4.5 WATER SUPPLY

4.5.1 ENVIRONMENTAL SETTING

IN THIS SECTION:

- Regulatory Setting
- City Water Service Area
- Water Service System
- Water Demand in Service Area
- Water Supply Limitations
- Water Supply Planning & Adopted Plans

REGULATORY SETTING

State Regulations

Drinking water is regulated by a number of federal and state law. The federal government sets minimum standards for the protection of water quality, including for drinking water and environmental protection. The Safe Drinking Water Act (SDWA) of 1974 and subsequent amendments gave the EPA the authority to set standards for contaminants in drinking water supplies. The National Primary Drinking Water Standards establish the maximum contaminant levels (MCLs) allowed in public distribution systems. The National Secondary Drinking Water Standards establish the MCLs that apply to potable water supplies at the point of delivery to the customer. The EPA administers the SDWA at the federal level and establishes MCLs for bacteriological, inorganic, organic and radiological contaminants (U.S. Code Title 42, and Code of Federal Regulations Title 40). The California Environmental Protection Agency (Cal EPA) administers and enforces the drinking water program and has adopted its own SDWA, which incorporates the federal SDWA requirements, including some requirements specific only to California (California Health and Safety Code, Section 116350 and related sections).

The California Office of Environmental Health Hazard Assessment (OEHHA) has initiated evaluation for several chemicals for which new MCLs have been promulgated by the EPA, which triggers a requirement that OEHHA prepare a Public Health Goal (PHG) designed to define the level of pollutant at which no adverse health effect is expected to occur. PHG levels are concentrations of chemicals in drinking water that are not anticipated to produce adverse health effects following long-term exposures. These goals are advisory but must be used as the health basis to update the state's primary drinking water standards (MCLs) by the California Department of Public Health (DPH) (Health and Safety Code, Section 116365(b)(1). In addition, re-review, as required by Health and Safety Code Section 116365(e)(1), has been initiated for chemicals for which initial PHGs were published in 1997 and 1999. Risk assessments have been initiated for the chemicals, a few of which are listed below that are newly regulated:

- Bromate,
- Chlorite,

- Haloacetic acid, and
- Nitrosodimethylamine (NDMA).

Pursuant to State Water Code requirements, water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet (approximately 980 million gallons) of water annually must prepare and adopt an urban water management plan (UWMP) and update it every five years. The Act requires water agencies to evaluate and describe their water resource supplies and projected needs over a 20-year planning horizon, and to address a number of related subjects including water conservation, water service reliability, water recycling, opportunities for water transfers, and contingency plans for drought events (City of Santa Cruz Water Department, February 2006). The City adopted its *2005 Urban Water Management Plan* (UWMP) in February 2006 as further discussed below in the "Water Supply Planning & Adopted Plans" subsection. In accordance with state law, the City is currently updating the UWMP, for planned adoption in Fall 2011.

In 2001, Senate Bill (SB) 610 amended California law regarding review of water availability for large projects (Section 10910 et seq. of the Water Code, Section 21151.9 of the Public Resources Code [CEQA] and Section 15155 of the State CEQA Guidelines). Pursuant to SB 610, the preparation of a "water supply assessment" (WSA) is required for projects subject to CEQA that meet specified criteria regarding project size (e.g., for projects of 500 or more residential units, 500,000 square feet or more of retail commercial space, 250,000 square feet or more of office commercial space, 500 or more hotel rooms, specified industrial uses, or a project that would result in a water demand equal to or greater than the amount needed to serve a 500-unit residential project). These assessments, prepared by "public water systems" responsible for service, address whether there are adequate existing or projected water supplies available to serve proposed projects over a 20-year period, in addition to existing demand and other anticipated development in the service area. Where a WSA concludes that insufficient supplies are available, the WSA must lay out steps that would be required to obtain the necessary supply. The content requirements for the assessment include, but are not limited to, identification of the existing and future water suppliers and quantification of water demand and supply by source in five-year increments over a 20-year projection for average normal, single-dry, and multiple-dry years. The absence of an adequate current water supply does not preclude project approval, but does require a lead agency to address a water supply shortfall in its project approval findings.

In February 2008, Governor Schwarzeneger introduced a comprehensive plan for improving the Sacramento-San Joaquin Delta with a key component intended to achieve a 20% reduction in per capita water use statewide by the year 2020. In November 2009, SB 7, The Water Conservation Act of 2009, was enacted, which directs urban water suppliers to calculate their baseline per capita water use and to set a 2020 water use target. Water agencies have until July 2011 to fulfill the mandate to calculate their baselines and reduction targets.

Pursuant to State law (Government Code section 56430), the Local Agency Formation Commission (LAFCO) is required to review all municipal services in the county once every five years. The Santa Cruz LAFCO completed and accepted its report in August 2005.

