatory Framework, for additional information about the Porter-Cologne Water Quality Control Act.

The September 2017 Water Quality Control Plan for the Central Coastal Basin (Basin Plan) is the Central Coast RWQCB's current master water quality control planning document (Central Coast RWQCB 2017). The Basin Plan establishes beneficial uses for each of the water bodies in the Central Coast Region. Table 4.8-1 lists the beneficial uses of the primary surface water features utilized by the City for water supply or potentially impacted by the Proposed Project.

Table 4.8-1. Beneficial Uses

Beneficial Use Designation	Water Bodies								
	San Lorenzo River	*Newell Creek*	*Loch Lomond Reservoir*	*Liddell Creek*	*Laguna Creek*	*Majors Creek*	*Rodeo Creek Gulch*	*Soquel Creek*	*Aptos Creek*
Municipal and Domestic Supply (MUN)	E	E	E	E	E	E	E	E	E
Agricultural Supply (AGR)	E	E	E	E	E	E	E	E	E
Industrial Process Supply (PROC)	—	—	—	—	—	—	—	—	—
Industrial Service Supply (IND)	E	E	E	E	E	E	E	E	E
Groundwater Recharge (GWR)	E	E	E	E	E	E	E	E	E
Water Contact Recreation (REC-1)	E	E	E	E	E	E	E	E	E
Non-contact Water Recreation (REC-2)	E	E	E	E	E	E	E	E	E
Wildlife Habitat (WILD)	E	E	E	E	E	E	E	E	E
Cold Freshwater Habitat (COLD)	E	E	E	E	E	E	E	E	E
Warm Freshwater Habitat (WARM)	—	—	E	—	—	—	—	—	—
Migration of Aquatic Organisms (MIGR)	E	E	E	E	E	E	–	E	E
Spawning, Reproduction, and/or Early Development (SPWN)	E	E	E	E	E	E	E	E	E
Preservation of Biological Habitats of Special Significance (BIOL)	E	—	—	—	—	—	—	E	E
Rare, Threatened, or Endangered Species (RARE)	E	—	E	—	—	E	—	—	—
Estuarine Habitat (EST)	—	—	—	—	—	E	—	—	E
Fresh Water Replenishment (FRSH)	E	E	—	—	E	E	E	E	E
Navigation (NAV)	—	—	E	—	—	—	—	—	—
Hydropower Generation (POW)	—	E	—	—	—	—	—	—	—
Commercial and Sport Fishing (COMM)	E	E	E	E	E	E	E	E	E
Aquaculture (AQUA)	—	—	—	—	—	—	—	—	—
Inland Saline Water Habitat (SAL)	—	—	—	—	—	—	—	—	—
Shellfish Harvesting (SHELL)	—	—	—	—	—	—	—	—	—

Source: Central Coast RWQCB 2017.
Note: E = Existing Beneficial Uses.

The Basin Plan includes numerous water quality objectives that apply to all inland surface waters. The objectives that would apply to the Proposed Project include those related to turbidity, suspended material, and sediment, as project-related construction could result in erosion induced sedimentation of adjacent or downstream water bodies. Sediment- and turbidity-related surface water quality objectives are specified on pages 30 and 39 of the Basin Plan. In addition, water quality objectives for oil and grease, toxicity, chemical constituents, organic chemicals, and inorganic chemicals would apply to the Proposed Project as project-related construction and operation could result in incidental releases of petroleum products and hazardous materials to the environment. Surface water quality objectives associated with these chemicals are specified on pages 30-31 and 37-39 of the Basin Plan. While the Porter-Cologne Water Quality Control Act requires the State to adopt water quality policies, plans, and objectives that protect the State's waters, the federal CWA establishes basic guidelines for regulating discharges of both point and non-point sources of pollutants into the waters of the United States.[2] The CWA requires that states adopt water quality standards to protect public health, enhance the quality of water resources, and ensure implementation of the CWA. CWA Section 303(d) requires states to identify and prepare a list of water bodies that do not meet water quality objectives, and to establish Total Maximum Daily Loads (TMDLs) for each water body to ensure attainment of water quality objectives. These TMDLs are updated every two years in the SWRCB Integrated Report, also known as the Section 305(b) report, which assigns an Integrated Report Condition Category to all assessed water body segments. Water body segments that exceed protective water quality standards are placed on the 303(d) list of impaired waters. Water quality impairments for the water bodies potentially affected by the Proposed Project are identified in Table 4.8-2. These impaired bodies are listed as Category 5 in the SWRCB Integrated Report, which includes waters where at least one beneficial use is not supported, and a TMDL is required.

Table 4.8-2. Water Quality Impairments

Water Body	2014 and 2016 303(d) List of Water Quality Impairments (Included under SWRCB Integrated Report Category 5)
San Lorenzo River	Chlordane, chloride, chlorpyrifos, enterococcus, *Escherichia coli*, fecal coliform, nitrate, polychlorinated biphenyls (PCBs), sedimentation/siltation, sodium, water temperature,
Newell Creek	pH, sedimentation/siltation
Loch Lomond Reservoir	None
Liddell Creek	None
Laguna Creek	None
Majors Creek	None
Soquel Creek/Lagoon	Enterococcus, *Escherichia coli*, fecal coliform, indicator bacteria, sedimentation/siltation
Aptos Creek	Indicator bacteria, sedimentation/siltation

Source: Central Coast RWQCB 2017.
Notes: PCBs = polychlorinated biphenyls; SWRCB = State Water Resources Control Board.

4.8.1.4 Groundwater Resources

The scope of this groundwater resources section focuses mainly on the existing conditions related to the proposed Beltz ASR facilities that would be located in the Santa Cruz Mid-County Groundwater Basin to support the project-level impact analysis for this component. More generalized information is also provided about the Santa Margarita Groundwater Basin to support the programmatic impact analysis for new ASR facilities.

[2] Point-source discharges are those emanating from a pipe or discrete location/process, such as an industrial process or wastewater discharge. Non-point source pollutants are those that originate from numerous diffuse sources and land uses, and which can accumulate in stormwater runoff or in groundwater.

Santa Cruz Mid-County Groundwater Basin

Background

The Santa Cruz Mid-County GSP was completed and adopted by the Santa Cruz Mid-County Groundwater Agency (MGA) in November 2019 and submitted to the Department of Water Resources (DWR) on January 30, 2020 (MGA 2020). DWR approved the GSP on June 3, 2021 as being found to satisfy the requirements of SGMA (DWR 2021). The Santa Cruz Mid-County GSP was mandated in accordance with the Sustainable Groundwater Management Act (SGMA) of 2014 (see Section 4.8.2, Regulatory Framework, for information about SGMA). The GSP is a collaborative effort between local water agencies, technical experts, land use agencies, environmental managers, and community members to manage the groundwater basin sustainably. The intent of the GSP is to guide long-term management of the shared groundwater resources in the Santa Cruz Mid-County Groundwater Basin to ensure a stable groundwater basin and therefore a reliable water supply to meet community needs now and into the future.

MGA member agencies began studying groundwater and managing the Santa Cruz Mid-County Groundwater Basin long before SGMA was passed into law. The City and SqCWD acquired interests in groundwater pumping in the basin, and together with Santa Cruz County commissioned the first hydrogeologic study of the basin in the mid-1960s. Seawater intrusion identified in the Santa Cruz Mid-County Groundwater Basin in the 1980s required water managers to develop an extensive monitoring network of wells to monitor the basin groundwater and to help improve understanding of the basin, as well as implement water conservation and groundwater management strategies to balance groundwater demand with the basin groundwater budget. In accordance with Assembly Bill 3030, also known as the Groundwater Management Act, a Groundwater Management Plan was developed for the Mid-County Groundwater Basin. The MGA subsequently formed in 2016 as a Joint Powers Authority, with four member agencies, including the City, Central Water District, County of Santa Cruz, and SqCWD. These four agencies have been actively working together and reaching out to private well owners on Santa Cruz Mid-County Groundwater Basin management since the 1990s, in accordance with the Groundwater Management Plan. This plan has been replaced by the GSP, which currently serves as the groundwater management planning document for the basin (MGA 2019). The City and SqCWD also have a cooperative monitoring/adaptive groundwater management agreement and a private well monitoring agreement. This section focuses on groundwater resources of the SqCWD and the City because of the focus on the Beltz ASR facilities, although there are three other management authorities in the Santa Cruz Mid-County Groundwater Basin: the County of Santa Cruz, the Central Water District, and the Santa Cruz Mid-County Groundwater Agency (MGA 2019).

The area within and surrounding the Beltz system is urbanized and mostly connected to the City's municipal water system. Within this area, there are no agricultural or industrial users of groundwater in the immediate vicinity of the Beltz system; the only other groundwater wells in the vicinity are identified as remediation/monitoring wells (DWR 2020b). Additionally, there are private domestic wells in the vicinity of Beltz 12. An existing cooperative groundwater management agreement (see Chapter 3, Project Description) between the City and SqCWD provide for monitoring of the effects of operating the City's Beltz 12 well and the SqCWD's O'Neill Ranch well on nearby private domestic wells and Soquel Creek.

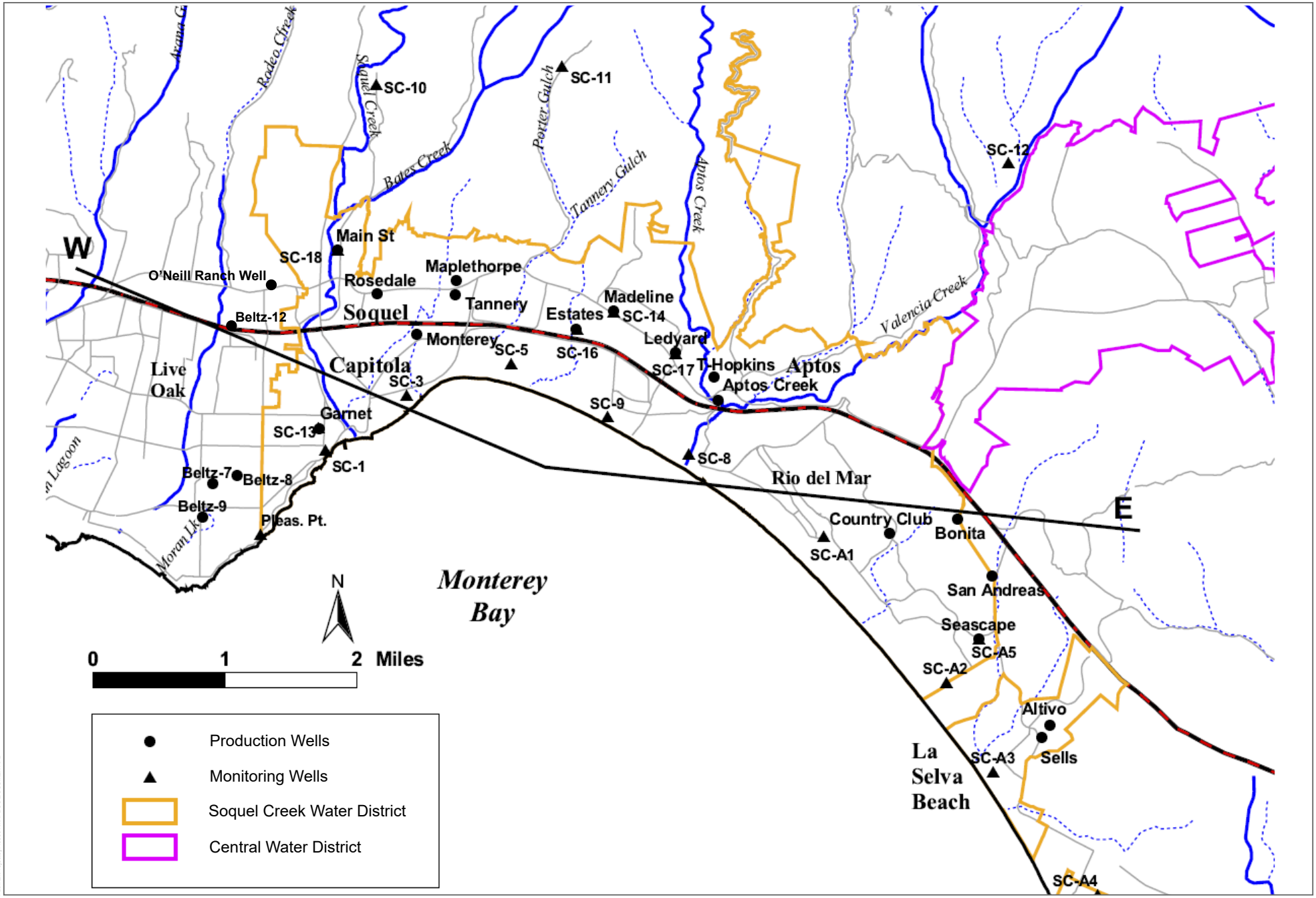
Groundwater Conditions

Located near the southeastern boundary of the areas served by the City, close to the western boundary of the SqCWD (see Figure 4.8-2), the Beltz ASR facility sites include a collection of four production wells spread throughout 2 miles of the Pleasure Point and Live Oak neighborhoods (i.e., Beltz 8, 9, 10 and 12). The Beltz ASR facility sites are located within the Santa Cruz Mid-County Groundwater Basin (see Figure 4.8-2). This basin is the primary water supply for approximately 50,000 people in the Santa Cruz Mid-County Region, including the City of Capitola and unincorporated parts of Santa Cruz County, including Live Oak, Soquel, Aptos, Sea Cliff, Seascape, and La Selva Beach. In addition, the City of Santa Cruz pumps approximately 5% of its water supply from the Beltz wells.

The Santa Cruz Mid-County Groundwater Basin includes the former Soquel Valley Basin and portions of three adjacent basins—the West Santa Cruz Terrace Basin, the former Santa Cruz Purisima Formation Basin, and the original Pajaro Valley Basin. The lateral boundaries of the basin generally follow the definable limits of the stacked Purisima Formation aquifer system, the Aromas Red Sands, and other Tertiary-aged units that occur between the base of the Purisima Formation and the granitic basement of the basin. The Santa Cruz Mid-County Groundwater Basin is bound on the west by the West Santa Cruz Terrace Basin; on the north by the Zayante-Vergeles Fault and the Purisima Highlands Subbasin of the Corralitos Basin; on the east by the Pajaro Valley Subbasin of the Corralitos Basin, and on the south by Monterey Bay (MGA 2019).

The Purisima Formation underlies the entire Santa Cruz Mid-County Groundwater Basin and consists of moderately consolidated, fine- to medium-grained sandstone, with siltstone and claystone interbeds (Figure 4.8-3 and Figure 4.8-4). The Purisima Formation has been divided into hydrostratigraphic units including, from oldest to youngest (i.e., deepest to shallowest), Purisima-AA Aquifer, Purisima-A Aquifer, Purisima-B Aquitard, Purisima-BC Aquifer, Purisima-D Aquitard, Purisima-DEF Aquifer, and Purisima-F Aquifer. An aquitard is a relatively impermeable layer of clay that generally prevents upward and downward movement of groundwater, thus separating aquifers. These geologic units are tilted to the east, which has resulted in some of the younger units being eroded away in the western portion of the basin (i.e., vicinity of the Beltz ASR site), leaving only the older units as aquifers. Also present in the western portion of the basin is the Tu unit, which consists of undifferentiated Tertiary sandstone. This unit is a localized productive aquifer that includes all non-Purisima water-bearing units between the poorly defined base of the AA aquifer unit and the top of the granitic basement (MGA 2019).

The Purisima Formation is blanketed by the Aromas Red Sands in the eastern third of the basin, and by relatively shallow, localized alluvial and terrace deposits. The Aromas Red Sands, which overlie the Purisima Formation in the hills and coastal terraces east of Valencia Creek, consist of consolidated fine- to coarse-grained sands with lenses of silt and clay. The Aromas Red Sands are divided into an upper and lower unit. The upper unit is generally unsaturated, especially where the water table is drawn down to near sea level. The hydraulic conductivity of the lower unit ranges from 6 to 50 feet per day, whereas the hydraulic conductivity of the upper unit is 3 to 40 feet per day. There is no continuous aquitard between the Aromas Red Sands and uppermost Purisima unit (Purisima F-unit) (MGA 2019).



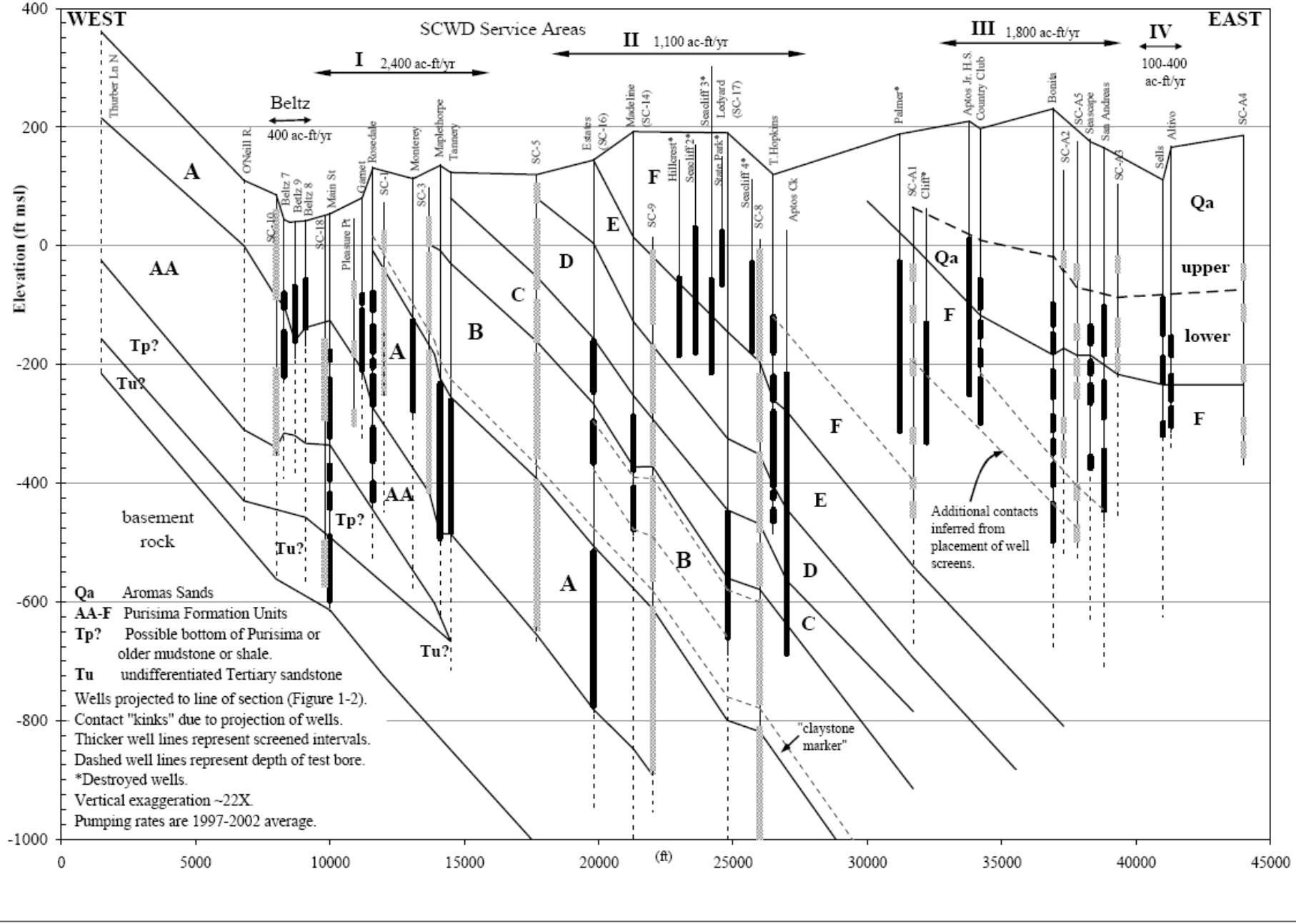
SOURCE: SqCWD 2004

FIGURE 4.8-3

West-East Geologic Cross Section Location

Santa Cruz Water Rights Poject

DUDEK



SOURCE: SqCWD 2004

FIGURE 4.8-4

West-East Geologic Cross-Section

Santa Cruz Water Rights Poject

DUDEK

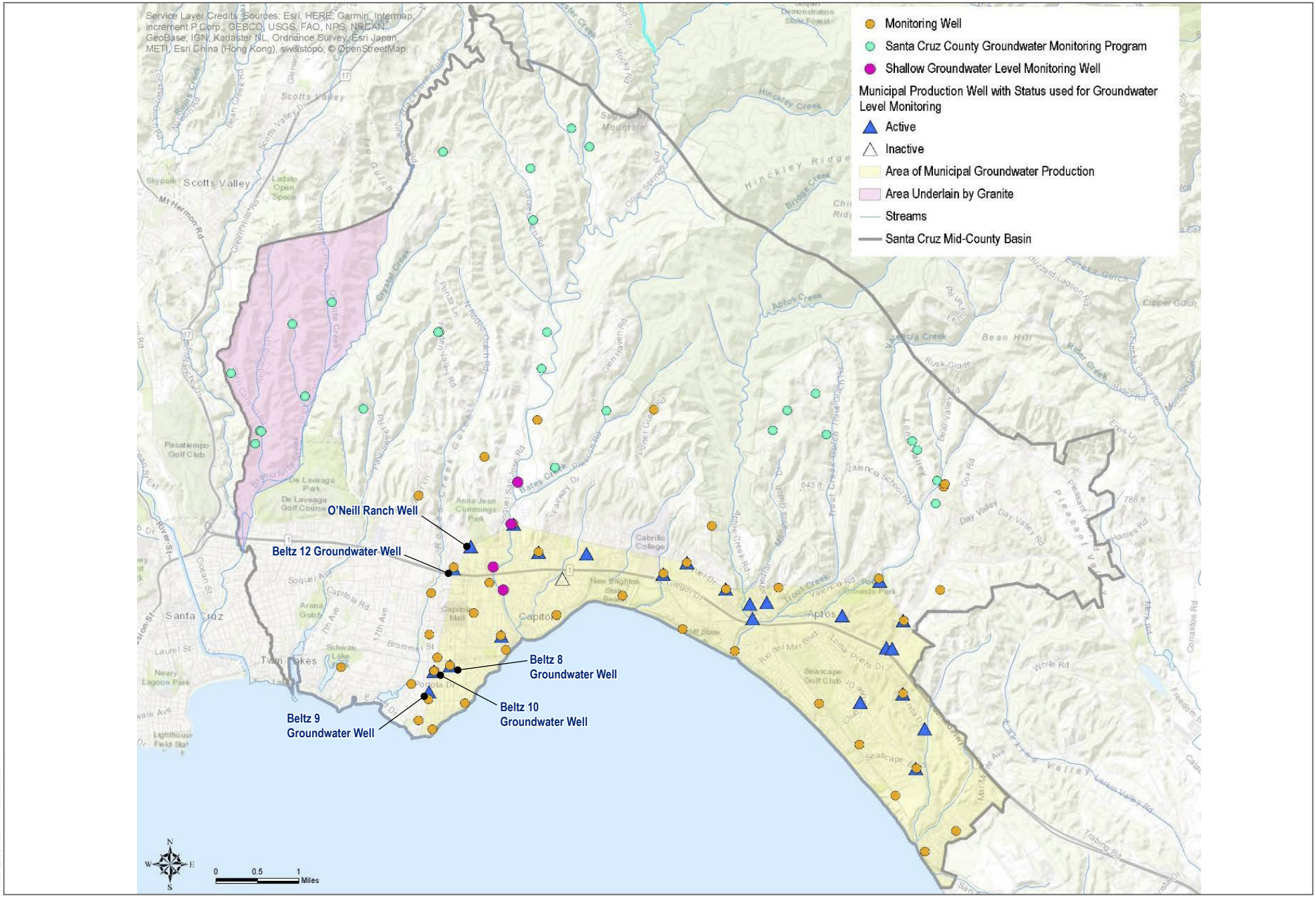
The City receives nearly all its municipal water supply from surface sources but supplements a small percentage (approximately 5%) of this supply with groundwater resources during the summer dry months/peak season. Based on average annual basin groundwater production, City pumping accounts for approximately 7% of the total annual pumping that occurs in the Santa Cruz Mid-County Groundwater Basin. The Beltz ASR facility sites are located within the areas served by the City, but the City works with neighboring water districts in groundwater supply and conservation efforts, as the districts in the Santa Cruz Mid-County Groundwater Basin do not import water from any surface water sources outside of the basin. The SqCWD relies solely on the groundwater basin for its municipal supply of water and accounts for 62% of the average annual pumping that occurs in the basin. The CWD is also entirely dependent on groundwater from the Santa Cruz Mid-County Groundwater Basin and accounts for approximately 6% of the average annual pumping that occurs in the basin (MGA 2019).

Historically, the Soquel Valley Basin and encompassing Santa Cruz Mid-County Groundwater Basin were identified by the state as a groundwater basin subject to critical conditions of overdraft and at risk of seawater intrusion, which is the movement of seawater intro freshwater aquifers due to natural processes or human activities. Seawater intrusion is caused by decreases in groundwater levels, typically due to groundwater extraction, or by a rise in seawater levels. For many years, the amount of groundwater extracted from the basin exceeded the amount naturally recharging groundwater through rainfall. Despite extensive water conservation efforts and reductions in groundwater pumping in recent years compared to prior decades (see Chapter 3, Project Description, for additional information), the long-term overdraft of the basin lowered groundwater elevations along portions of the coast. Some production wells have historically declined to −30 feet below mean sea level (bmsl). Lowered groundwater levels have allowed seawater intrusion into coastal portions of the groundwater aquifers and pose the threat of more widespread seawater contamination of groundwater. Once a portion of a groundwater basin is contaminated with seawater, the seawater intrusion can be irreversible (Marina, A. 2017; Oude Essink, G.H. 2001; SqCWD 2016) and can result in either abandoning water supply wells or requiring costly treatment to remedy the poor water quality. Based on the seawater intrusion risk, the basin is considered a high priority groundwater basin in critical overdraft, as defined under SGMA. As a result, the GSP has been prepared for the basin (MGA 2019).