City Plans and Ordinances

The City of Santa Cruz has enacted several ordinances regarding water conservation. Title 16 of the City's Municipal Code addresses water, sewers and other public services. Chapter 16.01 identifies regulations and restrictions during declared times of water shortages. Chapter 16.02 sets forth water conservation provisions to prevent the waste or unreasonable use or method of use of water. Chapter 16.03 requires that plumbing fixtures be retrofitted with "low consumption plumbing fixtures"[1] in all residential, commercial and industrial buildings served by the City of Santa Cruz Water Department that use water in showers, toilets and urinals whenever a property is sold. Chapter 16.16 sets forth requirements for water-efficient landscaping and also is intended to comply with the California Government Code section 65591, et seq., the Water Conservation in Landscaping Act. The regulations are applicable to applicants for new, increased or modified water service within the City's water service area. On June 28, 2011, the City Council adopted Ordinance 2011-04 that amends the Municipal Code and adds a new section (16.08.065) to allow graywater use for irrigation. Graywater is wastewater that originates from showers, bathtubs, bathroom sinks and clothes washing machines.

Pursuant to Section 16.04 of the Municipal Code, the City currently imposes a "System Development Charge" (SDC) on all new connections or upsizing of existing meters, based on meter size. The charge is to pay for the new connection or additional demand's proportional share of the system expansion costs essential to provide water to the new or additional service. The fee is assessed at the time of connection to the water system, and is placed in a separate account that is used exclusively for:

(1) Payment for the City's future construction of specified facilities, or

(2) Reimbursement to developers who have been required or permitted to install such listed facilities which are oversized beyond that needed for the certain development and are subject to the terms of a reimbursement agreement with the City, or

(3) Payment for water conservation programs approved by the City Council which have the net effect of increasing the amount of water supply available for allocation to new connections.

CITY WATER SERVICE AREA

The City of Santa Cruz Water Department provides water service to an approximately 20-square-mile area that includes lands within existing City limits, the portion of UCSC that is within City limits, adjoining unincorporated areas of Santa Cruz County (including Live Oak and residential subdivisions along Graham Hill road), a small part of the City of Capitola and coastal agricultural lands outside City limits (City of Santa Cruz Water Department, February 2006). In November 2006, LAFCO adopted a water service boundary map for the City's service area that includes properties that are currently provided water service or are within the

[1] Section 16.03.030 defines "low consumption plumbing fixtures" as any showerhead rated to use a maximum of 2.5 gallons of water per minute, any toilet rated to use a maximum of 1.6 gallons per flush, and any urinal and associated flush valve rated to use a maximum of 1.0 gallon per flush.

City or County urban service areas (see Figure 4.5-1[2]). The City currently serves nearly 21,000 residential accounts, 2,200 commercial, industrial, institutional and municipal accounts, and 500 irrigation accounts (EKI, March 2011). In addition to domestic demand, the City supplies approximately 18 million gallons of water per year for agricultural uses along the North Coast outside of City limits.

The City of Santa Cruz Water Department is a municipal utility that is owned and operated by the City of Santa Cruz. The governing body for the Water Department is the City Council. A seven-member Water Commission advises the Council on policy matter involving operations and management of the water system. The Department operates financially as an enterprise in which all costs of running the system are paid by water rates, service charges, and related revenues. The Water Fund receives no tax or general fund revenues (City of Santa Cruz Water Department, February 2006).

WATER SERVICE SYSTEM

The City has four primary water sources that are described below. Major facilities include a 18-million-gallon per day (mgd) water treatment plant, several pump stations, 16 distribution reservoirs, and about 300 miles of water pipelines throughout the service area (City of Santa Cruz Water Department, February 2006).

Water Supply Sources

The City of Santa Cruz water system is comprised of four main sources of water supply:

- North Coast Sources;
- San Lorenzo River Diversions;
- Loch Lomond Reservoir; and
- Live Oak Wells.

NORTH COAST SOURCES

The North Coast sources consist of surface diversions from three coastal streams and a natural spring located approximately 6-8 miles northwest of downtown Santa Cruz. These sources are Liddell Spring, Laguna Creek, Reggiardo Creek and Majors Creek. The North Coast system has been in operation since the 1880s. The City has pre-1914 appropriative rights for surface diversion from Liddell Spring, Laguna Creek, Reggiardo Creek, and Majors Creek. As pre-1914 sources, the North Coast diversions are least affected by water rights limitations. Diversion from these sources is limited primarily by flows (City of Santa Cruz Water Department, February 2006), and more recently endangered species issues.

[2] All EIR figures are included in Chapter 7.0 at the end of the EIR (before appendices) for ease of reference as some figures are referenced in several sections.