The City maintains a series of monitoring wells that monitor groundwater levels (Figure 4.8-5) and groundwater quality (Figure 4.8-6). The City maintains 34 monitoring wells and 4 production wells in their groundwater level monitoring network. Of these wells, seven have been chosen as Representative Monitoring Points (RMPs) during SGMA-derived GSP implementation (Figure 4.8-7). Similarly, the City maintains 28 monitoring wells and 4 production wells for groundwater quality purposes, with 18 of those chosen as RMPs with respect to SGMA-derived GSP implementation (Figure 4.8-8). In addition, a series of 13 monitoring wells have been established in the basin to assess the risk of seawater intrusion. Eight of these monitoring wells lie within the areas served by the City and the SqCWD service area, from Moran Lake to Aptos Creek. These monitoring wells, which are located adjacent to the coastline, are depicted on Figure 4.8-8 as Protective Groundwater Elevation Monitoring Wells and Chloride Monitoring Wells (MGA 2019).

Groundwater Levels

As previously discussed, long-term overdraft of the Santa Cruz Mid-County Groundwater Basin has led to ongoing seawater intrusion. The greatest groundwater level declines in the basin were measured in the Purisima BC unit in 1984, when declines up to 140 feet occurred. In 1988, groundwater level declines peaked in the Purisima A and DEF units, with declines of 80 feet and 100 feet, respectively. By 2005, basin groundwater levels in the Purisima aquifers had recovered somewhat but were still characterized by a broad and persistent pumping trough that was below sea level surrounding municipal production wells. Groundwater elevation contours in the most productive Purisima aquifer units in fall 2005 showed depressed groundwater levels at the coast still ranged from sea level to −30 feet bmsl.



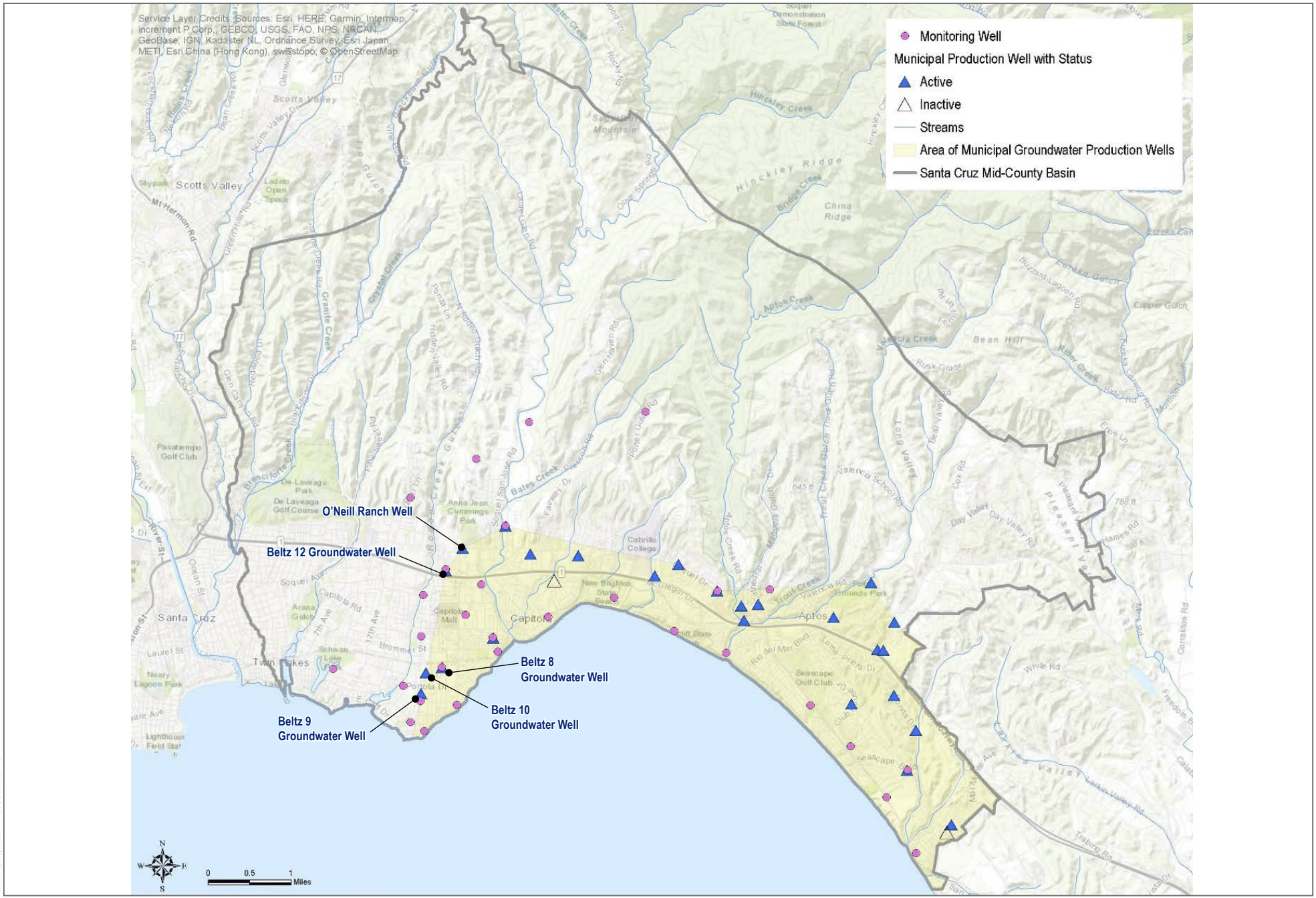
SOURCE: SCMGA 2019

FIGURE 4.8-5

Santa Cruz Mid-County Groundwater Basin Groundwater Level Monitoring

Santa Cruz Water Rights Poject

DUDEK



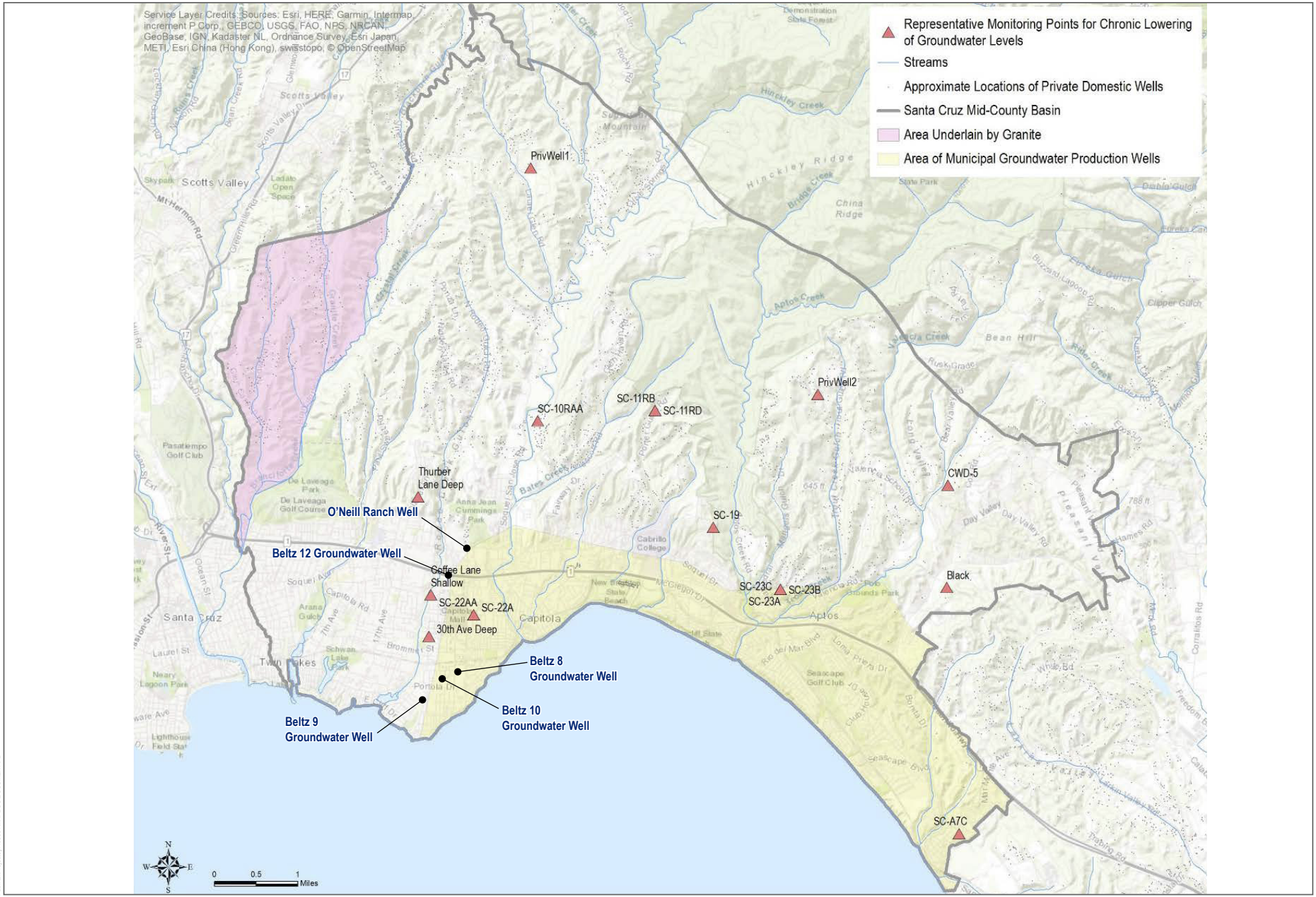
SOURCE: SCMGA 2019

FIGURE 4.8-6

Santa Cruz Mid-County Groundwater Basin Groundwater Quality Monitoring

Santa Cruz Water Rights Poject

DUDEK



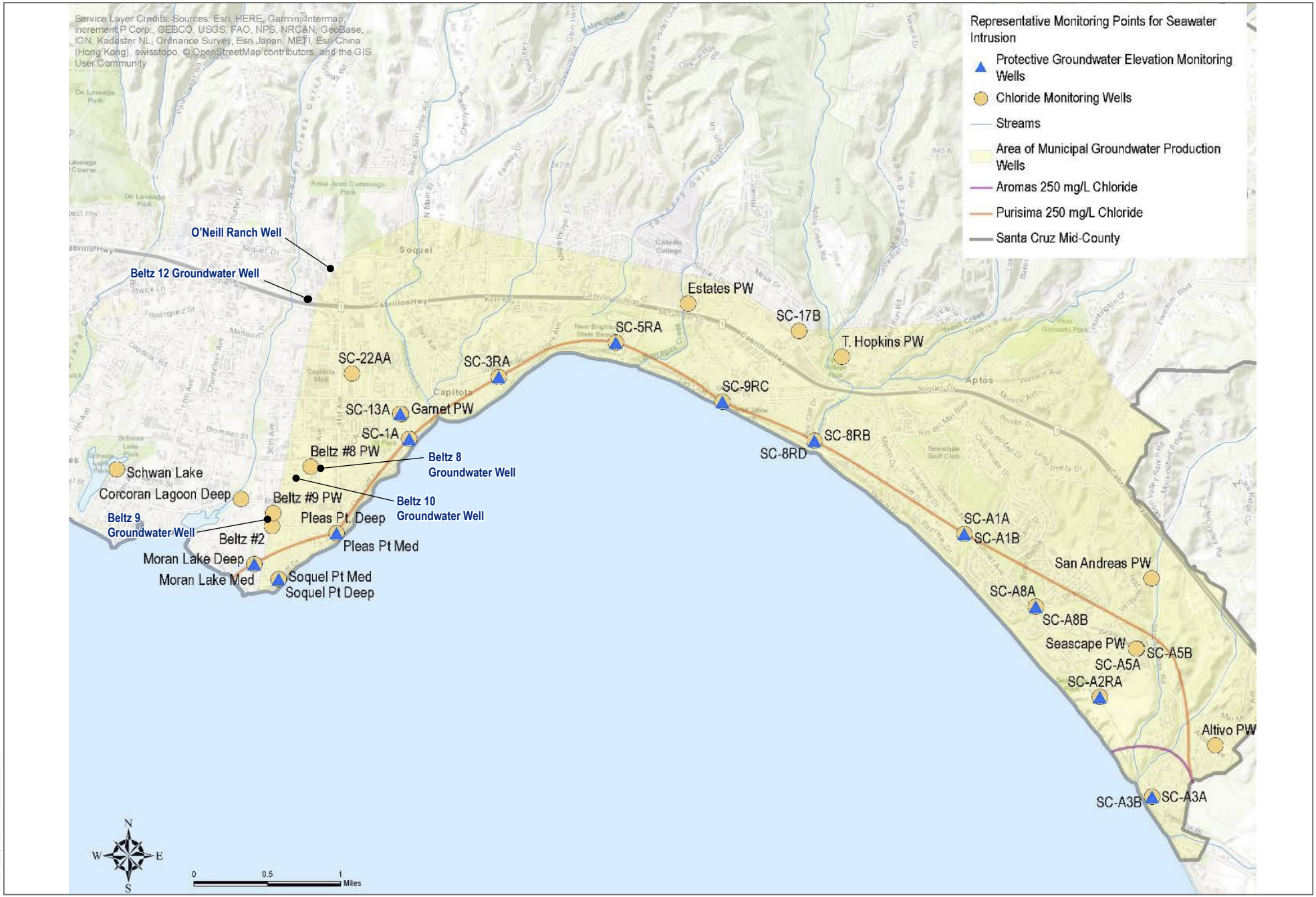
SOURCE: SCMGA 2019

FIGURE 4.8-7

Representative Monitoring Network for Measuring Chronic Lowering of Groundwater Levels

Santa Cruz Water Rights Poject

DUDEK



SOURCE: SCMGA 2019

FIGURE 4.8-8

Representative Monitoring Network for Measuring Seawater Intrusion

Santa Cruz Water Rights Poject

DUDEK

After 2005, groundwater demand decreased and remained constant until 2009. Groundwater recovery started with two consecutive years of above average rainfall in 2005/2006. An economic recession, starting around 2008, further reduced water demand, possibly contributing to recovering groundwater levels during the period of below average rainfall from 2007 to 2009. A further decrease in groundwater demand occurred from 2010 to 2011.

From 2012 to 2013, groundwater demand increased because of drought conditions, resulting in lower groundwater levels. This drop in groundwater levels was followed by groundwater recovery from 2014 to 2017, because of decreased demand. The 2014/2015 decrease in demand and associated increase in groundwater levels corresponds with increased statewide water restrictions due to the 2012-2015 drought. As a result, the overall water levels in the Purisima Formation were at their highest recorded elevations during water year 2016 (October 1, 2015 through September 30, 2016) since the monitoring well network was established (MGA 2019; DWR 2020a). In the Purisima A/AA and Tu aquifers, those most relevant to Beltz ASR, an overall decrease in groundwater elevation (ranging from 0 feet to −0.9 feet bmsl) was measured from 2012 to 2016. Despite this net decrease in water levels at these wells, average water levels in 8 out of the 13 monitoring wells met established protective elevations against seawater intrusion during Water Year 2016 (MGA 2019).

Operational changes in the basin show that the most influential factor in changing coastal groundwater levels is changing the amount of groundwater pumping in high yielding municipal supply wells. Recharge from rainfall generally has a less immediate effect on coastal groundwater levels because most aquifers are confined by less permeable layers, and areas where the aquifers are exposed at the surface and can be directly recharged are limited (MGA 2019).

As required by SGMA and associated regulations, the MGA is tasked with conserving groundwater in the Santa Cruz Mid-County Groundwater Basin and has developed groundwater level sustainability goals for the basin to ensure beneficial uses and a safe and reliable supply that meets current and future basin demand without causing "undesirable results," which is a statutory term from SGMA (see Section 4.8.2.2, State [Sustainable Groundwater Management Act] for a definition). With respect to groundwater levels, minimum thresholds and measurable objectives were defined. Each MGA member agency has its own network of dedicated monitoring wells and production wells that monitor groundwater elevations in its own service area or area of jurisdiction. These individual networks, many of which have been used to manage the basin since the 1980s, are combined for use in the GSP.

Almost all monitoring wells and all production wells have data loggers to continuously monitor groundwater levels. Shallow monitoring wells used to monitor surface water/groundwater interactions are also included in this GSP monitoring network. With 170 wells in the basin monitored at least twice a year, the network is demonstrably extensive and sufficient to evaluate short-term, seasonal, and long-term trends in groundwater for groundwater management purposes. Groundwater level data from many of the wells have been used since 2006 to generate fall and spring groundwater elevation contours for all the basin aquifers. As there are multiple well clusters with monitoring wells completed in different aquifers at the same location included throughout the basin, these clustered wells are used to understand changes in vertical gradients between aquifers. Several years of monitoring of clustered wells along Soquel Creek (Figure 4.8-5) indicate that there is an indirect influence where shallow groundwater levels mimic deeper regional groundwater trends, which have been influenced by municipal pumping. However, since these observations have only been observed within a few wells along lower Soquel Creek, further study as part of GSP implementation will revise the current understanding (MGA 2019).

Although the Beltz ASR facility wells are located within the greater Soquel Creek Watershed, these wells are located within the Rodeo Creek Gulch Subwatershed, west of the Lower Soquel Creek Subwatershed, in which the shallow monitoring wells are located (see Figure 4.8-1).

Groundwater Quality

Groundwater in the Purisima Formation regularly has iron and/or manganese concentrations above the secondary drinking water standards, 300 micrograms per liter (µg/L) and 50 µg/L, respectively. Production wells in the formation with elevated iron concentrations can reach 3,000 µg/L, and manganese can reach up to 600 µg/L. Both iron and manganese occur naturally in the Purisima Formation because of the dissolution of metals within the aquifer. Concentrations within a well can fluctuate greatly and may range by two orders of magnitude. Neither constituent poses a major health concern at the levels found within the basin; however, the SWRCB Drinking Water Division maintains a health-based Notification Level for manganese of 500 µg/L, based on neurotoxic risk. Because iron and manganese are naturally occurring, increasing concentration trends have not been observed. Groundwater pumped from the Purisima Formation for municipal purposes is treated to reduce iron and manganese levels prior to distribution (MGA 2019).

Currently, groundwater quality issues in the Santa Cruz Mid-County Groundwater Basin include one location with 1,2,3-trichloropropane (1,2,3-TCP) concentrations in groundwater, widespread nitrate in parts of the Aromas Red Sands aquifers, elevated ammonia concentrations in the western portion of the basin (in the vicinity of Beltz 12 ASR facility sites and adjoining SqCWD service area), and saline water associated with seawater intrusion in two areas along the coast. Otherwise, Santa Cruz Mid-County Groundwater Basin groundwater quality is good, with no poor groundwater quality present within productive aquifers. The 1,2,3-TCP concentrations have been detected in the SqCWD Country Club well, which is screened in Aromas Red Sands and Purisima F aquifers (MGA 2019). These concentrations of 1,2,3-TCP, nitrates, and chloride have either been detected in monitoring wells or in production wells prior to being treated to drinking water standards. Elevated concentrations (i.e., above drinking water standards) of these contaminants are not present in potable water supplies.

As previously discussed, seawater intrusion has been of great concern for the Santa Cruz Mid-County Groundwater Basin for many years. At times, groundwater elevations have been at −30 ft bmsl creating a gradient for seawater to intrude from Monterey Bay into coastal aquifers. In 2017, the MGA contracted the firms SkyTEM and Ramboll to conduct a geophysical survey of the coast and 1 mile offshore to accurately characterize the risk of seawater intrusion in the basin. The survey revealed that the Purisima A/AA subaquifer is at high risk for seawater intrusion. In addition, high chloride concentrations have been detected in two City monitoring wells along the coast. Although measured chloride levels in the existing Beltz facilities have been within standard range for the basin (10 to 100 milligrams per liter [mg/L]) and below the action threshold (700 mg/L), Beltz 8, 9, and 10 receive water from the Purisima A/AA formation, thus making seawater intrusion a concern (MGA 2019).

Like that described above for groundwater levels, each MGA member agency monitors a network of dedicated monitoring wells and production wells for groundwater quality in its service area or area of jurisdiction. These monitoring sites have also been used to manage the Santa Cruz Mid-County Groundwater Basin since the 1980s. The distribution and sampling frequency of monitoring and production wells used for sampling groundwater quality reflects locational and aquifer depth susceptibility to contamination, including seawater. The monitoring wells used to detect possible seawater intrusion are located immediately adjacent to the coastline. All coastal monitoring wells are sampled for chloride and total dissolved solids quarterly to ensure increases in salinity are identified quickly.

Ammonia

The SqCWD's O'Neill Ranch water supply well (Figure 4.8-2) has naturally occurring ammonia concentrations that are difficult to treat (SqCWD 2018). The O'Neill Ranch well and associated water treatment plant were initially placed online as a new water source in February 2015. Iron and manganese are treated at the treatment plant by

oxidation with sodium hypochlorite and filtration, through six greensand pressure filters. Naturally occurring ammonia is also oxidized during this process. After the well was first placed online, ammonia concentrations increased from 0.24 milligrams per liter (mg/L) in 2015 to 1.40 mg/L in September 2018, and in June 2018 the well was taken offline as the treatment dose had reached the maximum use allowed for sodium hypochlorite. In addition to the ammonia level increasing over time, it also fluctuated upon startup of the well (SqCWD 2018; Corona Environmental Consulting 2020). The SqCWD requested a temporary waiver of the sodium hypochlorite maximum use level to further evaluate the ammonia conditions at the O'Neill Ranch well and to consider future options (SqCWD 2018). This request was approved by the SWRCB, Division of Drinking Water, and the SqCWD will experiment with a bleach management solution, including dilution, which is pending initiation (Corona Environmental Consulting 2020).

Ammonia is also present at various, albeit lesser, concentrations in the SqCWD's and City's other Purisima Formation-area production and monitoring wells. For example, ammonia in groundwater increased substantially at the Beltz 12 well, which is approximately 1,800 feet southwest of the O'Neill Ranch well, from 0.18 mg/L to 0.57 mg/L, from August to October 2020 (City of Santa Cruz 2021a). The highest levels of ammonia have been found in the Tu (unnamed Tertiary unit) aquifer, underlying the Purisima Formation and overlying the granitic basement rock. This unit provides a substantial amount of groundwater flow to the O'Neill Ranch well. Testing in February 2017 indicated that ammonia was present in all the depth intervals tested, but the highest concentrations were largely restricted to two inflow zones, including one between 400 and 420 feet below ground surface and one between 510 and 540 feet below ground surface (SqCWD 2018).

Santa Margarita Groundwater Basin

The Santa Margarita Groundwater Basin is a primary source of water supply for Scotts Valley and the San Lorenzo Valley. It covers over 30 square miles in the Santa Cruz Mountains foothills, forming a triangular area that extends from Scotts Valley to the east, Boulder Creek to the northwest, and Felton to the southwest. The Santa Margarita Basin is a geologically complex area that was formed by the same tectonic forces that created the Santa Cruz Mountains (Kennedy/Jenks Consultants 2016). The major water purveyors that directly rely on the supply from Santa Margarita Groundwater Basin are SVWD, SLVWD, and Mount Hermon Association (MHA). Santa Margarita Groundwater Basin is also the sole supply source for 13 small water systems and over 1,100 private well users. In addition, the City derives a major portion of its supply from the San Lorenzo River watershed that overlaps the basin (SVWD 2020).

Since the early 1980s, SVWD has actively managed groundwater resources. In 1994, the agency formally adopted a Groundwater Management Plan in accordance with Assembly Bill 3030, also known as the Groundwater Management Act under California Water Code Section 10750 (Kennedy/Jenks Consultants 2016). The main goal of the Groundwater Management Plan is to better manage the aquifers providing the community's drinking water through the management of quantity and quality of the groundwater supply. The Santa Margarita Groundwater Agency (SMGWA) is a groundwater sustainability agency that was more recently formed as a Joint Powers Authority to comply with SGMA, and the GSP for the Santa Margarita Groundwater Basin is underway. The SMGWA has three member agencies—SVWD, SLVWD, and the County of Santa Cruz—and is governed by a Board of Directors comprising two representatives from each member agency, one representative from the City of Scotts Valley, one from the City of Santa Cruz, one from Mount Hermon Association, and two private well owner representatives (SMGWA 2020). The SMGWA is overseeing the preparation of the Santa Margarita GSP, which must be completed and submitted to the DWR by 2022 given that the groundwater basin is in the medium to high priority category, but is not subject to critical conditions of overdraft.

Precipitation is the primary source of groundwater recharge in the basin in the form of direct percolation of precipitation through the soil to groundwater, as well as infiltration from streams. The major groundwater outflows include discharge to streams and springs and groundwater pumping (Kennedy/Jenks Consultants 2016). The decline of groundwater levels in many parts of the basin occurred during 1985 to 2004, representing a loss in groundwater storage in Santa Margarita Groundwater Basin by an estimated 28,000 acre-feet. This loss in groundwater storage resulted in diminished local water supply and reduced sustaining baseflows to local streams that support fishery habitats. As a result of conservation and other management efforts at local water agencies, the total pumping from Santa Margarita Groundwater Basin has decreased by 45% since 1997 (SVWD 2020).

4.8.1.5 Hydrologic Hazards

This section provides the potential flooding conditions at each of the project and programmatic infrastructure component sites for which improvements and new facilities are proposed.

Aquifer Storage and Recovery Sites

As there are no definitive sites identified to date for new ASR facilities, no site conditions are provided. Based on Federal Emergency Management Agency (FEMA) flood zone maps, none of the Beltz ASR facility sites are located within 100-year floodplains (Zone A or AE). The Beltz ASR sites are located within Zone X, Area of Minimal Flood Hazard (FEMA 2020).

Intertie Improvement Sites

City/SVWD Intertie Site

Based on FEMA flood zone maps, the proposed City/SVWD intertie pipeline and pump station sites are not located within a 100-year flood plain (Zone A or AE). The pipeline site is located within Zone X, Area of Minimal Flood Hazard (FEMA 2020).

City/SqCWD/CWD Intertie Site

Soquel Village Pipeline Site

Based on FEMA flood zone maps, the Soquel Village pipeline site traverses the 100-year flood plain of Soquel Creek (Zone AE) (FEMA 2020).

Park Avenue Pipeline and McGregor Drive Pump Station Upgrade Sites

Based on FEMA flood zone maps, the Park Avenue pipeline and McGregor Drive pump station upgrade sites are not located within a 100-year flood plain (Zone A or AE). The pipeline and pump station sites are located within Zone X, Area of Minimal Flood Hazard (FEMA 2020).

Freedom Boulevard and Valencia Drive Pump Station Sites

Based on FEMA flood zone maps, the Freedom Boulevard and Valencia Drive pump station sites are not located within a 100-year flood plain (Zone A or AE). The pump station sites are located within Zone X, Area of Minimal Flood Hazard (FEMA 2020).

Surface Water Diversion Sites

Felton Diversion Site

Based on FEMA flood zone maps, the Felton Diversion site is located within the 100-year flood plain of the San Lorenzo River (Zone AE) (FEMA 2020).

Tait Diversion and Coast Pump Station Site

Based on FEMA flood zone maps, the Tait Diversion and Coast Pump Station site is located within the 100-year flood plain of the San Lorenzo River (Zone AE) (FEMA 2020).

4.8.2 Regulatory Framework

4.8.2.1 Federal

Clean Water Act

The CWA, as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality (33 United States Code Section 1251 et seq.). The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The CWA establishes basic guidelines for regulating discharges of both point and non-point sources of pollutants into the waters of the United States.[3] The CWA requires that states adopt water quality standards to protect public health, enhance the quality of water resources, and ensure implementation of the CWA. Commonly relevant sections of the act are as follows:

- **Sections 303 and 304** provide for water quality standards, criteria, and guidelines. Under Section 303(d) of the CWA, the State of California is required to develop a list of impaired water bodies that do not meet water quality standards and objectives. California is required to establish TMDLs for each pollutant/stressor. A TMDL defines how much of a specific pollutant/stressor a given water body can tolerate and still meet relevant water quality standards. Once a water body is placed on the Section 303(d) List of Water Quality Limited Segments, it remains on the list until a TMDL is adopted and the water quality standards are attained, or there is sufficient data to demonstrate that water quality standards have been met and delisting from the Section 303(d) list should take place. TMDLs applicable to the Proposed Project are listed in Table 4.8-2.
- **Section 401 (Water Quality Certification)** indicates that a federal agency may not issue a permit or license to conduct any activity that may result in any discharge into waters of the United States unless a Section 401 water quality certification is issued, verifying compliance with water quality requirements, or waiving such a certification. States where the discharge would originate are generally responsible for issuing water quality certifications. CWA Section 404 permits (see description below) are subject to Section 401 certification.
- **Section 402 (National Pollutant Discharge Elimination System)** establishes the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredged or fill material) into waters of the United States. This permit program is administered by the SWRCB and the nine RWQCBs, who have several programs that implement individual and general permits related

[3] Point-source discharges are those emanating from a pipe or discrete location/process, such as an industrial process or wastewater discharge. Non-point source pollutants are those that originate from numerous diffuse sources and land uses, and which can accumulate in stormwater runoff or in groundwater.

to construction activities, stormwater runoff quality, and various kinds of non-stormwater discharges. The NPDES General Construction Permit is discussed in Section 4.8.2.2, State. In general, in California, a NDPES permit also provides waste discharge requirements, although waste discharge requirements can be issued for discharges that are not within the coverage of the Section 402 NPDES program.

The Municipal Stormwater Permitting Program under CWA Section 402 regulates stormwater discharges from municipal separate storm sewer systems (MS4s). MS4 permits are issued in two phases: Phase I, for medium and large municipalities, and Phase II for small municipalities. The Phase II Small MS4 General Permit requires the discharger to develop and implement best management practices through a coordinated storm water program with the goal of reducing the discharge of pollutants to the maximum extent practicable, which is the performance standard specified in Section 402(p) of the CWA. See Section 4.8.2.3, Local for the City's Stormwater Management Program.

- **Section 404 (Discharge of Dredged or Fill Material into Waters of the United States)** establishes a permit program for the discharge of dredged or fill material into waters of the United States. This permit program is jointly administered by the USACE and U.S. Environmental Protection Agency (EPA). Section 4.3, Biological Resources, addresses this requirement in greater detail. A Section 401 water quality certification generally is necessary for a Section 404 permit.

Numerous agencies have responsibilities for administration and enforcement of the CWA. At the federal level, this includes the EPA, USACE, and the major federal land management agencies such as the U.S. Forest Service and Bureau of Land Management. At the state level, with the exception of tribal lands, the California Environmental Protection Agency (CalEPA) and its sub-agencies, including the SWRCB and the nine RWQCBs, have been delegated primary responsibility for administering and enforcing certain provisions of the CWA. At the local level, the Central Coast RWQCB and the County both have enforcement and implementation responsibilities under the CWA.

Federal Antidegradation Policy

The federal Antidegradation Policy (40 Code of Federal Regulations 131.12), first included in EPA's regulations in 1983, is designed to protect water quality and water resources. The policy requires states to develop statewide antidegradation policies and identify methods for implementing those policies. State antidegradation policies and implementation measures must include the following provisions: (1) existing instream uses and the water quality necessary to protect those uses shall be maintained and protected; (2) where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development; and (3) where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected. State permitting actions must be consistent with the federal Antidegradation Policy.

4.8.2.2 State

Porter–Cologne Water Quality Control Act

The Porter–Cologne Water Quality Control Act (first codified in the California Water Code Section 13000 et seq. in 1969) is the primary water quality control law for California. Whereas the CWA applies to all waters of the United States, the Porter–Cologne Act applies to waters of the state, which includes isolated wetlands and groundwater in

addition to federal waters.[4] The act requires a Report of Waste Discharge for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the state. For discharges directly to surface water (waters of the United States) from a point source, an NPDES permit is required, which is issued under both state and federal law; for other types of discharges, such as waste discharges to land (e.g., spoils disposal and storage), erosion from soil disturbance, or discharges to waters of the state (e.g., groundwater and isolated wetlands), waste discharge requirements are required and are issued exclusively under state law. Waste discharge requirements typically require many of the same best management practices (BMPs) and pollution control technologies as NPDES permits.

California Antidegradation Policy

The California Antidegradation Policy, otherwise known as the Statement of Policy with Respect to Maintaining High Quality Water in California, was adopted by the SWRCB (State Board Resolution No. 68-16) in 1968. Unlike the federal Antidegradation Policy, the California Antidegradation Policy applies to all waters of the state, not just surface waters. The policy requires that, with limited exceptions, whenever the existing quality of a water body is better than the quality established in individual basin plans, such high-quality water must be maintained and discharges to that water body must not unreasonably affect any present or anticipated beneficial use of the water resource. As stated in the Central Coast RWQCB Basin Plan, "discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State."

Water Quality Control Plan for the Central Coastal Basin

The Porter–Cologne Water Quality Control Act sets forth the obligations of the SWRCB and RWQCBs to adopt and periodically update water quality control plans (Basin Plans), in which beneficial uses and water quality objectives are established, and which include implementation programs and policies to achieve those objectives (California Water Code Sections 13240 through 13247). Beneficial uses applicable to the Proposed Project are listed in Table 4.8-1. Of particular importance to the Proposed Project is the Basin Plan's water quality objective for turbidity, which states that an "increase in turbidity attributable to controllable water quality factors shall not exceed the following limits:

1. Where natural turbidity is between 0 and 50 nephelometric turbidity units (NTU), increases shall not exceed 20%.
2. Where natural turbidity is between 50 and 100 NTU, increases shall not exceed 10 NTU.
3. Where natural turbidity is greater than 100 NTU, increases shall not exceed 10%" (Central Coast RWQCB 2019).

Construction General Permit (SWRCB Order No. 2009-0009-DWQ, as Amended)

For stormwater discharges associated with construction activity in the State of California, the SWRCB has adopted and administers the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) to avoid and minimize water quality impacts attributable to such activities. The Construction General Permit applies to all projects in which construction activity disturbs 1 acre or more of soil. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling and excavation. The Construction General Permit requires development and implementation of a stormwater pollution prevention plan (SWPPP), which would specify water quality BMPs designed to reduce or

[4] "Waters of the state" are defined in the Porter–Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code Section 13050[e]).

eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site. Routine inspection of all BMPs is required under the provisions of the Construction General Permit, and the SWPPP must be prepared and implemented by qualified individuals as defined by the SWRCB.

To receive coverage under the Construction General Permit, the project proponent must submit a Notice of Intent and permit registration documents to the SWRCB and applicable RWQCB. Permit registration documents include completing a construction site risk assessment to determine appropriate coverage level; detailed site maps showing disturbance area, drainage area, and BMP types/locations; the SWPPP; and, where applicable, post-construction water balance calculations and active treatment systems design documentation.

Post-Construction Stormwater Management Requirements

The Central Coast RWCQB adopted Resolution No. R3-2013-0032, which approved post-construction stormwater management requirements for development projects in the Central Coast region. The requirements apply to small MS4s subject to post-construction requirements of the Phase II Municipal General Permits and are intended to apply to development projects, in order to protect watershed processes so that beneficial uses of receiving waters affected by stormwater management are maintained and, where applicable, restored. The requirements focus on Low Impact Development (LID) and other types of control measures. LID treatment systems implement harvesting and use, infiltration, and evapotranspiration. LID is an effective approach to managing stormwater to minimize the adverse effects of urbanization and development on watershed processes and beneficial uses resulting from changes in stormwater runoff conditions. LID strategies can achieve significant reductions in pollutant loading and runoff volumes as well as greatly enhanced groundwater recharge rates. The proper implementation of LID techniques results in greater benefits than single purpose stormwater and flood control infrastructure.

Sustainable Groundwater Management Act

In 2014, California enacted the "Sustainable Groundwater Management Act" (California Water Code Sections 10720-10737.8 et seq.) to bring the state's groundwater basins into a more sustainable regime of pumping and recharge. The legislation provides for the sustainable management of groundwater through the formation of local groundwater sustainability agencies and the development and implementation of GSPs. GSPs were required to be submitted to the DWR by January 31, 2020 for all basins designated as high- or medium-priority basins and as basins that are subject to critical conditions of overdraft. GSPs are required to be submitted to the DWR by January 31, 2022 for all other high- or medium-priority basins. GSPs are also encouraged for basins designated as low- and very low priority basins by the SWRCB.

A groundwater sustainability plan shall include all of the following:

a. A description of the physical setting and characteristics of the aquifer system underlying the basin that includes the following:
    1. Historical data, to the extent available.
    2. Groundwater levels, groundwater quality, subsidence, and groundwater-surface water interaction.
    3. A general discussion of historical and projected water demands and supplies.
    4. A map that details the area of the basin and the boundaries of the groundwater sustainability agencies that overlie the basin that have or are developing groundwater sustainability plans.
    5. A map identifying existing and potential recharge areas for the basin. The map or maps shall identify the existing recharge areas that substantially contribute to the replenishment of the groundwater basin.

b.

1. Measurable objectives, as well as interim milestones in increments of five years, to achieve the sustainability goal in the basin within 20 years of the implementation of the plan.
2. A description of how the plan helps meet each objective and how each objective is intended to achieve the sustainability goal for the basin for long-term beneficial uses of groundwater.
3. An extension may be granted of up to 5 years beyond the 20-year sustainability timeframe upon a showing of good cause.
4. The plan may address undesirable results[5] that occurred before, and have not been corrected by, January 1, 2015. A ground has discretion as to whether to set measurable objectives and the timeframes for achieving any objectives for undesirable results that occurred before, and have not been corrected by, January 1, 2015.

c. A planning and implementation horizon.

d. Components relating to the following, as applicable to the basin:

1. The monitoring and management of groundwater levels within the basin.
2. The monitoring and management of groundwater quality, groundwater quality degradation, inelastic land surface subsidence, and changes in surface flow and surface water quality that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin.
3. Mitigation of overdraft.
4. How recharge areas identified in the plan substantially contribute to the replenishment of the basin.
5. A description of surface water supply used or available for use for groundwater recharge or in-lieu use.

e. A summary of the type of monitoring sites, type of measurements, and the frequency of monitoring for each location monitoring groundwater levels, groundwater quality, subsidence, streamflow, precipitation, evaporation, and tidal influence. The plan shall include a summary of monitoring information such as well depth, screened intervals, and aquifer zones monitored, and a summary of the type of well relied on for the information, including public, irrigation, domestic, industrial, and monitoring wells.

f. Monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin. The monitoring protocols shall be designed to generate information that promotes efficient and effective groundwater management.

g. A description of the consideration given to the applicable county and city general plans, a description of the various adopted water resources-related plans and programs within the basin, and an assessment of how the groundwater sustainability plan may affect those plans.

[5] Undesirable results means one or more of the following effects caused by groundwater conditions occurring throughout the basin: (1) chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon (overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods); (2) significant and unreasonable reduction of groundwater storage; (3) significant and unreasonable seawater intrusion; (4) significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies; (5) significant and unreasonable land subsidence that substantially interferes with surface land uses; and/or (6) depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

The approved and pending GSPs in the study area are summarized below. See Section 4.8.1.4, Groundwater Resources, for additional information about existing and pending GSPs that apply to the project area.

Santa Cruz Mid-County Groundwater Sustainability Plan

As indicated in Section 4.8.1.4, Groundwater Resources, the MGA oversaw the preparation of a cooperative GSP for the now redefined Santa Cruz Mid-County Groundwater Basin, which covers the mid-Santa-Cruz-County region and is generally bounded by Branciforte Creek on the west, the unincorporated communities of Aptos and La Selva Beach on the east, the Zayante Fault (somewhat below Summit Road) on the north, and the Pacific Ocean on the south (see Figure 3-3). The Santa Cruz Mid-County Groundwater Basin includes the former Soquel Valley Basin and portions of three adjacent basins—the West Santa Cruz Terrace Basin, the former Santa Cruz Purisima Formation Basin, and the original Pajaro Valley Basin. The Soquel Valley Basin was identified by the state as a groundwater basin subject to critical conditions of overdraft.

The Santa Cruz Mid-County Groundwater Basin GSP was released for public review in July 2019. The GSP was completed and adopted by the MGA in November 2019 and submitted to DWR on January 30, 2020; DWR approved the GSP on June 3, 2021. The GSP sets sustainability management criteria for each of the five sustainability indicators applicable to the Santa Cruz Mid-County Groundwater Basin and identifies projects and management actions to achieve and maintain basin sustainability. Baseline projects and management actions (Group 1), in conjunction with other projects and management actions planned to reach sustainability (Group 2), include water conservation and demand management, installation and redistribution of municipal groundwater pumping, Pure Water Soquel, ASR in the Beltz system (Beltz ASR) and elsewhere, water transfers/in lieu groundwater recharge and distributed stormwater managed aquifer recharge. Additional potential future projects and management actions may be evaluated in the future (Group 3). The GSP will guide ongoing management of the groundwater basin with a goal to achieve and maintain the basin's sustainability goal within 20 years and over a 50-year planning and implementation horizon (MGA 2019).

Santa Margarita Groundwater Sustainability Plan

As indicated in Section 4.8.1.4, Groundwater Resources, the SMGWA is overseeing the preparation of the Santa Margarita GSP, which must be completed and submitted to the DWR by 2022, given that the groundwater basin is in the medium to high priority category, but is not subject to critical conditions of overdraft. The SMGWA has drafted three key basin management goals: (1) ensure water supply reliability for current and future beneficial uses, (2) maintain water quality to meet current and future beneficial uses, and (3) prevent adverse environmental impacts. These goals will be re-evaluated as the SMGWA develops its GSP.

California Government Code

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, and transmissions of water supplies are exempt from local (i.e., county and city) building and zoning ordinances. The project and programmatic components evaluated in this EIR relate to operation, utilization, and storage of water resources; therefore, these facilities are legally exempt from County of Santa Cruz, City of Scotts Valley, City of Santa Cruz, and City of Capitola building and zoning ordinances. However, these facilities are not exempt from the California Coastal Act or relevant Local Coastal Program (LCP), as described below.

California Coastal Act

In 1976, the California State Legislature enacted the California Coastal Act (Public Resources Code Section 30000 et seq.) to provide long-term protection of the state's 1,100-mile coastline for the benefit of current and future generations. The California Coastal Act provides for the management of lands within California's coastal zone boundary, as established by the Legislature and defined in the California Coastal Act (Section 30103). The boundary of the coastal zone varies across the state. The boundary extends generally 1,000 yards from the mean high tide line of the sea; however, in significant coastal estuarine, habitat, and recreational areas it extends inland to the first major ridgeline paralleling the sea or five miles from the mean high tide line of the sea, whichever is less, and in developed urban areas the zone generally extends inland less than 1,000 yards. The coastal zone boundary also extends approximately 3 miles offshore.

The goals of the California Coastal Act, per Public Resources Code Section 30001.5, are to:

a. Protect, maintain, and where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources.
b. Assure orderly, balanced utilization and conservation of coastal zone resources taking into account the social and economic needs of the people of the state.
c. Maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone consistent with sound resources conservation principles and constitutionally protected rights of private property owners.
d. Assure priority for coastal-dependent and coastal-related development over other development on the coast.
e. Encourage state and local initiative and cooperation in preparing procedures to implement coordinated planning and development for mutually beneficial uses, including educational uses, in the coastal zone.

Furthermore, the California Coastal Act includes specific policies to achieve these goals within the coastal zone (see Division 20 of the Public Resources Code). These policies include the legal standards applied to coastal planning and regulatory decisions made by the California Coastal Commission (CCC) pursuant to the California Coastal Act. The California Coastal Act requires that individual jurisdictions adopt a LCP to implement the California Coastal Act at the local level. After the CCC certifies a LCP, the local government becomes the coastal development permit (CDP) permitting authority, subject to appeals to the CCC. See Section 4.8.2.3, Local, for information about Santa Cruz County's LCP and the City of Capitola's LCP.

Aquifer Storage and Recovery General Order

On September 19, 2012, the SWRCB adopted Water Quality Order 2012-0010, which includes waste discharge requirements for ASR projects that recharge groundwater with treated drinking water (General Order). The purpose of the General Order is to streamline the permitting process and to ensure consistent requirements for these projects.

4.8.2.3 Local

As indicated above, the project and programmatic infrastructure components relate to operation, utilization, and storage of water resources and therefore, these facilities are legally exempt under California Government Code Section 53091 (d) and (e) from the County of Santa Cruz, City of Scotts Valley, City of Santa Cruz, and City of Capitola building and zoning ordinances. However, it is nevertheless assumed that City-owned facilities (i.e., ASR facilities, and the Felton Diversion and Tait Diversion and Coast Pump Station improvements) would be constructed consistent with City stormwater programs and regulations, as applicable. Additionally, Beltz 8, 9,

and 10 ASR facilities, and any new ASR facilities that are located in the coastal zone of unincorporated Santa Cruz County, would have to comply with relevant County LCP policies and implementing ordinances, as water infrastructure is not exempt from the California Coastal Act or the relevant LCP. Lastly, the portion of the City/SqCWD/CWD intertie in the coastal zone (i.e., the McGregor Drive pump station upgrade, and part of the Park Avenue pipeline south of State Highway 1), would have to comply with the City of Capitola's LCP and implementing ordinances. All other programmatic infrastructure components located outside of the coastal zone (i.e., City/SVWD intertie and the portion of the City/SqCWD/CWD intertie located north of State Highway 1) would be exempt from all local building and zoning policies and regulations, including stormwater regulations.

Based on the above, this section provides local programs, policies and regulations related to hydrology and water quality that are applicable to the Proposed Project. See also Section 4.9, Land Use, Agriculture and Forestry, and Mineral Resources, for a more detailed description and analysis of applicable policies and ordinances.

City of Santa Cruz Stormwater Management Program

The City has developed a comprehensive Stormwater Management Program (SWMP) to fulfill the requirements for the Phase II NPDES General Permit for Discharges of Stormwater from Municipal Separate Storm Sewer Systems (MS4s) (i.e., MS4 General Permit) and to reduce the amount of pollutants discharged in urban runoff. The SWMP is a comprehensive program to reduce the amount of pollutants discharged in urban runoff and to improve and protect water quality. The SWMP includes six required control programs and two recommended control programs for industrial and commercial facilities and BMPs. The City SWMP was approved by the Central Coast RWQCB on April 14, 2009 and thus the City is granted coverage under the statewide NPDES MS4 General Permit.

City of Santa Cruz Municipal Codes Regarding Stormwater

In 1998, the City adopted an ordinance, entitled "Stormwater and Urban Runoff Pollution Control," which is Chapter 16.19 of the City's Municipal Code. The ordinance established the legal authority to prohibit illicit connections and pollutant discharges to the City storm drain system. The ordinance also provides the City with the legal authority to conduct inspections and sampling. In addition, the ordinance contains a provision requiring the implementation of BMPs, as published by the Public Works Department, by certain types of facilities. The City also has the authority to terminate illicit connections and discharges, and to initiate enforcement actions for violations of the code. Potential enforcement actions include written notices, citations, termination of discharge, and monetary penalties. The ordinance prohibits non-stormwater discharges to the storm drain system with a few exceptions. The City revised the Stormwater Ordinance in July 2003 to update the ordinance and incorporate new Phase II stormwater regulations. Municipal Code Section 16.19.140 requires that any construction project, including those undertaken under any permit or approval granted pursuant to Titles 15 (Streets and Sidewalks), 18 (Buildings and Construction), and 24 (Zoning) of the City Code, shall implement BMPs, including the City's mandatory BMPs as detailed in the latest BMP manual published by the City's Public Works Department. BMPs are required to be maintained in full force and effect throughout the life of a project.

Title 24 of the Municipal Code includes provisions to ensure that new developments or remodeled sites are designed and constructed in a manner that limits alteration of drainage patterns, prevents erosion, and minimizes long-term impacts on water quality. Chapter 24.14, Environmental Resource Management, contains a section on Conservation Regulations that includes general provisions for drainage and erosion controls. These provisions include requirements that a drainage plan be submitted for projects, both large and small, when existing drainage patterns would be altered by new construction. A drainage plan must be submitted and reviewed as part of the project approval. In addition, the ordinance requires that stormwater runoff resulting from project development be

minimized, and if a proposed project includes the discharge of runoff into a natural watercourse, the drainage plan shall include methods to safeguard or enhance the existing water quality. Devices such as detention basins, percolation ponds, or sediment traps may be required by the City, where appropriate or as specified in an adopted plan or wetlands management plan. Provisions pertaining to erosion control include requirements that a site development be fitted to the topography and soil to create the least potential for erosion. Vegetation removal is limited to the amount necessary and according to the project approved erosion control plan.

The Grading Ordinance is a subset of Title 18, Buildings and Construction, of the City's Municipal Code and is included in Chapter 18.45 – Excavation and Grading Regulations. This ordinance provides technical regulations of grading and excavation, in conjunction with the Environmental Resource Management provisions (Municipal Code, Title 24, Chapter 24.14), in order to safeguard life, health, safety and the public welfare; protect fish and wildlife, riparian corridors and habitats, water supplies, and private and public property, and to protect the environment from the effects of flooding, accelerated erosion and/or deposition of silt. The ordinance accomplishes this by providing guidelines, regulations, and minimum standards for clearing, excavation, cuts, fills, earth moving, grading operations (including cumulative grading), water runoff, and sediment control. In addition, the ordinance includes provisions regarding administrative procedures for issuance of permits and approval of plans and inspections during construction and subsequent maintenance. The City revised the Grading Ordinance in April 2004 to strengthen the ordinance regarding implementation of BMPs, including those for erosion and sediment control.

County of Santa Cruz General Plan and Local Coastal Program

The County of Santa Cruz General Plan and LCP is a comprehensive, long-term planning document for the unincorporated areas of the County and includes the County's LCP, which was certified by the CCC in 1994. The County General Plan and LCP provides policies and programs to establish guidelines for future growth and all types of physical developments.

The County's certified LCP that applies to activities within the coastal zone is administered by the County Planning Department, pursuant to the California Coastal Act, and includes: (1) the LCP land use plan consisting of the policies and adopted land use, resource, constraint and shoreline access maps and charts contained in the General Plan/LCP document; and (2) the implementing ordinances.

As the Proposed Project contains some infrastructure components within the coastal zone in unincorporated Santa Cruz County (i.e., Beltz 8, 9, and 10 ASR facilities) those components are not exempt from the LCP and would require compliance with the LCP, including LCP policies and standards contained in the LCP implementing ordinances, where relevant, through the issuance of CDPs from Santa Cruz County. Additionally, it is possible that new ASR facilities could also be located within the coastal zone in unincorporated Santa Cruz County and would require compliance with the LCP. The LCP implementing ordinances in Santa Cruz County Code (SCCC) Chapter 13.03 include the following sections that are relevant to the hydrology and water quality and related LCP policies are provided and analyzed in Section 4.9, Land Use, Agriculture and Forestry, and Mineral Resources:

- Zoning Regulations (Chapter 13.10)
- Coastal Zone Regulations (Chapter 13.20)
- Geologic Hazards (Chapter 16.10)
- Grading Regulations (Chapter 16.20)
- Erosion Control (Chapter 16.22)
- Riparian Corridor and Wetlands Protection (Chapter 16.30)
- Permit and Approval Procedures (Chapter 18.10)

The relevant LCP policies and ordinances are addressed through the CDP findings made by the County and not through separate approvals (e.g., Riparian Exception). The SCCC requires the following CDP findings for approval of a CDP in accordance with Chapter 18.10:

(A) That the project is a use allowed in one of the basic zone districts that are listed in LCP Section 13.10.170(D) as consistent with the LCP Land Use Plan designation of the site.

(B) That the project does not conflict with any existing easement or development restrictions such as public access, utility, or open space easements.

(C) That the project is consistent with the design criteria and special use standards and conditions of this chapter pursuant to SCCC 13.20.130 and 13.20.140 et seq.

(D) That the project conforms with the public access, recreation, and visitor-serving policies, standards and maps of the LCP Land Use Plan, including Chapter 2: Section 2.5 and Chapter 7.

(E) That the project conforms to all other applicable standards of the certified LCP.

(F) If the project is located between the nearest through public road and the sea or the shoreline of any body of water located within the coastal zone, that the project conforms to the public access and public recreation policies of Chapter 3 of the California Coastal Act.

(G) In the event of any conflicts between or among the required findings, required findings in subsections (E) and (F) of this section shall prevail. [Ord. 5182 § 1, 2014; Ord. 4346 §§ 54, 55, 1994; Ord. 3435 § 1, 1983].

County of Santa Cruz Runoff and Pollution Control Ordinance

Chapter 7.79 of the SCCC addresses runoff and pollution control to protect the health, safety, and welfare of the public by protecting the surface and groundwater quality, groundwater recharge, beneficial uses, marine habitats, watershed health, and ecosystems of the receiving waters of the County, including the Monterey Bay, from discharge of pollutants and the adverse effects of hydromodification, and to comply with Federal and State laws concerning stormwater. This chapter requires compliance with industrial and construction NPDES discharge permits, where relevant. Additionally, prior to issuing a County permit under Title 16, Environmental and Resource Protection, a stormwater pollution control plan must be prepared addressing the use of BMPs during construction, including appropriate BMPs from the County Construction Site Stormwater Pollution Control BMP Manual. New development and redevelopment shall also mitigate impacts due to development and implement BMPs per the County Design Criteria, adopted by the County of Santa Cruz and included in Chapters 16.20 (Grading Regulations) and 16.22 (Erosion Control) of the SCCC. These BMPs include measures to control the volume, runoff rate, and potential pollutant load of stormwater runoff from new development and redevelopment projects; to minimize the generation, transport, and discharge of pollutants; to prevent runoff in excess of predevelopment conditions; and to maintain predevelopment groundwater recharge.

City of Capitola Local Coastal Program and Design Standards for Drainage

Development and conservation in Capitola's coastal areas is also regulated by Capitola's LCP (City of Capitola 2005), which was originally certified by the CCC in 1981 and amended in 2001 and 2005. An update to Capitola's LCP is currently in progress. Capitola's Local Coastal Land Use Plan is a comprehensive long-term plan for land use and physical development within the City's coastal zone. Prior to the issuance of any permit for development within the coastal zone, the City of Capitola is required to prepare necessary findings that the development meets the standards set forth in all applicable land use policies. Related LCP policies are provided and analyzed in Section 4.9, Land Use, Agriculture and Forestry, and Mineral Resources.

Section 15.28.120 of the Capitola Municipal Code addresses design standards for drainage. However, these standards would not apply to the infrastructure components of the Proposed Project as they are included in the City's building regulations, which the Proposed Project is exempt from under California Government Code Section 53091 (d) and (e), as described previously.

City of Scotts Valley Design Standards for Drainage

Section 15.28.120 of the Scotts Valley Municipal Code addresses design standards for drainage. However, these standards would not apply to the infrastructure components of the Proposed Project as they are included in the City's building regulations, which the Proposed Project is exempt from under California Government Code Section 53091 (d) and (e), as described previously.

4.8.3 Impacts and Mitigation Measures

This section contains the evaluation of potential environmental impacts associated with the Proposed Project related to hydrology and water quality. The section identifies the standards of significance used in evaluating the impacts, describes the methods used in conducting the analysis, and evaluates the Proposed Project's impacts and contribution to significant cumulative impacts, if any are identified.

4.8.3.1 Standards of Significance

The standards of significance used to evaluate the impacts of the Proposed Project related to hydrology and water quality are based on Appendix G of the CEQA Guidelines and the City of Santa Cruz CEQA Guidelines, as listed below. A significant impact would occur if the Proposed Project would:

A. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.
B. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
C. Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river or through the addition of impervious surface, in a manner which would: (i) result in substantial erosion or siltation on or off site; (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site; (iii) 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 (iv) impede or redirect flood flows.
D. In flood hazards, tsunami, or seiche zones, risk release of pollutants due to project inundation.
E. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

4.8.3.2 Analytical Methods

This section evaluates the potential hydrology and water quality impacts associated with construction and operation of the Proposed Project. The analysis of potential impacts addresses the various project and programmatic components listed in Table 4.8-3, which are described in detail in Chapter 3, Project Description.

Table 4.8-3. Project and Programmatic Components

Proposed Project Components	Project Components	Programmatic Components
WATER RIGHTS MODIFICATIONS		
Place of Use	✓	
Points of Diversion	✓	
Underground Storage and Purpose of Use	✓	
Method of Diversion	✓	
Extension of Time	✓	
Bypass Requirement (Agreed Flows)	✓	
INFRASTRUCTURE COMPONENTS		
Water Supply Augmentation		
Aquifer Storage and Recovery (ASR)		✓
New ASR Facilities at Unidentified Locations		✓
Beltz ASR Facilities at Existing Beltz Well Facilities	✓	
Water Transfers and Exchanges and Intertie Improvements		✓
Surface Water Diversion Improvements		
Felton Diversion Fish Passage Improvements		✓
Tait Diversion and Coast Pump Station Improvements		✓

Construction-related impacts are considered for each project and programmatic infrastructure component of the Proposed Project. Operational-related impacts associated with the water rights modifications, including Agreed Flows, and the infrastructure components are also evaluated, as further described below.

As indicated in Chapter 3, Project Description, the Proposed Project would include various water rights modifications that would directly affect the City's water system operations. Specifically, direct impacts associated with the water rights modifications include those related to changes in hydrology of the San Lorenzo River and North Coast streams. The Proposed Project would modify the hydrology of the San Lorenzo River and the North Coast streams by both increasing and reducing streamflows at different times, in different seasons and in different water-year types. For example, surface water diversions that would support ASR operations could reduce streamflows somewhat in wetter times. On the other hand, those ASR operations would increase streamflows in Newell Creek, and therefore the San Lorenzo River, indirectly at other times because the groundwater storage resulting from those ASR operations would allow Loch Lomond Reservoir to be full more often, which would increase reservoir spills into Newell Creek.

This section of the EIR therefore analyzes the Proposed Project's effects on streamflows and reservoir levels and the resulting effects on surface water hydrology conditions, where relevant to the CEQA standards of significance in Section 4.8.3.1, Standards of Significance. These analyses are supported by hydrologic and water supply modeling conducted for the Proposed Project and included in Appendix D and further described below. To ensure comprehensive evaluation of these operational impacts the hydrologic and water supply modeling assesses operations with the implementation of the water rights modifications and all infrastructure components of the Proposed Project.

To understand the implications of the Proposed Project, the City developed baseline and Proposed Project modeling to serve as the basis of Proposed Project analysis. The baseline represents the current system as modeled for City water supply planning, as of the 2018 Notice of Preparation for the Proposed Project. The Proposed Project modeling provides the best possible representation of the Proposed Project within the framework of the modeling system. While the model includes water transfers, it does not include water exchanges, as described in Chapter 3, Project Description. This modeling approach provides a worst-case analysis of water quality impacts, as greater volumes of surface water would be required compared to a scenario that includes exchanges, because exchanges in which the City would receive water from neighboring agencies would reduce the City's diversions. Additionally, there is currently no way to estimate or model the amount of water the City could expect to receive back from neighboring agencies through exchanges. Exchanges could be pursued in the future under the provisions of the Mid-County Groundwater Basin GSP, which indicates that if water transfers benefit groundwater levels, and are sustainable over time, and the Basin's performance consistently reaches sustainability targets, then the City potentially could recover some of the increase in groundwater in storage as a supplemental supply during dry periods.

The modeling results were used in this section to assess whether the water rights modifications and other elements of the Proposed Project could potentially impact residual stream flows (also referred to as residual flows). Residual flows are the stream flows downstream of the City's diversions. In the event that stream diversions resulted in a substantial decrease in residual flows, water quality impacts could occur (Significance Standard C), including increased temperature (i.e., due to shallower water) and altered salinity, dissolved oxygen, and pH concentrations. Changes in Loch Lomond Reservoir levels and spill characteristics as a result of the Proposed Project are also considered to address potential water quality impacts that could occur.

In addition, potential impacts to groundwater levels and groundwater quality have been evaluated with respect to proposed stream diversions for ASR injection and extraction, and for water transfers to neighboring water agencies (Significance Standard B). Impacts have been evaluated with respect to maintaining sustainable groundwater management, compliance with the Santa Cruz Mid-County GSP, and compliance with the pending Santa Margarita Basin GSP that is being prepared.

The impact analysis assumes the Proposed Project would be constructed and operated in compliance with the most current and applicable regulations related to water quality and stormwater runoff, as described in Section 4.8.2, Regulatory Framework. Impacts have been evaluated with respect to the standards of significance, as described above. In the event adverse environmental impacts would occur subsequent to consideration of applicable regulations and of Proposed Project standard operational and construction practices described in detail in Chapter 3, Project Description and evaluated below, impacts would be potentially significant and mitigation measures would be provided to reduce impacts to less-than-significant levels, where feasible.

Application of Relevant Standard Practices

The Proposed Project also includes standard operational and construction practices (see Section 3.4.5, Standard Operational and Construction Practices), that the City or its contractors would implement to avoid and minimize water quality impacts during construction and operations. These practices and their effectiveness in avoiding and minimizing impacts are described below.

Standard Operational Practices

The operational practices include the following: operation of ASR injections and extractions consistent with the sustainable management criteria of the applicable GSP (Standard Operational Practice #2); operation of ASR facilities in accordance with all requirements of the SWRCB Water Quality Order 2012-0010, General Waste Discharge Requirements for Aquifer Storage and Recovery Projects that Inject Drinking Water into Groundwater (Standard Operational Practice #3); no diversions from surface streams to provide water for ASR injections in months classified as Hydrologic Condition 5 (driest), as defined in the Agreed Flows (Standard Operational Practice #4); no diversions from surface streams to transfer to neighboring agencies in months classified as Hydrologic Condition 4 (dry) or Hydrologic Condition 5 (driest), as defined in the Agreed Flows (Standard Operational Practice #5); and when Loch Lomond Reservoir is spilling during late spring and summer the City will release additional cooler flow through the fish release below the dam when needed to offset the potential warming effects of reservoir spills below Newell Creek Dam at that time of the year (Standard Operational Practice #6).

Standard Operational Practice #2 and #3 would avoid or minimize groundwater effects by providing for compliance with the applicable GSP and state regulations related to ASR projects. Standard Operational Practices #4 and #5 would avoid or minimize water quality effects by prohibiting surface water diversions from the City's sources for ASR injections during months categorized as driest and prohibiting such diversions for transfer to neighboring agencies during months categorized as both dry and driest. These measures will avoid diversions for these purposes during such dry conditions when streamflows are already low. Without these measures, diversions have the potential to remove flows that are or could be a benefit to water quality, since protective bypass flow requirements may be relaxed to less than optimal levels at certain times during these dry periods. Additionally, Standard Operational Practice #6 would offset the potential warming effects of reservoir spills below Newell Creek Dam during the late spring and summer to avoid potential water quality effects due to potential temperature increases.

Standard Construction Practices

The construction practices that address indirect impacts on water quality resulting from uncontrolled erosion and fugitive dust, uncontrolled runoff and sedimentation in waterways, and unintended spills of hazardous materials or deposition of trash include the following: installation of erosion control best management practices (Standard Construction Practice #1); providing stockpile containment and exposed soil stabilizing structures (Standard Construction Practice #2); providing runoff control devices (Standard Construction Practice #3); providing wind erosion controls (Standard Construction Practice #4); locating and stabilizing spoil disposal sites (Standard Construction Practice #5); storing equipment at least 65 feet from active channels to minimize potential hazardous spills (Standard Construction Practices #6 and #7); preventing equipment leaks through regular maintenance (Standard Construction Practice #8); implementing proper waste/trash management (Standard Construction Practice #9); avoiding activities in active channels whenever possible and siting new ASR facilities outside of streams and drainages (Standard Construction Practice #10); isolating activities in active channels (Standard Construction Practice #11); implementing appropriate measures during dewatering activities (Standard Construction Practices #17 through #22); and using appropriate equipment to minimize disturbance to channels (Standard Construction Practice #12).

These practices would minimize the potential for indirect effects on water quality during construction caused by uncontrolled erosion and fugitive dust by installation of erosion best management practices (e.g., silt fences, fiber roles, covering stockpiles) and wind erosion controls (e.g., watering active construction areas, use of soil binders on exposed areas, covering haul trucks). Uncontrolled runoff and sedimentation in waterways would be minimized by providing runoff control devices along with the installation of erosion best management practices. Construction

in or near streams would avoid the active channels when possible and when avoidance is not possible activities would be isolated in the active channel through dewatering and appropriate equipment would be used to minimize disturbance and related water quality effects. Unintended spills of hazardous materials or deposition of trash would be minimized by storing equipment at a distance from active channels, preventing equipment leaks, and implementing proper waste and trash management.

4.8.3.3 Project Impact Analysis

This section provides a detailed evaluation of hydrology and water quality impacts associated with the Proposed Project.

Impact HYD-1: Surface Water Quality Standards and Waste Discharge Requirements (Significance Standards A and E). Construction and operation of the Proposed Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality. In addition, the Proposed Project would not conflict with or obstruct implementation of a water quality control plan related to surface water. ***(Less than Significant)***

Water Rights Modifications

This project component would involve making modifications within the City's pre-1914 and post-1914 water rights, permits, and licenses. Modifications include expansion of the place of use, modifications related to method and points of diversion and rediversion, addition of underground storage, extension of time to reach full beneficial use under the City's Felton permits, and Agreed Flows. The water rights modifications of the Proposed Project would not directly result in construction or operation of new infrastructure facilities and would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. Therefore, this project component would have no direct impacts.

The following analysis evaluates the potential indirect impacts related to surface water quality as a result of the proposed water rights modifications, that once approved could result in the implementation of the project and programmatic infrastructure components of the Proposed Project.

Infrastructure Components

Impacts to water quality through exceedance of water quality standards, non-conformance with waste discharge requirements, or by other means can potentially result from the short-term effects of construction activities (e.g., erosion and sedimentation due to land disturbances, uncontained material and equipment storage areas, improper handling of hazardous materials) and the long-term effects of operation of the new or upgraded facilities (e.g., use/handling of hazardous materials). This impact also covers the portion of Significance Standard E regarding conflicts with or obstruction of the implementation of a water quality control plan, with respect to surface water quality. This analysis addresses the applicable Basin Plan objectives provided above. Groundwater quality is addressed in Impact HYD-2. Impact HYD-3 addresses the alteration of drainage patterns and/or increases in impervious surfaces.

ASR Facilities

New ASR Facilities. The Proposed Project includes the City installing and operating new ASR facilities within the Santa Cruz Mid-County Groundwater Basin inside or outside the areas served by the City, and in the Santa Margarita Groundwater Basin outside the areas served by the City. Grading and construction associated with new ASR

facilities could result in short-term erosion of exposed soils. Environmental factors that affect erosion rates include topographic, soil, and rainfall characteristics. Although the soil types at these new ASR facility sites are not known due to currently undefined locations, well sites are typically located on relatively flat to gently sloping topography, thus minimizing the potential for high stormwater runoff rates and associated erosion.

Erosion and sedimentation affect water quality and interfere with aquatic species feeding, respiration, reproduction (due to embeddedness), and rearing (due to pool filling). In addition to sediment, other pollutants associated with construction activity could include heavy metals, oil/grease, fuels, debris/trash from construction-related materials, and concrete curing compounds. Sediment can also be a carrier for these pollutants in the event that contaminants leak into onsite soils and are subsequently transported off site as a result of erosion. Basin Plan objectives for organic contaminants (e.g., fuels, paints, solvents) are generally the same as the respective drinking water quality standards (i.e., maximum contaminant levels), and the Basin Plan objectives for debris and certain other compounds are qualitative in nature, requiring that release of such pollutant sources not adversely impact the beneficial uses of downstream water bodies. Without adequate precautions, wind and rain events that occur during construction activities could generate pollutants or mobilize sediment such that those pollutants contribute to the water quality degradation of receiving waters or violate Basin Plan objectives.

SWPPPs, which would specify water quality BMPs designed to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from construction sites, would not likely apply given the anticipated size of these facilities (0.25 acres). However, as indicated in Section 4.8.3.2, Analytical Methods, the City has identified standard construction practices that would be implemented by the City or its contractors during construction activities associated with all project and programmatic infrastructure components, where relevant. With implementation of these standard construction practices, grading and construction at new ASR facilities would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality of nearby creeks and the Monterey Bay during construction.

As discussed in Section 4.7, Hazards, Hazardous Materials, and Wildfire, new ASR operations would require hazardous materials use. The new ASR facilities would use and store hazardous materials in the pump control room and chemical storage building, similar to existing operations at Beltz facilities. Hazardous materials used for the operation of the new ASR facilities would be in accordance with requirements and recommendations in the applicable Safety Data Sheet(s) and would be managed in accordance with federal, state, and local laws and regulations. Hazardous materials required for operation and maintenance of the proposed infrastructure components would be stored in secured, covered areas with secondary containment. The City submits Hazardous Materials Business Plans to Santa Cruz County Environmental Health Services (EHS), which is the Certified Unified Program Agency within the geographic boundaries of the County (including all four cities). EHS is responsible for enforcing State statutes and regulations, as well as the local ordinance (County Code Chapter 7.100) pertaining to the storage, use, and disposal of hazardous materials and waste. Compliance with standard spill prevention and containment regulations would minimize the potential for spills of hazardous materials impacting nearby water bodies during new ASR operations. As a result, construction and operations of new ASR facilities would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality of nearby creeks and the Monterey Bay. Therefore, this programmatic component would have a less-than-significant impact.

Beltz ASR Facilities. This project component involves the installation of upgrades to the existing Beltz facilities at Beltz 8, 9, 10, and 12 to allow for injection of treated water from the City's Graham Hill Water Treatment Plant (GHWTP) and subsequent recovery (referred to below as extraction). Figures 3-4a through 3-4d (see Chapter 3, Project Description) illustrate the site boundaries and proposed improvements at each of the well sites. Proposed ASR upgrades to the Beltz system would include new connection pipelines within each well infrastructure; wellhead

modifications; new submersible pump and motor assembly; new valves and electrical conduit; and as part of a treatment plant upgrade, a second backwash tank might be installed at Beltz 8. Additionally, up to three monitoring wells, approximately 400 feet deep, could be installed at Beltz 9.

As discussed in Section 4.5, Geology and Soils, Beltz wells are located on relatively flat to gently sloping topography. Beltz 8, 9, and 12 are located on Watsonville loam soils, which occur on terraces and alluvial fans, on 0% to 15% slopes. Beltz 10 is located on Elkhorn sandy loam, which occurs on terraces and alluvial fans, on 2% to 9% slopes. The relatively flat topography would minimize stormwater runoff rates and associated erosion. Watsonville loam soils, which include loam, clay loam, and sandy clay loam, are somewhat poorly drained and have a very low to moderately low capacity to transmit water. Elkhorn sandy loam and clay loam are well drained and have a moderately high capacity to transmit water. The well-drained soils reduce erosion rates by enhancing stormwater infiltration into on-site soils.

Excavations and construction associated with the Beltz ASR facility upgrades could result in short-term erosion of exposed soils. Construction-related activities that result in sediment releases are related to exposing previously stabilized soils to potential mobilization by rainfall/runoff and wind. Such activities include the removal of impervious surfaces, excavations, and soil stockpiling at the site, including soil stockpiles associated with facility upgrades and monitoring well drilling. Erosion could result in sedimentation of downstream drainages, resulting in adverse water quality impacts. Beltz 12 ASR facility site is located within the Rodeo Creek Gulch Watershed and Beltz 8, 9, and 10 ASR facility sites are located within the small watershed of intermittent Stream 472, located upstream of Moran Lake.

However, as indicated in Section 4.8.3.2, Analytical Methods, the City has identified standard construction practices that would be implemented by the City or its contractors during construction activities associated with all of the project and programmatic infrastructure components, where relevant. In addition, compliance with standard spill prevention and containment regulations would minimize the potential for spills of hazardous materials impacting nearby water bodies during Beltz ASR facility operations. As a result, construction and operations at the Beltz ASR facilities would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality of Rodeo Creek Gulch and intermittent Stream 472, located upstream of Moran Lake. Therefore, this project component would have a less-than-significant impact.

Water Transfers and Exchanges and Intertie Improvements

New or improved intertie facilities between the water systems of the City and neighboring water agencies are proposed to facilitate future water transfers and exchanges once City water rights are modified and operational agreements have been negotiated. The facilities may include the City/SVWD intertie, which includes a new pipeline and pump station; and the City/SqCWD/CWD intertie, which includes the Soquel Village and Park Avenue pipeline replacements, the McGregor Drive pump station upgrade, and the new Freedom Boulevard and Valencia Road pump stations.

The City's water supply system could be interconnected to the SVWD's system through installation of approximately 8,000 linear feet of new 12-inch-diameter intertie piping from Sims Road in the south, along La Madrona Drive to the north, to the City of Scotts Valley where a new pump station would be constructed (see Figure 3-4f in Chapter 3, Project Description). As discussed in Section 4.5, Geology and Soils, the topography along the City/SVWD intertie pipeline alignment is generally gently to moderately sloping, but the alignment also traverses the banks of a creek subsidiary to Carbonera Creek. Steeper sections of the alignment are underlain by Ben Lomond-Felton complex soils, which are located on 50% to 75% mountain slopes. Other sections of the intertie alignment are underlain by Pfeiffer gravelly sandy loam, on 15% to 30% slopes; Zayante coarse sand, on 5% to 30% slopes; and Watsonville loam, on 2% to 15% slopes. Most of these soil types are well-drained to somewhat excessively well drained, thus

enhancing stormwater infiltration and reducing erosion. However, excavations and construction on or at the base of steep slopes could potentially result in excessive erosion during precipitation events.

As described in Section 4.5, Geology and Soils, the Soquel Village pipeline site is located on variable topography, including relatively flat to gently sloping areas, with localized steep slopes (30% to 50%) adjacent to and in the vicinity of Soquel Creek. Similarly, the southern portion of the Park Avenue pipeline site traverses slopes associated with Tannery Gulch, on 15% to 30% slopes. The steeper hillside areas of the Soquel Village pipeline site are underlain by Elkhorn-Pfeiffer Complex soils, which are well-drained and would enhance stormwater infiltration and reduce runoff rates. However, excavations and construction on these slopes could potentially result in excessive erosion during precipitation events.

As indicated in Section 4.7, Hazards, Hazardous Materials, and Wildfire, residual soil contamination is present in soil at a former Exxon gas station site located adjacent to the Soquel Village pipeline site, at 2501 Main Street in Soquel. The site received low-risk closure in 2011, stating that remaining contamination was not migrating, and remaining contamination would meet water quality objectives through natural attenuation. However, notifications to the Central Coast RWQCB, Santa Cruz County EHS, and the local planning and building departments must be conducted prior to ground-disturbance activities at the Soquel Village pipeline site to ensure proper oversight of trench dewatering, if necessary.

The proposed Freedom Boulevard pump station site is relatively flat to gently sloping and underlain by Baywood loamy sand, which is somewhat excessively drained, on 15% to 30% slopes. The Valencia Drive pump station site is gently sloping and is also underlain by Baywood loamy sand. The somewhat excessively drained soils would enhance stormwater infiltration and reduce runoff rates.

As indicated in Section 4.8.3.2, Analytical Methods, the City has identified standard construction practices that would be implemented by the City or its contractors during construction activities associated with all project and programmatic infrastructure components, where relevant, to reduce erosion during construction. Additionally, dewatering would be required if trenching for pipeline installation intercepts shallow groundwater and such activities would be subject to permitting approval by the Central Coast RWQCB. Water removed from the excavation would be pumped into temporary portable tanks to allow sediment to drop out and meet NPDES dewatering permit (Order No. R3-2017-0042, NPDES Permit No. CAG993001, Waste Discharge Requirements, NPDES General Permit for Discharges with Low Threat to Water Quality) water quality standards before being discharged into storm drains or area drainages. Any potentially contaminated groundwater in dewatering wells would not be discharged into storm drains or area drainages, as temporarily stored water would also be tested for pollutants prior to discharge.

No water quality impacts are anticipated with operation of the proposed pipelines, as no pollutants would be used within the pipelines. As discussed in Section 4.7, Hazards, Hazardous Materials, and Wildfire, operation of the pump stations would result in hazardous materials use during operation of these facilities. Hazardous materials used for the operation of all proposed project and programmatic infrastructure components would be in accordance with requirements and recommendations in the applicable Safety Data Sheet(s) and would be managed in accordance with federal, state, and local laws and regulations. Hazardous materials required for operation and maintenance of the proposed infrastructure components would be stored in secured, covered areas with secondary containment. Hazardous wastes which are generated by project and programmatic infrastructure components would be generated, stored, manifested, and transported in accordance with federal, state, and local regulations. Therefore, operation of the proposed pump stations would not result in spills that could affect adjacent water bodies or underlying groundwater.

As a result, construction and operation of potential future intertie improvements would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality of City and County creeks. Therefore, this programmatic component would have a less-than-significant impact.

Felton Diversion Improvements

Minor modifications to the existing Felton Diversion may include fish screen replacement, installation of a traveling brush system to keep the fish screens operating at optimum efficiency, and construction of a continuous downstream outmigration bypass route within the existing bypass channel with downstream opening slide gate. These improvements would be constructed on the west side of the Felton Diversion entirely within the existing concrete diversion facility structure. These improvements would not require any construction activities or disturbance in the riverbed. The existing concrete bypass channel and fish ladder would be dewatered, if needed, and closed during construction. Dewatering would be accomplished through the hand placement of sandbags on either side of the concrete bypass channel. Once construction is completed, any construction debris would be removed from the bypass channel and fish ladder prior to reopening them. Figure 3-4h in Chapter 3, Project Description shows the worst-case area of disturbance associated with construction of the Felton Diversion improvements.

As indicated in Section 4.5, Geology and Soils, the topography at the Felton Diversion site is relatively flat to gently sloping, except for the bank of the San Lorenzo River, most of which has been modified for the existing intake structure and fish ladder. In addition, the Felton Diversion site is underlain by Soquel loam, which is moderately well drained, thus enhancing infiltration of stormwater runoff and reducing the potential for erosion. However, excavations and construction associated with these diversion improvements immediately adjacent to the San Lorenzo River, including the riverbank, could potentially result in erosion and sedimentation of the San Lorenzo River. As indicated in Section 4.8.3.2, Analytical Methods , the City has identified standard construction practices that would be implemented by the City or its contractors during construction activities associated with the programmatic components, where relevant, thus minimizing the potential for erosion-induced siltation of the river.

Dewatering of the existing bypass channel and fish ladder during diversion modifications would be subject to permitting approval by the Central Coast RWQCB. Any potentially contaminated groundwater in dewatering wells associated with incidental spills from heavy equipment would not be discharged into the San Lorenzo River. No water quality impacts are anticipated with diversion modifications, as no new potential pollutants (other than currently used minor quantities of oil, grease, degreasers, etc.) would be used to operate the diversion structure. As a result, construction and operations at the Felton Diversion site would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality of the San Lorenzo River. Therefore, this programmatic component would have a less-than-significant impact.

Tait Diversion and Coast Pump Station Improvements

Improvements at the Tait Diversion could include, but would not be limited to: (1) a new or modified intake design, (2) upstream and/or downstream hydraulic modifications, (3) improvements to the check dam, and (4) any required fish passage upgrades. Upgrades would be implemented to meet current state and federal fisheries protection criteria. The River Pumps at the Coast Pump Station facility would also require improvements, which could include, but would not be limited to, (1) new pumps and motors, (2) primary and backup power upgrades, which could include upgrades to the Pacific Gas & Electric substation, (3) a new or modified concrete wet well, and (4) a solids handling system. The Tait Diversion improvements would likely require construction activities and disturbance in the riverbed. Figure 3-4i in Chapter 3, Project Description shows the worst-case area of disturbance associated with construction of the Tait Diversion and Coast Pump Station Facility Improvements.

As indicated in Section 4.5, Geology and Soils, topography at the Tait Diversion and Coast Pump Station site is relatively flat to gently sloping and the site is underlain by Baywood loamy sand, which is somewhat excessively drained, and the Soquel loam, which is moderately well drained. The combination of well-drained soils and relatively flat topography would minimize the potential for erosion during precipitation events. However, excavations and construction associated with these diversion and pump station improvements immediately adjacent to the San Lorenzo River, including the riverbank, could potentially result in erosion and sedimentation of the San Lorenzo River. As indicated in Section 4.8.3.2, Analytical Methods, the City has identified standard construction practices that would be implemented by the City or its contractors during construction activities associated with all project and programmatic infrastructure components, where relevant, thus minimizing the potential for erosion induced siltation of the river.

Because the Tait Diversion improvements would likely require construction activities and disturbance in the riverbed, dewatering would likely be required. Dewatering would be subject to permitting approval by the Central Coast RWQCB. Any potentially contaminated groundwater in dewatering wells associated with incidental spills from heavy equipment would not be discharged into the San Lorenzo River. No water quality impacts are anticipated with diversion modifications, as no new potential pollutants (other than currently used minor quantities of oil, grease, degreasers, etc.) would be used to operate the diversion structure. As a result, construction and operations at the Tait Diversion and Coast Pump Station sites would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality of the San Lorenzo River. Therefore, this programmatic component would have a less-than-significant impact.

Mitigation Measures

As described above, the Proposed Project would not result in significant impacts related to violation of any water quality standards or waste discharge requirements, and therefore, no mitigation measures are required.

Impact HYD-2: Decrease Groundwater Supplies, Interfere with Groundwater Recharge, or Conflict with Groundwater Plan (Significance Standards B and E). Construction and operation of the Proposed Project would not decrease groundwater supplies or interfere substantially with groundwater recharge such that sustainable groundwater management of the basin would be impeded. However, the Proposed Project could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan by potentially affecting local groundwater quality or causing restrictive effects in nearby wells. ***(Less than Significant with Mitigation)***

Water Rights Modifications

This project component would involve making modifications within the City's pre-1914 and post-1914 water rights, permits, and licenses. Modifications include expansion of the place of use, modifications related to method and points of diversion and rediversion, addition of underground storage, extension of time to reach full beneficial use under the City's Felton permits, and Agreed Flows for all North Coast streams, Newell Creek, and the San Lorenzo River. The water rights modifications of the Proposed Project would not directly result in construction or operation of new infrastructure facilities and therefore would not directly decrease groundwater supplies or interfere substantially with groundwater recharge such that sustainable groundwater management of the basin would be impeded or conflicts with a water quality control plan or sustainable groundwater management plan would result. Therefore, this project component would result in no direct impacts.

The following analysis evaluates the potential indirect impacts to groundwater as a result of the proposed water rights modifications, that once approved could result in the implementation of the project and programmatic infrastructure components of the Proposed Project.

Infrastructure Components

Aquifer Storage and Recovery

The Proposed Project includes the City installing and operating ASR facilities within the Santa Cruz Mid-County Groundwater Basin inside or outside the areas served by the City, and in the Santa Margarita Groundwater Basin outside the areas served by the City. ASR would include new ASR facilities at unidentified locations and Beltz ASR facilities at the existing Beltz well facilities. Overall, ASR is a programmatic component of the Proposed Project; however, as a subcomponent of ASR, Beltz ASR facilities is a project component of the Proposed Project.

To the extent ASR facilities and operations would occur outside of the City's existing water-right place of use, they would be enabled by the Proposed Project's expansion of the POU of the City's appropriative water rights. The Proposed Project includes the addition of underground storage supplements to the City's post-1914 appropriative permits and licenses only for the Beltz ASR facilities because those are the only proposed ASR facilities whose locations and proposed capacities are currently known. While additional underground storage supplements to those permits and licenses would have to be submitted to and approved by the SWRCB to implement new ASR facilities, the Proposed Project could ultimately result in the possible installation of ASR facilities in both groundwater basins to allow for injection of treated water from the City's GHWTP and possible subsequent extraction.

The total ASR capacity is intended to provide sufficient capacity to address the City's agreed-upon worst-year water supply gap of 1.2 billion gallons per year during modeled worst-year conditions identified during the WSAC planning process, described in Section 3.2.1, Water Supply Planning Background. ASR would have a total proposed injection infrastructure capacity of 4.5 mgd and a proposed extraction infrastructure capacity of 8.0 mgd, to meet this worst-year gap. The injection infrastructure sizing is smaller than the extraction infrastructure sizing because, generally, diverted surface water could be injected for groundwater storage over multiple years to be available for extraction over a shorter timeframe during dry periods. It is estimated that with this infrastructure capacity, an average of approximately 233 mgy, with a maximum of up to approximately 702 mgy, of treated surface water could be injected into the groundwater basin(s), and an average of approximately 176 mgy, with a maximum of approximately 1,064 mgy, of injected water could be extracted. To contribute to groundwater sustainability of the Santa Cruz Mid-County Groundwater Basin and the Santa Margarita Groundwater Basin, estimated annual operations show that in aggregate extraction volumes would be lower than injection volumes. However, maximum annual extraction volumes could exceed annual injection volumes during dry periods when access to more stored water supply is needed to meet City demands. Table 4.8-4 summarizes the ASR programmatic component of the Proposed Project and provides a conservative worst-case estimate of the proposed capacity and operational volumes for ASR.

As a subcomponent of ASR, Beltz ASR would provide only a portion of the total ASR capacity and operations, as shown in Table 4.8-4. The remainder of the total capacity and estimated annual operations would be provided at new ASR facilities. Further planning and analysis are required to determine locations for any potential new ASR facilities. Actual capacity and operational characteristics for new ASR facilities and Beltz ASR facilities would be based on completion of ASR pilot programs, design-level groundwater modeling, and the ASR design process.

Table 4.8-4. Proposed Aquifer Storage and Recovery Capacity and Estimated Operation

	Proposed Capacity (mgd)		Estimated Operation (mgy)			
	Injection	*Extraction*	*Average*		*Maximum*	
			Injection	*Extraction*	*Injection*	*Extraction*
Total Aquifer Storage and Recovery (ASR)	4.5	8.0	233	176	702	1,064
New ASR Facilities at Unidentified Locations	TBD	TBD	TBD	TBD	TBD	TBD
Beltz ASR Facilities at Existing Beltz Well Facilities	2.10	2.17[1]	188	137	358	315

Source: Gary Fiske and Associates 2021a, 2021b.
Notes: mgd = million gallons per day; mgy = million gallons per year; TBD = to be determined.
[1] Based on the physical limitations of the Beltz well facilities, the maximum extraction capacity at Beltz 8, 9, 10, and 12 is 3.27 mgd. Given that the existing groundwater system at these facilities extracts 1.1 mgd, 2.17 mgd of the total capacity is available for the proposed ASR facilities at these Beltz facilities.

Standard operational practices for ASR facilities described in Section 4.8.3.2, Analytical Methods, would be implemented during development and operation of ASR facilities. Operation of ASR facilities would be consistent with applicable adopted existing or future GSPs and could contribute to groundwater sustainability of the Santa Cruz Mid-County Groundwater Basin and the Santa Margarita Groundwater Basin, depending on the facilities' location. Contribution to groundwater sustainability of the Santa Cruz Mid-County Groundwater Basin would also contribute to the protection of groundwater quality from seawater intrusion per the Santa Cruz Mid-County GSP in support of the proposed water quality beneficial use.

New ASR Facilities

Groundwater Storage. As indicated above, new ASR facilities would include injection of surface water subject to the City's appropriative rights, but in excess of its instantaneous needs, into the natural structure of basin aquifers for use as an underground storage reservoir. The City's ASR project modeled for the Santa Cruz Mid-County Groundwater Basin GSP optimizes existing City infrastructure at the Beltz well system as a more efficient use of available resources to inject excess drinking water into basin aquifers. The GSP acknowledges, however, that eventual implementation of the City's ASR project may include new infrastructure, such as that identified for new ASR facilities in the Proposed Project. Drinking water stored in the Santa Cruz Mid-County Groundwater Basin from an ASR project would provide a supply during dry periods for the areas served by the City and any new ASR project could be designed with sustainability benefits to contribute to the restoration of the basin, according to the GSP. The GSP further indicates that information generated by pilot test evaluations will provide a basis for new ASR facility placement (i.e., locations), such that existing gaps in ASR facilities can be filled.

No proposed infrastructure site locations have been identified for new ASR facilities. Overall, ASR facilities would include sufficient capacity to address the City's agreed-upon worst-year water supply gap of 1.2 billion gallons per year during modeled worst-year conditions; however, as indicated in Table 4.8-4 the sizing for new ASR facilities has yet to be identified. As previously discussed, to contribute to groundwater sustainability of the Santa Cruz Mid-County Groundwater Basin and the Santa Margarita Groundwater Basin, estimated annual operations overall show that in aggregate extraction volumes would be lower than injection volumes, resulting in a net increase in

groundwater storage in the basins. A net increase in storage would result in beneficial impacts to the groundwater basins. As a result, the impact of new ASR facility operations on groundwater storage would be less than significant.

Groundwater Quality. As discussed in more detail below for Beltz ASR facilities, groundwater quality impacts related to seawater intrusion would similarly be beneficial, as new ASR facilities would be operated to achieve and maintain sustainability objectives of the GSP in terms of an overall raising of groundwater levels. In general, chronic lowering of groundwater levels could potentially cause poor quality groundwater to flow towards supply wells that would otherwise not have been impacted.

Currently, groundwater quality issues in the Santa Cruz Mid-County Groundwater Basin include one location with 1,2,3-TCP concentrations in groundwater, widespread nitrate in parts of the Aromas Red Sands aquifers, elevated ammonia concentrations in the western portion of the basin (i.e., in the vicinity of Beltz 12 ASR facilities and adjoining SqCWD service area), and saline water associated with seawater intrusion in two areas along the coast. Otherwise, Santa Cruz Mid-County Groundwater Basin groundwater quality is good, with no non-native poor groundwater quality present within productive aquifers. The 1,2,3-TCP concentrations have been detected in the SqCWD Country Club well, which is screened in Aromas Red Sands and Purisima F aquifers. Like the Beltz ASR facility wells (see below), new ASR facility wells in the Santa Cruz Mid-County Groundwater Basin would likely be screened in Purisima A/AA and Tu units. Although ASR is anticipated to occur in the Santa Margarita Groundwater Basin, the SCWD is pursuing an ASR project in the Mid-County Groundwater Basin first. As a result, the focus to-date has been on the Santa Cruz Mid-County Groundwater Basin, as described in the GSP (MGA 2019).

Each project implemented as part of the GSP, including new ASR facilities, would have its own unique water quality constituents of concern that would apply to monitoring and production wells. As detailed in Standard Operational Practice #3 (Section 4.8.3.2, Analytical Methods), groundwater quality monitoring plans would be included in use permits granted by the SWRCB with respect to injecting and storing treated drinking water in groundwater aquifers (i.e., SWRCB WQ Order 2012-0010, General Waste Discharge Requirements For Aquifer Storage And Recovery Projects That Inject Drinking Water Into Groundwater). New ASR facilities would be required to complete at least four quarters of background groundwater quality data to characterize groundwater quality in each aquifer that would receive injected treated water. The Notice of Intent application package associated with the SWRCB ASR order would include a technical report that identifies and describes target aquifers, delineates Areas of Hydrologic Influence, identifies all land uses within the delineated Areas of Hydrologic Influence, identifies project-specific constituents of concern, and assesses groundwater degradation (MGA 2019). As a result, the impact of new ASR facility operations on groundwater quality would be less than significant.

Groundwater Recharge. New ASR facilities, located on sites of approximately 0.25 acres, would result in small areas of paving that would be inconsequential with respect to recharge. As previously discussed, it is estimated that an average of approximately 233 mgy, with a maximum of up to approximately 702 mgy, of treated surface water could be injected into the groundwater basin(s). Such injections would augment natural groundwater recharge. Beneficial impacts would occur with respect to groundwater recharge because by design, new ASR facilities would, in aggregate, result in more groundwater injection than groundwater extraction. New ASR facilities would simply use one or both of the groundwater basins as a reservoir for treated surface water. New ASR facility-related extractions would not deplete the pre-existing groundwater in storage, but instead would contribute to the protection of groundwater quality from seawater intrusion in the Santa Cruz Mid-County Groundwater Basin and provide for sustainability benefits in both groundwater basins in compliance with the Santa Cruz Mid-County Groundwater Basin GSP and the pending Santa Margarita Groundwater Basin GSP. As a result, the impact of new ASR facility operations on groundwater recharge would be less than significant.

Impact Summary. New ASR facilities would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, as new ASR facilities would be completed in compliance with the Santa Cruz Mid-County Groundwater Basin GSP and, when it is adopted, the Santa Margarita Groundwater Basin GSP, as relevant to the potential site locations for new ASR facilities, per Operational Practice #2 described in Section 4.8.3.2, Analytical Methods.

ASR facilities and associated injections and extractions in the Santa Margarita Groundwater Basin would be planned to be installed and operated after the Santa Margarita Groundwater Basin GSP is prepared, adopted, and submitted to DWR in January 2022. The proposed timing will provide for new ASR facility injections and extractions in the Santa Margarita Groundwater Basin consistent with the sustainable management criteria, and avoidance of any undesirable results to be identified in the ultimately adopted Santa Margarita Groundwater Basin GSP and in any future revisions to that GSP.

As required by SGMA, both of these GSPs include or would include quantifiable minimum thresholds related to groundwater levels, groundwater quality (including seawater intrusion), surface/groundwater connection, subsidence, and changes in storage, such that undesirable effects would not occur, and groundwater basin sustainability would be achieved and maintained.

Based on compliance with the Santa Cruz Mid-County Groundwater Basin GSP and Santa Margarita Groundwater Basin GSP, including the associated groundwater monitoring programs, new ASR facilities would not decrease groundwater supplies or interfere substantially with groundwater recharge such that the sustainable groundwater management of the relevant basin would be impeded. Similarly, based on compliance with these GSPs, new ASR facilities would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Therefore, this programmatic component would result in a less-than-significant impact.

Beltz ASR Facilities

The Beltz ASR project component would involve injecting surface water, treated to drinking water standards, into the Santa Cruz Mid-County Groundwater Basin, which would act as an underground storage reservoir, consistent with the GSP for this basin (MGA 2019). This project component involves the installation of upgrades to the existing Beltz system at the existing Beltz 8, 9, 10, and 12 facilities to allow for injection of treated water from the City's GHWTP and subsequent extraction. Figures 3-4a through 3-4d in Chapter 3, Project Description illustrate the site boundaries and proposed improvements at each of the Beltz ASR facility sites.

Groundwater Recharge. The Beltz ASR facilities would not have an appreciable effect on natural aquifer recharge because additional impervious surfaces would not be created at any of these sites. The Beltz ASR facility sites are currently developed and paved and would not require additional areas of pavement. As shown in Table 4.8-4, it is estimated that an average of approximately 188 mgy, with a maximum of up to approximately 358 mgy, of treated surface water could be injected into the groundwater basin. Such injections would augment natural groundwater recharge. Beneficial impacts would occur with respect to groundwater recharge, because by design, Beltz ASR facilities would, in aggregate, result in more groundwater injection than groundwater extraction. Beltz ASR facilities would simply use the Santa Cruz Mid-County Groundwater Basin as a reservoir for treated surface water. Beltz ASR-related extractions would not deplete the pre-existing groundwater in storage, but instead would contribute to the protection of groundwater quality from seawater intrusion and provide for sustainability benefits in the groundwater basin, in compliance with the Santa Cruz Mid-County Groundwater Basin GSP. As a result, the impact of Beltz ASR operations on groundwater recharge would be less than significant.

Decrease Groundwater Supplies or Conflict with Groundwater Plan. Beltz ASR facilities would be completed in conformance with the Santa Cruz Mid-County Groundwater Basin GSP (see Operational Practice #2), which would contribute to the sustainability of the basin. A significant impact with respect to a decrease in groundwater supplies would occur if the Beltz ASR facilities resulted in the creation of or appreciable contribution to any "undesirable results", as defined in the Santa Cruz Mid-County Groundwater Basin GSP. Similarly, creation of or appreciable contribution to any undesirable results would occur if this project component impedes sustainable groundwater management of the groundwater basin, or conflicts with or obstructs implementation of a water quality control plan or sustainable groundwater management plan. Undesirable results are defined generally under SGMA (see Section 4.8.2.2, State, for additional information about SGMA), but more specifically and locally defined by the MGA as:

- **Chronic Lowering of Groundwater Levels**: A significant number of private, agricultural, industrial, and municipal production wells can no longer provide enough groundwater to supply beneficial uses.
- **Reduction of Groundwater in Storage**: A net volume of groundwater extracted (pumping minus annual volume of managed aquifer recharge) that will likely cause other sustainability indicators to have undesirable results.
- **Seawater Intrusion**: Seawater moving farther inland than has been observed from 2013 through 2017.
- **Degraded Groundwater Quality**: Groundwater quality, attributable to groundwater pumping or managed aquifer recharge, that fails to meet state drinking water standards.
- **Land Subsidence**: Any land subsidence caused by lowering of groundwater levels occurring in the basin would be considered significant and unreasonable.
- **Depletion of Interconnected Surface Water**: Significant and unreasonable depletion of surface water due to groundwater extraction, in interconnected streams supporting priority species, would be undesirable if there is more depletion than experienced since the start of shallow groundwater level monitoring through 2015.

As discussed for new ASR facilities, the Proposed Project's groundwater quality impacts would be beneficial, as Beltz ASR facilities would be operated to achieve and maintain sustainability objectives of the Santa Cruz Mid-County Groundwater Basin GSP in terms of an overall raising of groundwater levels. In addition, Beltz ASR facilities would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, as Beltz ASR facilities would be completed in compliance with the Santa Cruz Mid-County Groundwater Basin GSP. The GSP includes quantifiable minimum thresholds related to (1) groundwater levels and groundwater quality (including seawater intrusion), (2) changes in storage, (3) subsidence, and (4) surface/groundwater connection, such that undesirable effects would not occur, and groundwater basin sustainability would be maintained, as further described below.

1. Chronic Lowering of Groundwater Levels, Seawater Intrusion, and Degraded Groundwater Quality.

   Seawater Intrusion. As indicated in Section 4.8.1.4, Groundwater Resources, based on the seawater intrusion risk, the Santa Cruz Mid-County Groundwater Basin is considered a high priority groundwater basin in critical overdraft, as defined under SGMA. As a result, the Santa Cruz Mid-County Groundwater Basin GSP has been prepared for the basin (MGA 2019). The GSP was submitted to DWR in January 2020.

   A series of 13 monitoring wells, within areas served by the City and the SqCWD, have been established in the basin to assess the risk of seawater intrusion (see Figure 4.8-8). Based on regional groundwater elevation contour maps prepared for the Santa Cruz Mid-County GSP, seawater intrusion near the Beltz system has improved substantially from 2005 through 2018. General groundwater gradient is toward the south and southeast, toward the ocean (see Figure 4.8-2).

The Santa Cruz Mid-County Groundwater Basin GSP has evaluated the basin in the context of historical, current, and anticipated future groundwater conditions, and has established minimum thresholds at RMPs which if exceeded, would indicate that an undesirable result (as defined above) is occurring. Minimum thresholds at RMPs for chronic lowering of groundwater levels are based on the groundwater elevation required to meet the typical overlying water demand in the shallowest well in the vicinity of the RMP. Measurable objectives for RMPs are the 75th percentile of historical groundwater elevations for the period of record of each monitoring point. These RMPs are shown on Figure 4.8-7. For seawater intrusion, the GSP establishes minimum thresholds for chloride concentrations, but has also established minimum thresholds for coastal monitoring well groundwater elevations that are generally several feet above sea level (i.e., that serve as a "barrier" to seawater intrusion). The seawater intrusion RMPs are shown on Figure 4.8-8. The existing monitoring network for the Santa Cruz Mid-County Groundwater Basin, which includes these RMPs, has been used for several decades to collect information to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions. Each MGA member agency has its own network of dedicated monitoring wells and production wells that monitor groundwater elevations in its own service area or area of jurisdiction. The City's monitoring well network includes 38 wells, including 34 monitoring wells and 4 production wells, of which 7 are RMPs. The City completes monthly measurements of groundwater levels within these monitoring wells. Multiple well clusters with monitoring wells completed in different aquifers at the same location are used to understand vertical changes in vertical gradients between aquifers. The groundwater level monitoring network relies on groundwater levels either directly or using groundwater levels as a proxy to determine groundwater basin sustainability with respect to chronic lowering of groundwater levels, seawater intrusion, and depletion of interconnected surface water (MGA 2019). Similarly, with respect to groundwater quality, the City monitoring well network includes 32 monitoring wells of which 18 are RMPs. The groundwater quality monitoring network relies on groundwater quality to determine groundwater basin sustainability with respect to degraded groundwater quality and seawater intrusion (MGA 2019).

ASR is identified in the GSP as one of several "projects and management actions" that would contribute to achieving sustainable groundwater management of the basin (i.e., avoiding seawater intrusion and other undesirable results). Therefore, Beltz ASR facilities operated in conformance with the GSP, per Standard Operational Practice #2, would likely have a beneficial impact with respect to the groundwater basin since it allows for the storage of treated surface water in the basin to avoid further seawater intrusion, while supplying the City with additional storage that can be used during dry periods. The GSP would be refined over time and RMPs would be monitored to verify that Beltz ASR-related extractions are not causing undesirable effects in the groundwater basin. As a result, operation of Beltz ASR facilities would be consistent with the adopted GSP and could contribute to restoration of the Santa Cruz Mid-County Groundwater Basin. Therefore, the impact of this project component with respect to seawater intrusion would be less than significant.

Ammonia in Groundwater. In addition to groundwater quality issues associated with seawater intrusion, the SqCWD's O'Neill Ranch water supply well has naturally occurring ammonia concentrations that are difficult to treat. These ammonia concentrations, which increase with depth from the ground surface, appear to be increasing in the Santa Cruz Mid-County Groundwater Basin due to natural causes. Ammonia concentrations increased from 0.24 mg/L in 2015 to 1.40 mg/L in September 2018 (SqCWD 2018; Corona Environmental Consulting 2020). Ammonia concentrations have also been detected in the Beltz 12 well, approximately 1,800 feet southwest of the O'Neill Ranch well. For example, ammonia in groundwater increased in the Beltz 12 well, from 0.18 gm/L to 0.57 mg/L, from August to October 2020 (City of Santa Cruz 2021a). Proposed ASR injection at the Beltz 12 well could potentially affect the high concentrations of ammonia, resulting in increased or decreased ammonia concentrations in SqCWD's O'Neill Ranch well.

Pilot testing was completed at the Beltz 12 ASR facility from December 2018 to July 2019. Initial pilot testing at the facility indicated dilution of ammonia concentrations during injection, followed by a return to baseline conditions after extraction operations. Based on sampling of monitoring wells during pilot tests, no detrimental effects related to ammonia were observed, including ammonia concentrations at the O'Neill Ranch well. Rather, ASR had a beneficial impact with respect to ammonia concentrations in groundwater (Pueblo Water Resources 2020). The O'Neill Ranch well may be drawing ammonia concentrations from up-gradient groundwater (i.e., to the north and away from the Beltz 12 well); therefore, ammonia concentrations may rise in the O'Neill Ranch well in the future independent of down-gradient Beltz 12 ASR operations. However, because it is unclear whether long-term Beltz 12 ASR operations would adversely affect the water quality of the SqCWD O'Neill Ranch well, localized water quality impacts related to elevated ammonia concentrations is considered a potentially significant impact.

Each project implemented as part of the GSP, including Beltz 12 ASR, would have its own unique water quality constituents of concern that would apply to monitoring and production wells. As detailed in Standard Operational Practice #3, groundwater quality monitoring plans would be included in use permits granted by the SWRCB with respect to injecting and storing treated drinking water in groundwater aquifers (i.e., SWRCB WQ Order 2012-0010, General Waste Discharge Requirements For Aquifer Storage And Recovery Projects That Inject Drinking Water Into Groundwater). The Beltz 12 ASR facility would be required to complete at least four quarters of background groundwater quality data to characterize groundwater quality in each aquifer that would receive injected treated water. The Notice of Intent application package associated with the SWRCB ASR order would include a technical report that identifies and describes target aquifers, delineates Areas of Hydrologic Influence, identifies all land uses within the delineated Areas of Hydrologic Influence, identifies project-specific constituents of concern, and assesses groundwater degradation (MGA 2019).

In addition, implementation of MM HYD-1, Ammonia Monitoring, would avoid conflicts with the Santa Cruz Mid-County GSP by requiring: monitoring for ammonia concentrations in groundwater at the Beltz 12 ASR facility well and the SqCWD O'Neill Ranch well, consistent with sampling and analysis completed for the initial Beltz 12 ASR piloting (Pueblo Water Resources 2020); implementation of a groundwater investigation to determine the source of the ammonia (i.e., associated with Beltz 12 ASR or due to unrelated upgradient groundwater conditions) if it is determined that ammonia concentrations appear to be increasing as a result of Beltz 12 ASR operations; and implementation of remedial measures, as applicable, based on the results of the groundwater investigation (e.g., modification of injection and/or extraction operations until ammonia concentrations decrease to baseline or lower levels). Therefore, with the implementation of this mitigation measure, the impact of this project component related to ammonia concentrations would be reduced to a less-than-significant level.

Chronic Lowering of Groundwater Levels. Beltz ASR injection and extraction activities would potentially have an influence on other beneficial users of groundwater in the Santa Cruz Mid-County Groundwater Basin. The long-term plan in the basin, including the projects and management actions in the GSP, is to move pumping further from the coast to minimize the threat of seawater intrusion. Redistribution of municipal pumping is designed to be paired with projects, such as Pure Water Soquel Groundwater Replenishment and Seawater Intrusion Prevention Project (Pure Water Soquel), In-Lieu Recharge, and ASR, as a way to: (1) rest and reduce pumping of coastal wells and be consistent with basin sustainability goals to protect the groundwater supply against seawater intrusion; (2) prevent overdraft within the basin and resolve problems resulting from prior overdraft; (3) support reliable groundwater supply and quality to promote public health and welfare; (4) maintain or enhance groundwater levels where groundwater dependent ecosystems exist; and (5) maintain or enhance groundwater contributions to streamflow (MGA 2019).

The location of the more recently installed Beltz 12 well is reflective of this plan to move pumping further from the coast to minimize the threat of seawater intrusion (MGA 2019). To-date, one pilot test has been completed at the Beltz 12 ASR facility, from December 2018 to July 2019. The primary purpose of the ASR pilot testing was to demonstrate injection well hydraulics and operational performance characteristics of Beltz 12 and to monitor the local aquifer hydraulic and geochemical responses to recharge and recovery operations. These data can then be used to assess and design ASR, and as a basis for environmental planning and permitting documentation for a long-term, full-scale ASR project (Pueblo Water Resources 2020). Information generated by additional pilot test evaluations will help inform the degree to which Beltz ASR can fulfill the City's strategy to improve the reliability of its water supply, along with helping to evaluate the extent to which an ASR project can be operated in a manner that will achieve both supply reliability and groundwater sustainability benefits. These additional pilot tests, in combination with design-level groundwater modeling and the ASR design process, would contribute to determining optimal ASR capacity and operational characteristics. For example, the exact size of individual pumps and motors would not be known until after pilot testing of individual wells.

The area within and surrounding the Beltz system is urbanized and mostly connected to the City's municipal water system. Within this area, there are no agricultural or industrial users of groundwater in the immediate vicinity; the only other groundwater wells in the vicinity are identified as remediation/monitoring wells (DWR 2020b). However, groundwater levels in nearby private domestic wells, northeast of the Beltz 12 ASR facility, may be affected by ASR operations given their proximity. Baseline assessments were completed on five of these nearby wells in 2015 that are currently being monitored under a private well monitoring program being implemented by SqCWD and the City, for select wells within 1,000 meters (approximately 3,300 feet) of the Beltz 12 ASR facility. (Hydro Metrics 2015a, 2015b, 2015c, 2015d, 2015e). Four follow-up restrictive assessments were completed on these private wells, through December 2019 (Montgomery & Associates 2019a, 2019b, 2019c, 2019d, 2019e).

Demonstrated restrictive effects are defined as damage to the private well or pump caused by groundwater levels falling below the top of the well screens, or diminution of well yield. When groundwater falls below the top of the screen, pumping causes water to fall through the screen and into the well. This occurs because the pump normally draws the groundwater level down inside the well faster than water can flow into the well. Freefalling water becomes aerated or entrains air, thus creating several potential problems, including pump cavitation effects, bacteriological growth, and corrosion. Diminution of well yield can occur when well screens are significantly dewatered, thereby causing the well production rate or capacity to be reduced such that the well is rendered incapable of meeting historically measured production (Hydro Metrics 2015a, 2015b, 2015c, 2015d, 2015e).

Consistent with the private well monitoring program being implemented by SqCWD and the City, and consistent with restrictive effects criteria established in the baseline assessments for five nearby private domestic wells, proposed Beltz 12 ASR extractions would result in potentially significant impacts if restrictive effects occur in domestic wells located within 1,000 meters (approximately 3,300 feet) of the Beltz 12 ASR facility. More specifically, potential restrictive effects on the private wells would be considered significant if:

1. Static groundwater levels in the private wells were above the well screen prior to Beltz 12 ASR operations, but below the top of the well screen following initiation of ASR operations.
2. Pumping groundwater levels in the private wells were above the well screen prior to Beltz 12 ASR operations, but below the top of the well screen following initiation of ASR operations.
3. There is an appreciable reduction in the quantity of groundwater produced by the private well. Appreciable in this case would be defined as rendering the private well incapable of meeting its historical measured maximum daily production level, measured dry-season production levels, or measured annual production levels under drought conditions.

Given the potential for one or more of the above potential restrictive effects on the nearby private domestic wells to occur as a result Beltz 12 ASR operations, the impact related to chronic lowering of groundwater levels in nearby private wells is considered to be a potentially significant impact.

Implementation of Mitigation Measure MM HYD-2, Groundwater Level Monitoring, would avoid conflicts with the Santa Cruz Mid-County GSP by requiring: continuation of a private well monitoring program already in place; implementation of a groundwater investigation to determine the source of restrictive effects (i.e., associated with Beltz 12 ASR or O'Neill Ranch well extractions), if it is determined that restrictive groundwater effects are occurring during future ASR pilot tests and operations; and implementation of remedial measures, as applicable, based on the results of the groundwater assessment (e.g., modification of injection and/or extraction operations until groundwater levels return to baseline levels). Therefore, with implementation of this mitigation measure, the impact of Beltz 12 ASR operations related to chronic lowering of groundwater levels at nearby private wells would be reduced to less-than-significant level.

Operation of the Beltz 8, 9, and 10 ASR injections and extractions anticipated by the Proposed Project would be consistent with the sustainable management criteria per Operational Practice #2, and would avoid any undesirable results as identified in the adopted Santa Cruz Mid-County Groundwater Basin GSP and in any future revisions to the GSP. Beltz ASR would contribute to restoration of the Santa Cruz Mid-County Groundwater Basin, per the GSP (MGA 2019). Contribution to restoration of the basin would also protect the basin from seawater intrusion in support of the proposed water quality beneficial use identified in Chapter 3, Project Description. As a result, groundwater level impacts associated with Beltz 8, 9, and 10 ASR operations would be less than significant.

2. Reduction in Groundwater Storage. Undesirable results related to reduction in groundwater storage would occur if the five-year average net extraction exceeds the sustainable yield (minimum threshold) for any one of the groups of aquifers, including the Aromas Red Sands, Purisima, and Tu aquifers. Although only a total volume for the entire basin is required as a metric for the reduction of groundwater in storage sustainability indicator, per SGMA regulations, the Santa Cruz Mid-County Groundwater Basin GSP includes separate sustainable management criteria for three separate aquifer groups, including: 1) Aromas Red Sands and Purisima F, 2) Purisima DEF, BC, A, and AA aquifers, and 3) the Tu aquifer. The sustainable management criteria metrics for determining reduction in groundwater storage are based on the sustainable yields for each of the three aquifer groups (MGA 2019).

   Developing reduction of groundwater storage sustainable management criteria for separate aquifer units reflects the stacked aquifer units of the groundwater basin, where groundwater supplies in different areas of the basin are provided by different aquifer units. To maximize capacity, municipal wells are often screened across multiple aquifers. For example, most municipal wells screened in the Aromas Red Sands aquifer are also screened in the deeper Purisima F-unit aquifer. Other typical multiple aquifer-screened wells include: the Purisima DEF and BC units; the Purisima BC and A units; and the Purisima A and AA units. Although municipal wells screened in the Tu unit are also screened in the Purisima AA-unit, a high percentage of the flow in these wells is observed to be from the Tu unit. Additionally, the vertical separation of flow between the Purisima AA and Tu units is observed to be greater than the vertical separation between the Purisima A and AA units, which further supports the Tu unit being in a separate group. Although sustainable yield can be estimated for individual aquifers, monitoring pumping quantities from individual aquifers is not possible because of production wells being screened through multiple aquifers. Therefore, the aquifer groupings account for the extraction from the typically screened aquifers in production wells (MGA 2019).

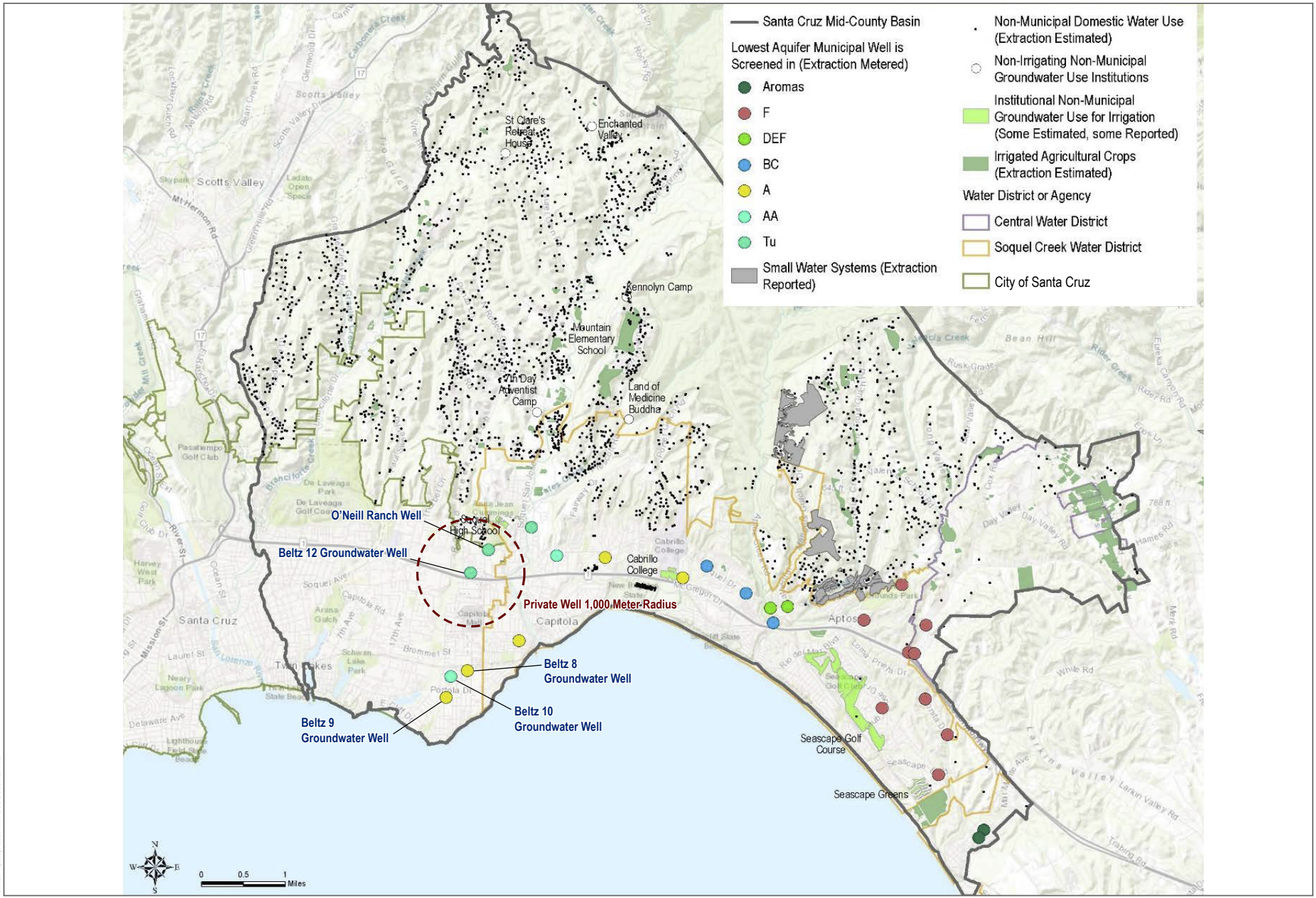
Beltz ASR would, in aggregate, result in less annual groundwater extraction than injection, but maximum annual extraction volumes could exceed injection volumes during dry periods when more water supply is needed to meet City demands (see above and Table 4.8-4). Undesirable results related to reduction in groundwater storage would only occur if the five-year average net extraction exceeds the sustainable yield (minimum threshold) for any one of the groups of aquifers. In addition, the GSP would be refined over time and RMPs would be monitored to verify that ASR-related extractions are not causing undesirable effects in the groundwater basin, including a reduction in groundwater in storage (MGA 2019). RMPs related to change in groundwater storage are shown on Figure 4.8-9.

The purpose of the reduction in storage sustainability indicator is to prevent undesirable results for other sustainability indicators. Each of these sustainability indicators are monitored by individual aquifer units. If undesirable results are observed in any aquifer unit or related to pumping from a specific aquifer unit, the most likely management action to eliminate the undesirable result is to change net pumping from the aquifer unit. The change in net pumping would be determined by that which is necessary to eliminate the undesirable result, not based on the reduction of groundwater in storage criteria (MGA 2019).

Localized pumping depressions and groundwater mounding would be part of normal operations during Beltz ASR operations and would be acceptable provided extractions remain within the zone of operational flexibility in maintaining aquifer volume above minimum thresholds over the five-year averaging period. Beltz ASR injection would add to the operational flexibility of the groundwater basin, allowing for increased withdrawals within individual aquifer groupings. Beltz ASR facilities would simply use the Santa Cruz Mid-County Groundwater Basin as a reservoir for treated surface water. Beltz ASR-related extractions would not deplete the pre-existing groundwater in storage, but instead would contribute to the protection of groundwater quality from seawater intrusion and provide for sustainability benefits in the groundwater basin in compliance with the Santa Cruz Mid-County Groundwater Basin GSP. Based on compliance with the Santa Cruz Mid-County Groundwater Basin GSP, including the associated groundwater monitoring program, Beltz ASR facilities would not result in a reduction in groundwater storage. As a result, the impact of Beltz ASR operations on groundwater storage would be less than significant.

3. Subsidence. As described in Section 4.5, Geology and Soils, land subsidence is a settling or sudden sinking of the ground surface due to subsurface compaction of earth materials. The principal causes of subsidence in California are aquifer-system compaction related to groundwater extraction, drainage and decomposition of organic soils, and oil and gas extraction. Effects of land subsidence include damage to buildings and infrastructure such as roads and canals, increased flood risk in low-lying areas, and lasting damage to groundwater aquifers and aquatic ecosystems. Based on a review of a U.S. Geological Survey subsidence map (USGS 2020), the study area is not in an area of regional ground subsidence. In addition, none of the conditions that typically result in subsidence is known to be present within the Santa Cruz Mid-County Groundwater Basin and no anecdotal evidence of subsidence related to groundwater extraction is known. No formal subsidence studies have been completed in the region (MGA 2019).

   Because historical declines in groundwater have been more than 50 feet, the possibility of aquifer-system compaction exists. However, based on available information, the likelihood of subsidence is low. Susceptibility to land subsidence from groundwater level declines requires aquitards (fine grained silts and clays) above or within which preconsolidation stress thresholds are exceeded. Preconsolidation stress is the maximum amount of past effective stress the soil has experienced. Aquitards in the Santa Cruz Mid-County Groundwater Basin are present between the aquifer units. However, in areas with pumping, the bottom elevations of aquitards are generally more than 100 feet below sea level, which is deeper than typical groundwater levels, resulting in a lack of aquitard dewatering and associated soil compaction (MGA 2019).



SOURCE: SCMGA 2019

FIGURE 4.8-9

Representative Monitoring Network for Measuring Reduction in Groundwater Storage

Santa Cruz Water Rights Poject

DUDEK

The greatest groundwater level declines since recording levels began in 1984 have been in the Purisima BC units of the Santa Cruz Mid-County Groundwater Basin, where declines of approximately 140 feet have occurred. The Purisima A and DEF units have also sustained substantial historical declines in groundwater levels. However, these groundwater levels have since recovered and no subsidence has been documented in the basin because of these declines. No subsidence monitoring has been completed in the basin; however, two continuous global positioning system (GPS) stations are in the vicinity of the basin. The GPS stations are in areas underlain by the Aromas Red Sands and Purisima F unit aquifers, which are hydraulically connected to the Santa Cruz Mid-County Groundwater Basin. Therefore, these station locations are somewhat representative of the basin, although no GPS stations are in areas of the basin where the main Purisima aquifers are being pumped and where historic long-term groundwater declines have occurred (MGA 2019).

However, the consolidated nature of the Purisima Formation, where groundwater level declines have historically occurred, has resulted in no land subsidence related to lowered groundwater levels. Similarly, subsidence is not anticipated in the future. Implementation of the GSP and avoiding undesirable results in the other five sustainability indicators would ensure that historic low groundwater levels would not occur in the future. In the highly unlikely event that land subsidence caused by lowered groundwater levels occurs in the basin and is identified as such by observational monitoring, the MGA would immediately regulate groundwater pumping in the area of subsidence. The identification of active land subsidence would trigger the need for dedicated subsidence monitoring and an amendment to the GSP that includes development of sustainable management criteria for the land subsidence sustainability indicator (MGA 2019).

In conclusion, the lack of evidence of subsidence linked to substantial groundwater declines, the lack of the susceptibility of the basin geology to subsidence, and existing regional subsidence monitoring near the Santa Cruz Mid-County Groundwater Basin indicates the inapplicability of the subsidence sustainability indicator for the basin. In addition, ASR operations augment a groundwater basin's natural recharge. As a result, the impact of Beltz ASR facilities with respect to ground subsidence would be less than significant.

4. Depletion of Interconnected Surface Water. The current shallow monitoring wells used to monitor and evaluate interactions between surface water and groundwater are focused on the lower stretch of Soquel Creek, where there are several municipal production wells, which are operated by SqCWD. In addition, multiple depth monitoring well clusters are located near Soquel Creek that are included in the evaluation of surface water and groundwater extractions (see Figure 4.8-5). No such shallow wells are near the Beltz ASR system, in the vicinity of Rodeo Creek Gulch and unnamed intermittent Stream 472, located upstream of Moran Lake. Under the GSP, eight new shallow monitoring wells would be added to complete the monitoring network and further evaluate the effects of groundwater extractions on streamflow in interconnected surface waters. It is expected that these wells will be installed prior to October 2022. The timing of installation of these new shallow monitoring wells would mean that they would be operational by the earliest time that Beltz ASR facilities become operational (Fall 2022). Currently, the proposed well location in the vicinity of the Beltz ASR wells is approximately ¾ mile upstream of the Beltz 12 ASR facility, along Rodeo Creek Gulch. This proposed shallow well site is a lower priority site that may require synoptic measurements to establish where the stream is gaining and losing, before finalizing this monitoring well site (MGA 2019).

   The locations of additional shallow wells would be selected based on whether groundwater is connected to surface waters, whether the area has a concentration of groundwater extraction wells, the suitability of nearby location for streamflow gauge, and potential for site access. Groundwater elevations as a proxy for surface water depletion are used as a measure of sustainability because no direct measurable change in streamflow from deep groundwater extraction has been detected in over 18 years of monitoring shallow groundwater levels adjacent to Soquel Creek. Based on monitoring along Soquel Creek, annual rainfall, flows from the upper Soquel Creek

Watershed outside of the Santa Cruz Mid-County Groundwater Basin, temperature, and evapotranspiration individually have a much greater measurable influence on streamflow than groundwater pumping. Even though there is no measurable direct change in streamflow from groundwater extraction, there is a demonstrable indirect influence on shallow groundwater connected to the creek from deeper aquifers pumped by municipal and private wells. As these observations are made from a few wells on Soquel Creek only, further study as part of GSP implementation would revise the current understanding of the relationship between streamflow and groundwater. Additional insight into this relationship might necessitate a future change in the GSP's sustainable management criteria for this sustainability criteria (MGA 2019). However, as noted above eight new shallow monitoring wells to evaluate the effects of groundwater extractions on streamflow in interconnected surface waters will be installed prior to October 2022, the earliest time that Beltz ASR facilities could become operational.

Data obtained from future groundwater monitoring locations would inform the validity of groundwater levels as a proxy for depletion of interconnected surface water, and better inform if changes are needed to minimum thresholds to avoid undesirable results. Groundwater level data collected would be evaluated annually with respect to streamflow, climate, groundwater usage, and biological responses. In addition, additional streamflow gauges to monitor changes in stream flow would be installed to correlate changes in streamflow from groundwater extraction (MGA 2019).

In conclusion, Beltz ASR would be completed in compliance with the Santa Cruz Mid-County Groundwater Basin GSP per Operational Practice #2. Sustainable management criteria established in the GSP for groundwater level decline and seawater intrusion (i.e., maintaining a seaward groundwater gradient) would contribute to maintaining shallow groundwater levels and protecting streamflow. Based on monitoring completed in Soquel Creek, municipal pumping does not appear to be diminishing streamflow in the basin. As a result, the impact of Beltz ASR facilities with respect to depletion of interconnected surface water would be less than significant.

Impact Summary. Based on the analysis above, the Beltz ASR project component would not interfere with groundwater recharge, or contribute to seawater intrusion, reduction in groundwater storage, ground subsidence, or depletion of interconnected surface water. As previously discussed, beneficial impacts would occur with respect to groundwater recharge because by design, Beltz ASR facilities would, in aggregate, result in more injection than extraction. Beltz ASR facilities would use the Santa Cruz Mid-County Groundwater Basin as a reservoir for treated surface water. Beltz ASR facility-related extractions would not deplete the pre-existing groundwater in storage, but instead would contribute to the protection of groundwater quality from seawater intrusion in the Santa Cruz Mid-County Groundwater Basin and provide for sustainability benefits in compliance with the Santa Cruz Mid-County Groundwater Basin GSP.

Because it is unclear whether long-term Beltz 12 ASR operations would adversely affect the localized water quality of the SqCWD O'Neill Ranch well, localized water quality impacts related to elevated ammonia concentrations is considered a potentially significant impact. Likewise, given the potential for localized restrictive effects to occur on the nearby private domestic wells within 1,000 meters (approximately 3,300 feet) as a result Beltz 12 ASR operations, the impact related to chronic lowering of groundwater levels is also considered to be a potentially significant impact. However, MM HYD-1 and MM HYD-2 would reduce these localized impacts to a less-than-significant level.

Water Transfers and Exchanges and Intertie Improvements

The Santa Cruz Mid-County Groundwater Basin GSP identifies water transfers/in lieu groundwater recharge as one of the "projects and management actions" that would deliver excess City surface water, treated to drinking water standards, to SqCWD to reduce groundwater pumping and allow an increase in groundwater in storage in order to help prevent seawater intrusion. If water transfers benefit groundwater levels, are sustainable over time, and the

basin's performance consistently reaches sustainability targets, then the GSP indicates that the City could recover, via exchanges, some of the increase in groundwater in storage as a supplemental supply during dry periods. The GSP also acknowledges the pilot water transfer program agreement between the City and SqCWD to sell excess winter water supply from the City's GHWTP. Pilot transfers were provided to a limited portion of the SqCWD service area during the 2018/2019 and 2019/2020 winter and spring wet season. During this time, active water quality monitoring and operational constraints analyses were conducted to inform feasibility for future expanded water transfers or exchanges.

Modification of the City's appropriative water rights through the Proposed Project would facilitate the opportunity for potential future water transfers and exchanges with neighboring water agencies, including SVWD, SLVWD, SqCWD, and CWD. Such transfers and exchanges would likely be provided for via agreements with defined terms related to timing, volume of water, water year conditions, return of water, etc., that would be developed between the City and one or more of the neighboring agencies. New or improved interties between the water systems of the City and of neighboring water agencies may be needed to facilitate future water transfers and exchanges once City water rights are modified.

Chapter 3, Project Description, indicates that when water is available and conditions of future agreements are met, a range of water volumes of approximately 98 mgy to 277 mgy (0.5 mgd to 1.5 mgd from November 1 to April 30) could be transferred by the City to SqCWD and/or CWD via the proposed intertie facilities, with some volume of water potentially returned or exchanged to the City during dry periods. Additionally, up to approximately 163 mgy (0.9 mgd from November 1–April 30) of water could be transferred by the City to SVWD and/or SLVWD via the proposed intertie facilities, again with some volume of water potentially returned to or exchanged with the City during dry periods. The amount of water that may be returned through exchanges is unknown at this time and will be based on the conditions described in the Santa Cruz Mid-County GSP, as described above, and the pending Santa Margarita GSP.

As indicated for Impact HYD-1, dewatering would be required if trenching for pipeline installation intercepts shallow groundwater. However, such dewatering would be temporary and localized, and would result in a negligible quantity of groundwater being extracted with respect to the quantity of groundwater present in the aquifers. In addition, dewatering would occur in accordance with a dewatering discharge permit to be issued by the Central Coast RWQCB. Intertie pipelines would not require a net increase in paving and therefore would not result in a loss of recharge. Proposed pump stations would result in small areas of paving that would be inconsequential with respect to recharge.

To the extent that water transfers occur on a regular basis and allow neighboring water agencies to rest their groundwater wells, such transfers could have a beneficial impact on groundwater conditions in the Santa Cruz Mid-County Groundwater Basin and the Santa Margarita Groundwater Basin. As a result, this programmatic component would not decrease groundwater supplies or interfere substantially with groundwater recharge such that the sustainable groundwater management of the basin would be impeded. In addition, this programmatic component would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Therefore, this programmatic component would result in a less-than-significant impact.

Felton Diversion, and Tait Diversion and Coast Pump Station Improvements

As indicated for Impact HYD-1, dewatering would be required during diversion modifications. However, such dewatering would be temporary and localized, and would result in a negligible quantity of groundwater being extracted with respect to the quantity of groundwater present in the underlying aquifers. In addition, dewatering would occur in accordance with a dewatering discharge permit to be issued by the Central Coast RWQCB. Diversion and pump station improvements would not require a net increase in paving given that the sites are already developed and paved, and

therefore would not result in loss of recharge. As a result, these programmatic components would not decrease groundwater supplies or interfere substantially with groundwater recharge such that sustainable groundwater management of the basin would be impeded. In addition, these programmatic components would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Therefore, this programmatic component would result in a less-than-significant impact.

Mitigation Measures

Implementation of the following mitigation measures would reduce potentially significant groundwater impacts of the Proposed Project, as described above, to a less-than-significant level.

MM HYD-1: Ammonia Monitoring (Applies to Beltz 12 Aquifer Storage and Recovery [ASR] Facility). Consistent with groundwater monitoring completed for the Beltz 12 ASR Pilot Test Project (Pueblo Water Resources 2020), monitoring for ammonia shall be completed in the Beltz 12 well and the Soquel Creek Water District (SqCWD) O'Neill Ranch well during future Beltz 12 ASR pilot tests and ASR operations. The City shall establish ammonia concentrations beginning at least 12 months prior to commencement of Beltz 12 ASR operations, by conducting quarterly sampling, and obtaining similar sampling data for the SqCWD's O'Neill Ranch well, as provided by SqCWD. During the first year of Beltz 12 ASR injection and extraction operations, the City shall conduct monthly monitoring of ammonia concentrations in groundwater. Following the first year of operations, monitoring of ammonia shall be quarterly. In the event that over a two-year sampling period after initiation of Beltz 12 ASR operations, City ammonia monitoring data, in combination with ammonia monitoring data from the SqCWD O'Neill Ranch well, indicates Beltz 12 ASR operations are not resulting in changes to ammonia concentrations that could adversely affect operations at the SqCWD's O'Neill Ranch well, ammonia sampling shall be discontinued in the Beltz 12 ASR well.

The City ammonia monitoring data, in combination with ammonia monitoring data from the SqCWD O'Neill Ranch well, shall be evaluated to determine if Beltz 12 ASR operations are resulting in changes to ammonia concentrations that could adversely affect operations at the SqCWD's O'Neill Ranch well. If ammonia levels increase above baseline, the City and SqCWD shall cooperatively develop, fund, and implement a hydrogeologic investigation to evaluate the source(s) and distribution of ammonia in the aquifer system and potential causes of the observed ammonia increases. The investigation shall include, if applicable, installation of a monitoring well cluster between the Beltz 12 ASR well and the O'Neill Ranch well to evaluate the gap in data between these two wells.

To the extent that the results of the hydrogeologic investigation indicate that Beltz 12 ASR operations are resulting in ammonia concentrations above baseline concentrations, ASR injection and/or extraction operations shall be modified until ammonia concentrations decrease to baseline (or lower) levels, as demonstrated with monthly (during the first year of operations) or quarterly monitoring data from the Beltz 12 ASR well, and the SqCWD's O'Neill Ranch well, as provided by SqCWD. The Beltz 12 ASR modifications shall be proportional to the degree of impact being caused by Beltz 12 ASR operations (versus O'Neill Ranch well operations). Quarterly monitoring reports shall be prepared to document monitoring results.

Additionally, during the next Mid-County Groundwater Sustainability Plan update process, the City shall work with other member agencies of the Mid-County Groundwater Sustainability Agency to address ammonia as a groundwater quality issue in the basin if warranted based on the outcome of monitoring and any hydrogeologic investigation performed, and incorporate the City's Beltz 12 ASR well and the SqCWD's O'Neill Ranch well into the plan update to allow for the ongoing assessment and monitoring of ammonia concentrations.

MM HYD-2: Groundwater Level Monitoring (Applies to Beltz 12 Aquifer Storage and Recovery [ASR] Facility). Consistent with restrictive effects criteria established in private well baseline assessment reports (Hydro Metrics 2015a, 2015b, 2015c, 2015d, 2015e), the private well monitoring program currently in place under the April 2015 cooperative monitoring/adaptive groundwater management agreement (cooperative groundwater management agreement) and the April 2015 stream flow and well monitoring agreement, between the City of Santa Cruz (City) and Soquel Creek Water District (SqCWD), shall be continued with respect to groundwater levels, and the City will contact and enroll any additional residents with private domestic wells within a 3,300-foot radius of the City's Beltz 12 ASR facility who want to join the program. Consistent with the existing cooperative groundwater management agreement, the City and SqCWD shall share monitoring and mitigating for impacts to third parties, such as private wells found in the area of overlap of 3,300-foot radius around SqCWD's O'Neill Ranch Well and 3,300-foot radius around the City's Beltz 12 well. Monitoring expenses shall be shared equally while mitigation expenses shall be shared proportionately. If private well monitoring reveals impacts to private wells due to the presence of restrictive effects, pump tests shall be conducted to determine proportionality. Monitoring and mitigation of impacts to private wells within a 3,300-foot radius of either the O'Neill Ranch well or Beltz 12 well, but not located in the overlap area, shall be the sole responsibility of the agency whose 3,300-foot radius encompasses the private well.

If demonstrated restrictive effects to nearby private domestic wells occur during ASR pilot testing or operations, the City and SqCWD shall cooperatively develop, fund, and implement a hydrogeologic investigation to evaluate the potential causes of the observed restricted effects in private wells. To the extent that the results of the hydrogeologic investigation indicates that Beltz 12 ASR operations are resulting in restrictive effects, ASR injection and/or extraction operations shall be modified until the corresponding undesirable effects are eliminated, as demonstrated with quarterly monitoring data from the private wells. The Beltz 12 ASR modifications shall be proportional to the degree of impact being caused by Beltz 12 ASR operations (versus O'Neill Ranch well operations). Annual monitoring reports shall be prepared to document monitoring results. In the event that restrictive effects to nearby private domestic wells does not occur during ASR pilot testing or operations, for a period of five years after initiation of Beltz 12 ASR operations, the City's participation in the private well monitoring program will be discontinued.

Additionally, during the next Mid-County Groundwater Sustainability Plan (GSP) update process, the City shall work with other member agencies of the Mid-County Groundwater Sustainability Agency to update information in the GSP related to private wells and the ongoing assessment and monitoring of groundwater levels at these wells, if warranted based on the outcome of monitoring and any hydrogeologic investigation performed.

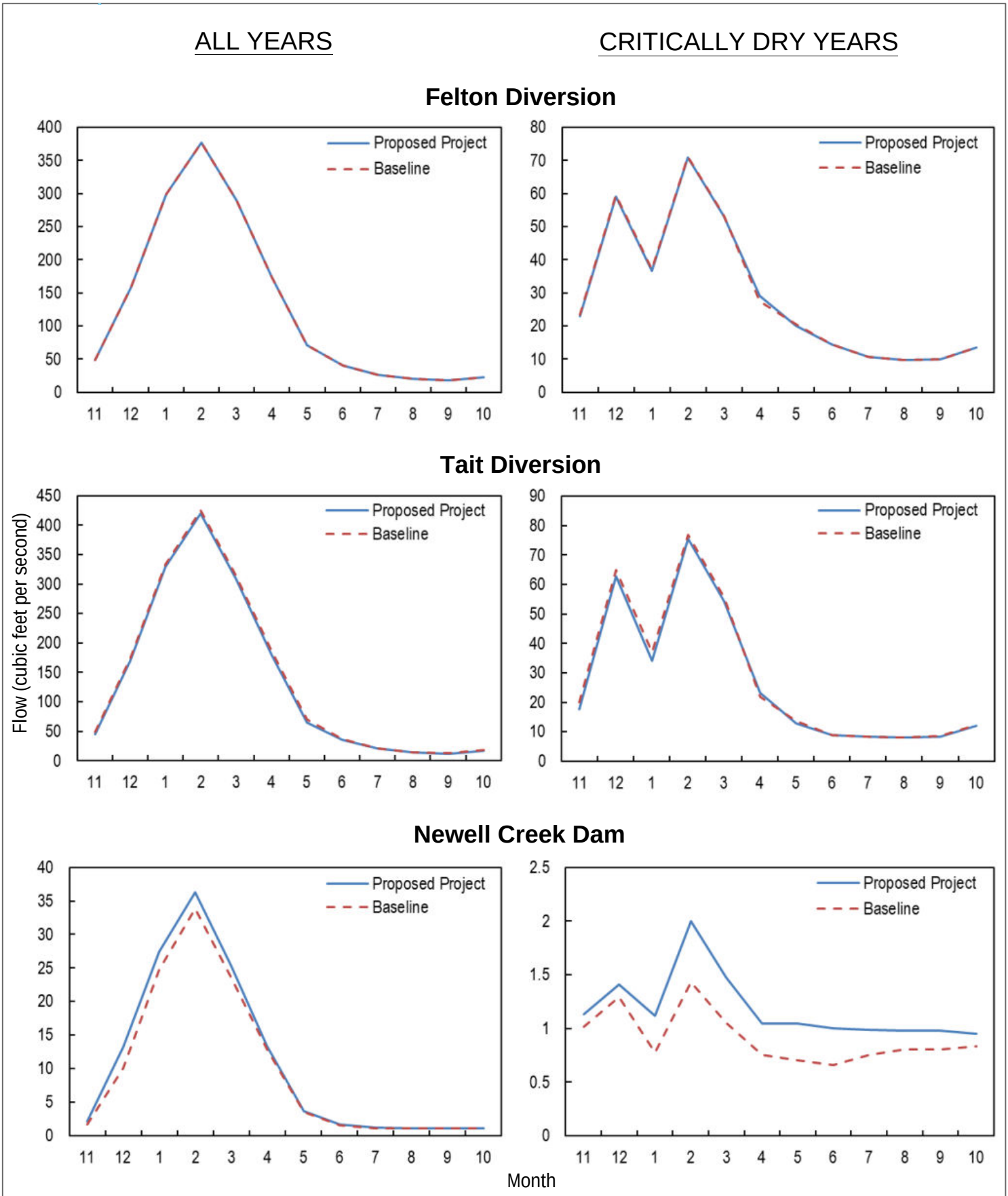
Impact HYD-3: Alteration to the Existing Drainage Pattern of the Site Area (Significance Standard C). Construction and operation of the Proposed Project could substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or 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. ***(Less than Significant with Mitigation)***

Water Rights Modifications

The water rights modifications of the Proposed Project would not directly result in construction or operation of new facilities and would not 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. However, the water rights modifications could directly impact residual stream flows (i.e., flows downstream of the City's diversions). In the event that stream diversions resulted in a substantial decrease in stream flows or Loch Lomond Reservoir levels, water quality impacts could occur, including increased temperature due to shallower water, and altered salinity, dissolved oxygen, and pH concentrations.

As indicated Section 4.8.3.2, Analytical Methods, the City has utilized a modeling system comprised of a hydrologic model, a water supply model, and a biological effects model to both refine and analyze the Proposed Project. See Appendix D for a detailed description of these models. Based on this modeling, Figure 4.8-10 and Figure 4.8-11 provide the average monthly residual flows below each of the City's diversions based on an average of all years and an average of critically dry years in the historical record (1936 to 2015). This information is provided for the San Lorenzo River at the Felton Diversion and Tait Diversion, Newell Creek at the Newell Creek Dam, and the North Coast stream diversions at Laguna Creek, Liddell Spring, and Majors Creek. Figure 4.8-10 and Figure 4.8-11 indicate that the difference in residual flows with the Proposed Project would be minimal relative to 2018 baseline conditions, with the exception of critical year residual flows in Newell Creek. In that case, the Proposed Project would result in an increase in residual flows of approximately 1 cfs relative to the baseline. Additionally, Appendix D-2, Attachment 1, Residual Flow Exceedance Curves, provides more detailed month-by-month information, which indicates that Proposed Project residual stream flows would result in some incremental differences (both higher and lower) than under 2018 baseline conditions, including during critically dry years.

The Proposed Project would increase Loch Lomond Reservoir levels as shown in Table 4.8-5, which indicates that the reservoir would spill more frequently, based on an average of all years in the historical record. Operation of the Loch Lomond Reservoir (reservoir spill and the existing required 1 cfs fish release) is the only City activity associated with the Proposed Project that has the potential to influence water temperatures (see Appendix D-3). Reservoir spilling in late spring and summer will increase somewhat with the Proposed Project (see Table 4.8-5), which can increase water temperatures below the Newell Creek Dam in Newell Creek because the reservoir spills are from the reservoir surface, which are warmer, particularly as the temperatures warm in the spring and early summer. Under Operational Practice #6, as described in Section 4.8.3.2, Analytical Methods, when the reservoir is spilling during late spring and summer the City will release additional cooler flow through the fish release below the dam, when needed to offset the potential warming effects of reservoir spills below Newell Creek Dam at that time of the year.

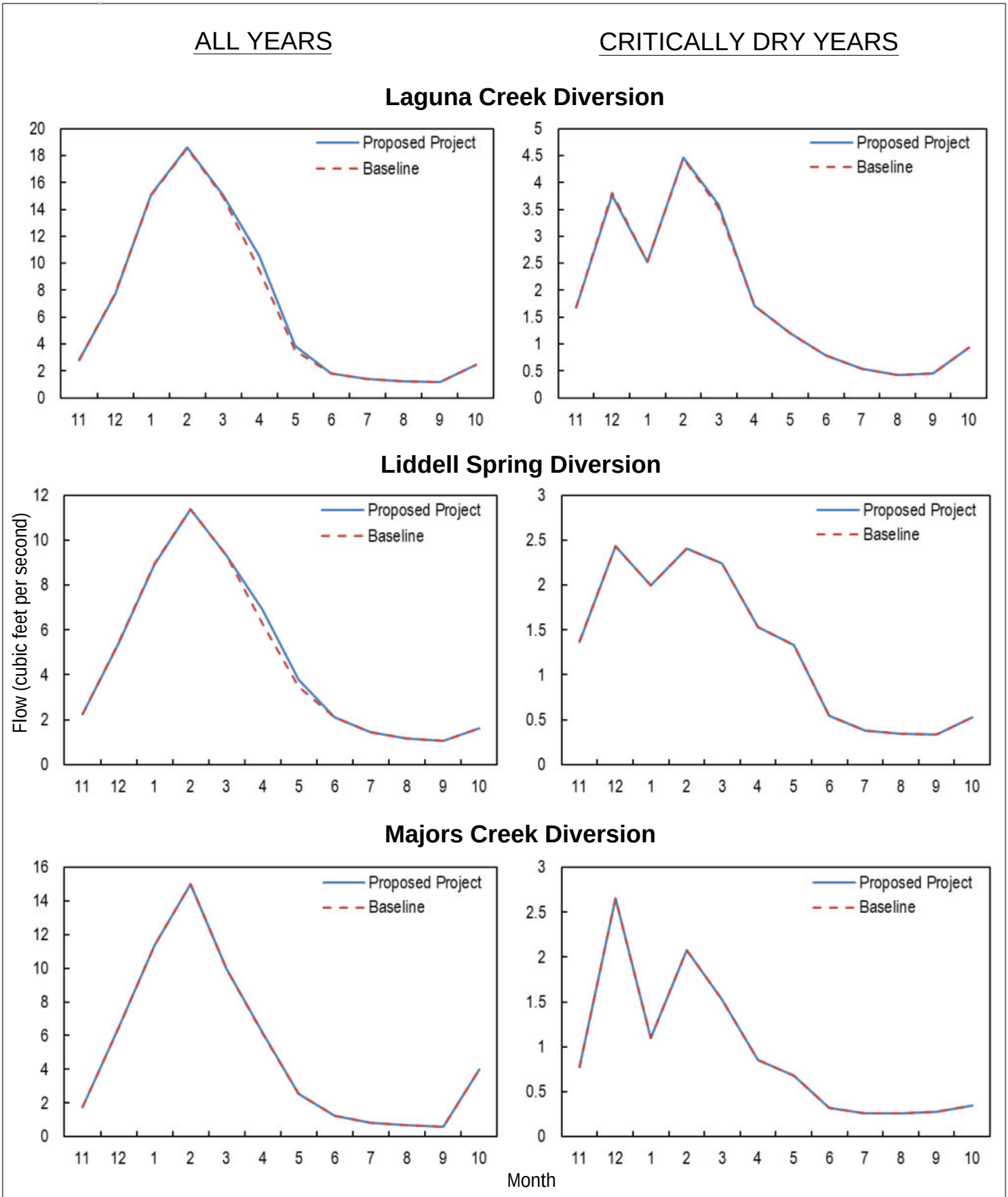


Note: Based on an average of all years and critically dry years in the historical record (1936 to 2015).

SOURCE: Gary Fiske and Associates 2021b

FIGURE 4.8-10

Average Monthly Residual Flows at Felton and Tait Diversions and Newell Creek Dam



Note: Based on an average of all years and critically dry years in the historical record (1936 to 2015).

SOURCE: Gary Fiske and Associates 2021b

FIGURE 4.8-11

Average Monthly Residual Flows at Laguna Creek, Liddell Spring, and Majors Creek Diversions

DUDEK

Table 4.8-5. Percent of Days that Loch Lomond Reservoir Spills

Month	2018 Existing Conditions	Proposed Project Conditions
Jan	41.4%	53.4%
Feb	60.3%	70.4%
Mar	68.6%	80.0%
Apr	64.5%	76.1%
May	48.8%	76.5%
Jun	18.9%	37.8%
Jul	0.0%	3.6%
Aug	0.0%	0.1%
Sep	0.0%	0.0%
Oct	0.0%	0.0%
Nov	1.5%	4.5%
Dec	14.8%	31.4%

Source: Gary Fiske and Associates 2021b.

Therefore, this project component of the Proposed Project would not substantially alter the existing drainage patterns of the City's surface water sources such that potentially adverse water quality impacts would result. Additionally, as Newell Creek Dam does not function as a flood control impoundment, an increase in Loch Lomond Reservoir levels and spill frequency would not cause downstream flooding. Therefore, this project component would have a less-than-significant direct impact.

The following analysis evaluates the potential indirect impacts related to alteration of drainage patterns as a result of the proposed water rights modifications, that once approved could result in the implementation of the project and programmatic infrastructure components of the Proposed Project.

Infrastructure Components

The project and programmatic infrastructure components that could substantially alter the existing drainage patterns of the site or area are the new facilities that would result in new impervious surfaces, including the new ASR facilities and the new pump stations associated with the City/SVWD intertie and the City/SqCWD/CWD intertie, which are further described below.

The proposed upgrades to Beltz ASR facilities, the McGregor pump station upgrade, and the Felton Diversion and Tait Diversion and Coast Pump Station improvements would not result in a net increase in impervious surfacing given that these sites are already developed and paved. Additionally, once installed, the City/SVWD intertie pipeline and the City/SqCWD/CWD intertie pipeline would be located underground or within existing bridge crossings (i.e., Porter Street bridge crossing of Soquel Creek) and would not result in a net increase in paving or pipeline installation beneath riverbeds. Therefore, the Beltz ASR facilities, intertie pipelines, the McGregor pump station upgrade, and the Felton Diversion and Tait Diversion and Coast Pump Station improvements would not result in substantial erosion or siltation on- or off-site; substantially increase in the rate or amount of surface runoff in a manner which would result in flooding on-or offsite; 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 and these components would result in a less-than-significant impact.

See Impact HYD-1 for construction and operational surface water quality impacts that are not related to alteration of existing drainage patterns.

New ASR Facilities

The Proposed Project includes the City installing and operating new ASR facilities within the Santa Cruz Mid-County Groundwater Basin, and in the Santa Margarita Groundwater Basin. New ASR facilities would be similar to some of the existing Beltz 8, 9, 10, and 12 facilities, as shown on Figures 3-4a through 3-4d in Chapter 3, Project Description. Following grading and construction, the new ASR facility sites would be paved. Assuming the existing sites for new ASR facilities are unpaved, an increase in impervious surfaces with this programmatic component would result in increased stormwater runoff rates, which in turn could result in off-site erosive scour, sedimentation or additional sources of polluted water in down-gradient water bodies, and potentially off-site flooding due to exceedance of existing storm drain capacity.

However, new ASR facilities would be constructed consistent with the City comprehensive SWMP and stormwater regulations, as it is assumed that these facilities would be owned and operated by the City. As discussed in Section 4.8.2, Regulatory Framework, the City has developed a comprehensive SWMP to fulfill the requirements for the NPDES MS4 General Permit and to reduce the amount of pollutants discharged in urban runoff. The SWMP is a comprehensive program to reduce the amount of pollutants discharged in urban runoff and to improve and protect water quality. Additionally, Title 24 of the City of Santa Cruz Municipal Code includes provisions to ensure that new developments or remodeled sites are designed and constructed in a manner that limits alteration of drainage patterns, prevents erosion, and minimizes long-term impacts on water quality. These provisions include requirements that a drainage plan be submitted for projects, when existing drainage patterns would be altered by new construction. In addition, the ordinance requires that stormwater runoff resulting from project development be minimized, and if a proposed project includes the discharge of runoff into a natural watercourse, the drainage plan shall include methods to safeguard or enhance the existing water quality. Devices such as detention basins, percolation ponds, or sediment traps may be required by the City, where appropriate or as specified in an adopted plan or wetlands management plan. Provisions pertaining to erosion control include requirements that a site development be fitted to the topography and soil to create the least potential for erosion and that vegetation removal is limited. In addition, Chapter 16.19 of the City's Municipal Code, the City Stormwater and Urban Runoff Pollution Control ordinance, prohibits illicit connections and pollutant discharges to the City storm drain system and requires the implementation of BMPs.

Additionally, any City facility in the coastal zone of unincorporated Santa Cruz County would be required to comply with County LCP policies and related coastal ordinances in the County Code related to drainage, grading, and erosion control, which are contained in County Code Chapter 13.20 (Coastal Zone Regulations), Chapter 16.20 (Grading Regulations), and Chapter 16.22 (Erosion Control).

With compliance with local stormwater regulations, this programmatic component of the Proposed Project would not substantially alter the existing drainage pattern of the new ASR facility sites or areas, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or off-site; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or offsite; 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. Therefore, this programmatic component would have a less-than-significant impact.

Water Transfers and Exchanges and Intertie Improvements (New Pump Stations Only)

City/SVWD Intertie Pump Station. The City/SVWD intertie would require a new pump station on La Madrona Drive, near the intersection with Altenitas Road (see Figure 3-4e in Chapter 3, Project Description). This pump station would be constructed on relatively flat to gently sloping topography and would not substantially alter the drainage patterns of the area through the alteration of the course of a stream or river. However, the pump station could increase runoff associated with new paving as this site is currently undeveloped, which could cause associated erosion, contribution of runoff water which would exceed the capacity of drainage systems or result in substantial additional sources of polluted runoff.

Given that this facility is located outside of the coastal zone and is a water infrastructure facility exempt from local ordinances under California Government Code 53091 (d) and (e) (see Section 4.8.2, Regulatory Framework), the City of Scotts Valley's drainage design standards would not apply and these impacts would be potentially significant if the facilities are not properly designed.

Implementation of MM HYD-3 would avoid substantial erosion or siltation on- or off-site; substantial increases in the rate or amount of surface runoff; substantial additional sources of polluted runoff; or impeding or redirecting flood flows by requiring that: post-construction stormwater runoff rates be equal to or less than under existing conditions, to prevent off-site erosion, flooding, and exceedance of existing stormwater drainage capacities; and pollutants in stormwater runoff are minimized. Therefore, with the implementation of this mitigation measure, the impact of the new pump station element of this programmatic component related to alteration of drainage patterns would be reduced to a less-than-significant level.

City/SqCWD/CWD Intertie Pump Stations. The City/SqCWD/CWD intertie would require two new pump stations on Freedom Boulevard and Valencia Drive (see Figure 3-4g in Chapter 3, Project Description). These pump stations would be constructed on relatively flat to gently sloping topography and would not substantially alter the drainage patterns of the area through the alteration of the course of a stream or river. The pump stations could increase runoff associated with new paving as these sites are currently undeveloped, which could cause associated erosion, contribution of runoff water which would exceed the capacity of drainage systems or result in substantial additional sources of polluted runoff.

Given that these facilities are located outside of the coastal zone and are water infrastructure facilities exempt from local ordinances under California Government Code 53091 (d) and (e) (see Section 4.8.2, Regulatory Framework), the County of Santa Cruz's drainage, grading, and erosion control ordinances would not apply and these impacts would be potentially significant if the facilities are not properly designed.

Implementation of MM HYD-3 would avoid substantial erosion or siltation on- or off-site; substantial increases in the rate or amount of surface runoff; substantial additional sources of polluted runoff; or impeding or redirecting flood flows by requiring that: post-construction stormwater runoff rates be equal to or less than under existing conditions, to prevent off-site erosion, flooding, and exceedance of existing stormwater drainage capacities; and pollutants in stormwater runoff are minimized. Therefore, with the implementation of this mitigation measure, the impact of the new pump station elements of this programmatic component related to alteration of drainage patterns would be reduced to a less-than-significant level.

Mitigation Measures

Implementation of the following mitigation measure would reduce potentially significant impacts related to alteration of drainage patterns of the Proposed Project, as described above, to a less-than-significant level.

MM HYD-3: **Drainage Improvements (Applies to City of Santa Cruz/Scotts Valley Water District Intertie Pump Station and City of Santa Cruz/Soquel Creek Water District/Center Water District New Intertie Pump Stations).** Final pump station designs shall include Low Impact Development features, which would: (1) reduce post-construction stormwater runoff rates to be less than or equal to existing conditions, for a 24-hour, 25-year storm event; and (2) minimize off-site runoff of stormwater pollutants through filtration features, such oil-water separators, vegetated swales, and bioretention basins. These features shall be inspected monthly to ensure functionality.

Impact HYD-4: **Flood, Tsunamis, and Seiche Zones (Significance Standard D).** Construction and operation of the Proposed Project in flood hazard, tsunami, or seiche zones would not risk release of pollutants due to project inundation. ***(Less than Significant)***

Water Rights Modifications

The water rights modifications of the Proposed Project would not directly result in construction or operation of new facilities and would not (in flood hazard, tsunami, or seiche zone) risk release of pollutants due to project inundation. Therefore, this project component would have no direct impacts.

The following analysis evaluates the potential indirect impacts related to floods, tsunamis, and seiches as a result of the proposed water rights modifications, that once approved could result in the implementation of the project and programmatic infrastructure components of the Proposed Project.

Infrastructure Components

Aquifer Storage and Recovery

New ASR Facilities. To protect the long-term integrity of new ASR facilities, such facilities would not be constructed in a flood, tsunami, or flood zone. As a result, new ASR facilities would not risk release of pollutants due to project inundation. Therefore, this programmatic component would have no impacts.

Beltz ASR Facilities. None of the Beltz ASR facilities are in flood zones; therefore, any facility improvements would not be subject to risk of pollutants due to inundation. Therefore, this project component would have no impacts.

Water Transfers and Exchanges and Intertie Improvements

The proposed City/SVWD intertie and the City/SqCWD/CWD intertie facilities would not traverse any creeks or flood zones. Although the Soquel Village pipeline would traverse Soquel Creek, the pipeline would be located either above or below the existing creek. If above the creek, it would be located within or attached to the existing Porter Street bridge crossing. Tunneling would be used if the pipeline would be located below the existing creek. Either way, the pipeline would therefore not impact flood levels.

As a result, operation of these interties would not result in risk of pollutants due to inundation. Therefore, this programmatic component would have no impacts.

Felton Diversion, Tait Diversion, and Coast Pump Station Improvements

The Felton and Tait Diversion improvements would be completed within the 100-year flood zone of the San Lorenzo River. However, the proposed improvements would involve similar use of hazardous materials, as under existing conditions. As discussed in Section 4.7, Hazards, Hazardous Materials, and Wildfire, materials such as oil, grease, or degreasers would be used, stored, and disposed in accordance with all applicable state and local regulations. As a result, diversion improvements would not risk release of pollutants due to inundation. Therefore, this programmatic component would have less-than-significant impacts.

Mitigation Measures

As described above, the Proposed Project would not result in significant impacts related to flooding and risk of release of pollutants due to inundation, and therefore, no mitigation measures are required.

4.8.3.4 Cumulative Impacts Analysis

This section provides an evaluation of cumulative hydrology and water quality impacts associated with the Proposed Project and past, present, and reasonably foreseeable future projects, as identified in Table 4.0-2 in Section 4.0, Introduction to Analysis, and as relevant to this topic. The geographic area for the analysis of cumulative impacts related to hydrology and water quality consists of the cumulative project site watersheds and underlying groundwater basins.

Impact HYD-5: Cumulative Hydrology and Water Quality Impacts (Significance Standards A, B, C, D, and E). Construction and operation of the Proposed Project, in combination with past, present, and reasonably foreseeable future development, would not result in a significant cumulative impact related to hydrology and water quality. ***(Less than Significant)***

As shown in Table 4.0-2 in Section 4.0, there are 15 capital improvement projects, 6 other infrastructure projects, and 13 residential, commercial, or mixed-use projects identified within the study area. Additionally, development at the UCSC campus is proposed under the 2021 Long Range Development Plan (LRDP).

Surface Water Quality and Stormwater Runoff

The known cumulative projects planned within the geographic area of analysis for cumulative impacts related to surface water quality and stormwater runoff would be those projects located within the same watersheds as the project and programmatic components of the Proposed Project. Within the San Lorenzo River watershed, cumulative projects in the City Water Department Capital Improvement Program (CIP) include replacement of the entire Newell Creek Pipeline (NCP Rehab/Replacement Project), which runs from Loch Lomond Reservoir to the GHWTP and improvements at the GHWTP.[6] These two projects were included in the project modeling as these planned upgrades are being pursued independently of the Proposed Project, but would be a component of the future conditions that would exist with the Proposed Project. Therefore, the modeling results and associated operational impact conclusions presented in Impact HYD-3 reflect the NCP Rehab/Replacement and GHWTP projects. The only other known cumulative projects that could affect conditions in the San Lorenzo River are the Conjunctive Use Plan for the San Lorenzo River Watershed (Conjunctive Use Plan) and the San Lorenzo River Lagoon

[6] Two other City CIP projects include the Felton Diversion Pump Station Assessment and the River Bank Filtration Study; however, these were not included in the cumulative analysis given that they are studies and improvements have not yet been identified.

Culvert Project. The Conjunctive Use Plan to increase stream baseflow for fish and increase reliability of surface and ground water supplies for the SLVWD would include water rights changes, use of existing interties to move water between service areas, use of SLVWD's Loch Lomond Reservoir water rights, and injection of excess surface water during wet periods and extraction of groundwater during dry periods in the Olympia area. The San Lorenzo River Lagoon Culvert Project would install a water-level control structure —a passive, head-driven culvert (pipe drain) system—in the San Lorenzo River lagoon at the mouth of the San Lorenzo River, which would provide a stabilized water elevation determined to protect habitat for salmonids and tidewater goby and to lessen localized flooding. As the Proposed Project and these two cumulative projects are intended to improve conditions in the San Lorenzo River for fish by improving or controlling river water levels or baseflows, they would result in beneficial cumulative impacts during operation related to surface water quality in the San Lorenzo River watershed.

Potential soil erosion from all cumulative project sites could combine to cause potentially significant cumulative water quality impacts due to sedimentation of downstream water bodies. Cumulative development and redevelopment within the watersheds identified for the cumulative projects would potentially result in short-term erosion related impacts during construction and long-term erosion related to denuded soil, improper drainage, and lack of erosion control features at each cumulative project site. Similarly, incidental spills of petroleum products and hazardous materials during construction at each cumulative project site could occur during construction, resulting in cumulative water quality impacts. However, short-term and long-term erosion BMPs and spill control BMPs would be employed at each site consistent with NPDES stormwater quality regulations, including the Construction General Permit and local MS4 permits.

Cumulative project grading, construction, and operation for City facilities would be completed consistent with stormwater regulations established by the City of Santa Cruz and the County of Santa Cruz where facilities could be located in the coastal zone. As discussed in Section 4.8.2, Regulatory Framework, the City of Santa Cruz has developed a comprehensive SWMP to fulfill the requirements for the MS4 General Permit and to reduce the amount of pollutants discharged in urban runoff. In addition, the City Stormwater and Urban Runoff Pollution Control ordinance established the legal authority to require BMPs to be maintained in full force and effect throughout the life of a project. The City of Santa Cruz Municipal Code includes provisions to ensure that new developments or remodeled sites are designed and constructed in a manner that limits alteration of drainage patterns, prevents erosion, and minimizes long-term impacts on water quality. These provisions include requirements that a drainage plan be submitted for projects, both large and small, when existing drainage patterns would be altered by new construction. In addition, the ordinance requires that stormwater runoff resulting from project development be minimized, and if a proposed project includes the discharge of runoff into a natural watercourse, the drainage plan shall include methods to safeguard or enhance the existing water quality. Devices such as detention basins, percolation ponds, or sediment traps may be required by the City, where appropriate or as specified in an adopted plan or wetlands management plan. Provisions pertaining to erosion control include requirements that a site development be fitted to the topography and soil to create the least potential for erosion.

Other non-City cumulative projects would be required to comply with local stormwater regulations during cumulative project construction and operation related to stormwater quality, alteration of drainages, and increased runoff, as established in the local ordinances during cumulative project construction and operation. Additionally, UCSC development under the 2021 LRDP would be required to comply with UCSC Post-Construction Requirements which require compliance with SWRCB Phase II NPDES requirements to manage peak flow rates and reduce sediment flow in the LRDP area (UCSC 2021). Therefore, the Proposed Project, in combination with past, present, and reasonably foreseeable future projects, would result in less-than-significant cumulative impacts related to surface water quality and stormwater runoff within the San Lorenzo River, Liddell Creek, Laguna Creek, Majors Creek, Arana Gulch/Rodeo Creek Gulch, Soquel Creek, and Aptos Creek Watersheds.

Groundwater

The known cumulative projects planned within the geographic area of analysis for cumulative impacts related to groundwater would be those projects located within the same groundwater basins as those project and programmatic components involving groundwater injection and/or extraction, including: Beltz 10 and 11 Rehab and Development, Pure Water Soquel, and Conjunctive Use Plan. The Beltz 10 and 11 Rehab and Development would include rehabilitation of Beltz 10 and the conversion of an existing monitoring well to a production well at Beltz 11. This project will shift pumping to different geologic layers of the Santa Cruz Mid-County Groundwater Basin. Pure Water Soquel would supplement natural recharge of the Santa Cruz Mid-County Groundwater Basin with purified water produced from a new tertiary treatment facility sited at the Santa Cruz Wastewater Treatment Facility and delivered to an advanced water treatment facility located in Live Oak in unincorporated Santa Cruz County. As described above, the Conjunctive Use Plan would provide for in-lieu recharge to the Santa Margarita groundwater aquifers, and injection of excess surface water during wet periods and extraction of groundwater during dry periods in the Olympia area. Recharge of groundwater aquifers would also occur with new ASR facilities and Beltz ASR facilities as part of the Proposed Project. Additionally, to the extent that water transfers as part of the Proposed Project occur on a regular basis and allow neighboring water agencies to rest their groundwater wells, such transfers could have a beneficial impact on groundwater conditions in the Santa Cruz Mid-County Groundwater Basin and the Santa Margarita Groundwater Basin.

Future groundwater extraction from Beltz 11, implementation of Pure Water Soquel, and implementation of the Conjunctive Use Plan for the San Lorenzo River Watershed would be completed in compliance with the Santa Cruz Mid-County Groundwater Basin GSP, or the pending Santa Margarita GSP, as relevant. As discussed for Impact HYD-2, operation of the new ASR facility and Beltz ASR facility injections and extractions anticipated by the Proposed Project in the Santa Cruz Mid-County Groundwater Basin would be consistent with the sustainable management criteria in the adopted Santa Cruz Mid-County Groundwater Basin GSP. In addition, with the implementation of MM HYD-1 and MM HYD-2, ASR operations would avoid any undesirable results related to groundwater quality, lowering of groundwater levels, groundwater recharge, change in groundwater storage, subsidence, or depletion of interconnected surface water as identified in the GSP. Potential new ASR facilities, Beltz ASR facilities and Pure Water Soquel would cumulatively contribute to restoration of the Santa Cruz Mid-County Groundwater Basin, per the GSP (MGA 2019) and ASR would also contribute to protecting the basin from seawater intrusion in support of the proposed water quality beneficial use identified in Section 3.4.2, Water Rights Modifications. Similarly, it is likely that the Conjunctive Use Plan, potential new ASR facilities in the Santa Margarita Groundwater Basin and other future projects identified in the pending Santa Margarita GSP, if pursued, would contribute to restoration of that basin. Therefore, based on compliance with the Santa Cruz Mid-County Groundwater Basin GSP and the pending Santa Margarita Groundwater Basin GSP, including the associated groundwater monitoring programs, cumulative projects related to groundwater listed above would not result in undesirable effects related to groundwater quality, lowering of groundwater levels, groundwater recharge, change in groundwater storage, subsidence, or depletion of interconnected surface water. Similarly, these cumulative projects would not result in conflict with a water quality control plan or groundwater sustainability plan. Conversely, aquifer recharge related to these cumulative projects would result in beneficial cumulative impacts related to groundwater supply and groundwater quality.

Flooding

The known cumulative projects planned within the geographic area of analysis for cumulative impacts related to flooding would be those projects located within the same watersheds as those project and programmatic infrastructure components that are also located within a 100-year floodplain, including the following projects along the San Lorenzo River: Newell Creek Dam Inlet/Outlet Replacement Project, NCP Rehab/Replacement Project, Main

Replacements, and the San Lorenzo River Lagoon Culvert Project. The Newell Creek Dam Inlet/Outlet Replacement Project would replace the existing aging inlet/outlet works at the Newell Creek Dam and replace the northern segment of the NCP that transports water to/from the Reservoir and the GHWTP. As described above, the NCP Project would replace the remaining portion of the Newell Creek Pipeline to GHWTP. The Main Replacements would replace distribution system water mains that may be constructed within flood zones coinciding with watersheds in the study area located in 100-year floodplains. As described above, the San Lorenzo River Lagoon Culvert Project would lessen localized flooding in the San Lorenzo River lagoon at the mouth of the San Lorenzo River.

As discussed in Impact HYD-4, the Felton and Tait Diversion improvements would be completed within the 100-year flood zone of the San Lorenzo River. Although these programmatic components and cumulative projects identified above would be located within designated 100-year floodplains, construction and operation of these facilities would not increase the risk of downstream flooding, as no proposed structures would impede flooding and increase downstream flood flows. Additionally, any materials such as oil, grease, or degreasers that would continue to be used, stored, and disposed of during diversion operations would occur in accordance with all applicable state and local regulations and as a result, would not risk release of pollutants due to inundation.

Additionally, within the study area the 13 residential, commercial, or mixed-use projects identified and development at the UCSC campus proposed under the 2021 Long Range Development Plan could alter drainage patterns and increase the rate or amount of surface runoff, which could exceed the capacity of stormwater drainage systems, resulting in flooding on or off-site of these locations. However, as indicated above, the non-UCSC cumulative projects would be required to comply with local stormwater regulations during cumulative project construction and operation and UCSC 2021 LRDP development would be required to comply with UCSC Post-Construction Requirements which require compliance with SWRCB Phase II NPDES requirements to manage peak flow rates in the LRDP area. Therefore, the Proposed Project, in combination with past, present, and reasonably foreseeable future projects, would result in less-than-significant cumulative impacts related to flooding.

4.8.4 References

Central Coast RWQCB (Regional Water Quality Control Board). 2017. *Water Quality Control Plan for the Central Coastal Basin.* September 2017 Edition. Accessed November 28, 2020 at https://www.waterboards.ca.gov/centralcoast/publications_forms/publications/basin_plan/docs2017/2017_basin_plan_r3_complete.pdf.

City of Santa Cruz. 2011. *Draft Environmental Impact Report, City of Santa Cruz General Plan 2030*. September 2011. Accessed November 27, 2020 at https://www.cityofsantacruz.com/home/showpublisheddocument?id=22471.

City of Santa Cruz Water Department. 2013. *Draft Watershed Lands Management Plan, Newell, Zayante & Laguna Creek Tracts*.

City of Santa Cruz. 2016. *2015 Urban Water Management Plan*. August 2016. Prepared by City of Santa Cruz Water Department. Accessed November 27, 2020 at https://www.cityofsantacruz.com/home/showpublisheddocument?id=55168.

City of Santa Cruz. 2021a. City of Santa Cruz Production Wells Ammonia Data 2014-Current.

City of Santa Cruz. 2021b. *Draft City of Santa Cruz Draft Anadromous Salmonid Habitat Conservation Plan for the Issuance of an Incidental Take Permit under Section 10(a)(1)(B) of the Endangered Species Act.* Prepared by City of Santa Cruz Water Department, Ebbin Moser + Skaggs LLP, Hagar Environmental Science, Gary Fiske and Associates, Balance Hydrologics, Inc., and Alnus Ecological. April.

City of Santa Cruz and SLVWD (City of Santa Cruz Water Department and San Lorenzo Valley Water District). 2018. *San Lorenzo River and North Coast Watersheds Sanitary Survey Update*. February 2018. Accessed November 28, 2020 at https://www.cityofsantacruz.com/home/showdocument?id=70464.

Corona Environmental Consulting. 2020. *Soquel Creek Water District: O'Neill Ranch Well Ammonia Mitigation Strategies, Phase 1 Data Review and Alternatives Analysis Memorandum*. March 30, 2020.

County of Santa Cruz. 2014. *Santa Cruz Integrated Regional Water Management Plan*. July 2014. Prepared by County of Santa Cruz, Health Services Agency, Environmental Health Division, Water Resources Program. Accessed November 27, 2020 at https://drive.google.com/file/d/0B6HSltdu_eBkZDhLLURyeTl5ZTA/view.

DWR (California Department of Water Resources). 2020a. SGMA Data Viewer. Online web map service. Accessed September 15, 2020 at https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer.

DWR. 2020b. Well Completion Report Map Application and Data Download. Accessed September 15, 2020 at https://dwr.maps.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37.

DWR. 2021. Letter from DWR with Statement of Findings Regarding the Approval of the Santa Cruz Mid-County Basin Groundwater Sustainability Plan. Accessed June 3, 2021 at https://sgma.water.ca.gov/portal/gsp/assessments/11.

FEMA (Federal Emergency Management Agency). 2020. "FEMA Flood Map Service Center: Search By Address." Accessed November 28, 2020 at https://msc.fema.gov/portal/search#searchresultsanchor.

Gary Fiske and Associates. 2021a. Beltz ASR Capacity Information. February 4, 2021.

Gary Fiske and Associates. 2021b. Water Supply Modeling Tabular Results with Historic Hydrology. May 19, 2021.

Hydro Metrics. 2015a. *Caudle Well Baseline Assessment, February 13 to November 18, 2014, O'Neill Ranch Private Well Monitoring and Mitigation Program*. June 2015.

Hydro Metrics. 2015b. *Curtiss Well Baseline Assessment, February 12 to November 18, 2014, O'Neill Ranch Private Well Monitoring and Mitigation Program*. June 2015.

Hydro Metrics. 2015c. *Jauhul Well Baseline Assessment, February 12 to November 18, 2014, O'Neill Ranch Private Well Monitoring and Mitigation Program*. June 2015.

Hydro Metrics. 2015d. *Silverberg Well Baseline Assessment, March 7 to November 18, 2014, O'Neill Ranch Private Well Monitoring and Mitigation Program*. June 2015.

Hydro Metrics. 2015e. *Walters Well Baseline Assessment, February 12 to November 18, 2014, O'Neill Ranch Private Well Monitoring and Mitigation Program*. June 2015.

Kennedy/Jenks Consultants. 2016. *2015 Urban Water Management Plan*. Prepared for the Scotts Valley Water District. June 2016.

Marina, A. 2017, "Seawater Intrusion and How to Prevent It". Accessed April 13, 2021 at https://thewaternetwork.com/_/hydrogeology-and-groundwater-remediation/article-FfV/seawater-intrusion-and-how-to-prevent-it-9-v0CjLpQrXlcT6z5RWC5w.

MGA (Santa Cruz Mid-County Groundwater Agency). 2019. *Santa Cruz Mid-County Groundwater Basin Groundwater Sustainability Plan.* November 2019. Accessed June 11, 2020 at https://www.soquelcreekwater.org/sites/default/files/documents/Reports/SC_MGA_GSP_Combined-12-2-19.pdf.

Montgomery & Associates. 2019a. *Caudle Well, Restrictive Effects Assessment through December 2019, O'Neill Ranch Private Well Monitoring and Mitigation Program*, July 2019.

Montgomery & Associates. 2019b. *Greenbrae Water Group Well, Restrictive Effects Assessment through December 2019, O'Neill Ranch Private Well Monitoring and Mitigation Program*, July 2019.

Montgomery & Associates. 2019c. *Jauhul Well, Restrictive Effects Assessment through December 2019, O'Neill Ranch Private Well Monitoring and Mitigation Program*, July 2019.

Montgomery & Associates. 2019d. *Silverberg Well, Restrictive Effects Assessment through December 2019, O'Neill Ranch Private Well Monitoring and Mitigation Program*, July 2019.

Montgomery & Associates. 2019e. *Walters Well, Restrictive Effects Assessment through December 2019, O'Neill Ranch Private Well Monitoring and Mitigation Program*, July 2019.

Oude Essink, G.H. 2001. *Salt Water Intrusion in a Three-Dimensional Groundwater System in the Netherlands: A Numerical Study*. In Transport in Porous Media Volume 43, page 137-158. Accessed April 13, 2021 at https://link.springer.com/article/10.1023/A:1010625913251.

Pueblo Water Resources. 2020. *Summary of Operations, Beltz 12 ASR Pilot Test Project, Santa Cruz ASR Project, Phase 2 Feasibility Investigation*. Prepared for Santa Cruz Water Department, June 2020.

SMGWA (Santa Margarita Ground Water Agency). 2020. "About Us and Background." Accessed November 2019 at https://smgwa.org/agency/about/.

SVWD (Scotts Valley Water District). 2020. "Santa Margarita Groundwater Basin." Accessed December 10, 2020 at https://www.svwd.org/about-your-water/santa-margarita-groundwater-basin

SqCWD (Soquel Creek Water District). 2016. "Primary Problem: Seawater Intrusion". Accessed April 13, 2021 at https://www.soquelcreekwater.org/our-water/primary-problem-seawater-intrusion. SqCWD. 2018. *Request for Temporary Waiver of NSF 60 Maximum Use Limit, Sodium Hypochlorite 12.5%, O'Neill Ranch Well and Water Treatment Plant (WTP), Soquel Creek Water District, System No. 4410017.* Prepared for the State Water Resources Control Board, Division of Drinking Water (DDW), October 29, 2019.

UCSC (University of California, Santa Cruz). 2021. Draft Environmental Impact Report for the University of California, Santa Cruz Long Range Development Plan. State Clearinghouse No. 2020029086. January 2021. Prepared by Ascent Environmental, Inc.

USGS (United States Geological Survey). 2020. "Areas of Land Subsidence in California." Accessed August 22, 2020 at https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html.

INTENTIONALLY LEFT BLANK