SAN LORENZO RIVER DIVERSIONS

The San Lorenzo River is the City's largest water supply source, and the City diverts water from the San Lorenzo River at two locations: the Tait Street Diversion, near the City limits just north of Highway 1, and the Felton Diversion located about 6 miles upstream from the Tait Street Diversion. The City is the largest single user of water from the San Lorenzo River basin; however, three other water districts, several private water companies, and numerous individual property owners share the San Lorenzo River watershed as their primary source for drinking water supply (EKI, March 2011).

The main surface water diversion is located at Tait Street near the City limits just north of Highway 1. The Tait Street diversion is supplemented by two shallow, auxiliary wells located on the east side of the river, which are hydraulically connected to the river and tied to the City's appropriative rights for surface diversion. The other San Lorenzo River diversion is the Felton Diversion Station, which is an inflatable dam and intake structure built in 1974, located about six miles upstream from the Tait Street Diversion. Water is pumped from this diversion through the Felton Booster Station to Loch Lomond Reservoir. The facility is used to augment storage in the reservoir during dry years when natural inflow from Newell Creek is low (City of Santa Cruz Water Department, February 2006). Pursuant to current permits, this water must be diverted to the Loch Lomond Reservoir and cannot be sent directly to the Graham Hill water treatment plant. Thus, the City's ability to utilize water from the Felton Diversion is dependent on the volume of available storage in Loch Lomond Reservoir, and as a result, the Felton Diversion is operated only intermittently, as needed to augment storage in Loch Lomond Reservoir when natural inflow from Newell Creek to the reservoir is low. The Felton Diversion is typically is used during the winter months of dry years (EKI, March 2011).

The City has rights to divert up to 12.2 cubic-feet-per-second (cfs) year-round from the San Lorenzo River at the Tait Street Diversion and adjacent wells (State Water Resources Control Board [SWRCB] Permit 2738 and License 7200). During periods of high flow, water from the Felton Diversion Dam on the San Lorenzo River is pumped up to the Loch Lomond Reservoir for storage. Under the City's current SWRCB permits (Permit Nos. 16123 and 16601), the City may divert up to 977 MGY of water from the San Lorenzo River at the Felton Diversion between September and May (City of Santa Cruz Water Department, February 2006). The City's SWRCB permits for the Felton Diversion also restrict diversions based on minimum instream flow requirements. In order to protect fish habitat in the San Lorenzo River, diversions at Felton may occur only when instream flow exceeds the prescribed flow. These minimum average daily flow requirements for instream flow are 10 cfs in September, 25 cfs in October, and 20 cfs from November to May (Ibid.). After fish flow requirements are met, the City has rights to divert 7.8 CFS during September, and 20 CFS from October to May, to an annual maximum of 977 million gallons (Local Agency Formation of Santa Cruz County, June 2005).

LOCH LOMOND RESERVOIR

Loch Lomond Reservoir (also referred to as Newell Creek Reservoir in the City's operating permit) is located near the town of Ben Lomond in the Santa Cruz Mountains. Constructed in 1960, the reservoir collects water from the Newell Creek watershed and has a maximum capacity of 2,810 million gallons. In addition to the City, the San Lorenzo Valley Water District is entitled to receive a portion of the water stored in Loch Lomond (City of Santa Cruz Water Department, February 2006). The City and the San Lorenzo Valley Water District both have

rights to the water stored in the reservoir; the City's annual withdrawal limit is 1,042 million gallons.

LIVE OAK WELLS

Although groundwater constitutes only approximately 4% of the City's entire water supply, it has been a crucial component of the water system for meeting peak season demands and during periods of drought (City of Santa Cruz Water Department, February 2006). The groundwater supplies currently consist of four active wells in the unincorporated Live Oak area, referenced as the Beltz wells (No. 7, 8, 9 and 10). Beltz Wells No. 8 and No. 9 were installed in 1998 and began producing water for the City in 1999. Beltz Well No. 10 was installed in 2009. Beltz Well No. 7, installed in 1974, has poor yield. Well No. 4 is currently inactive.

Historically the City has produced groundwater in response to widely fluctuating hydrologic conditions with periods of little production during extremely wet years and periods of high production during drought conditions. Specifically, the City has operated its wells during a period of 150 to 200 days out of the year at a combined operational rate of about 1 mgd on average (City of Santa Cruz, February 2006). During the extended drought of 1987-1988, operation averaged a rate of 2 million gallons per day (mgd). In the City's Integrated Water Plan (IWP) Program DEIR, the City documented its planning goal of maintaining groundwater production into the future at the maximum rate of approximately 2 mgd (1,500 gpm) during drought conditions.

The City is actively pursuing replacement of Beltz Well 4. The loss of Beltz Well No. 4 has impacted the City's capacity to maintain a stable groundwater supply. The replacement for Well No. 4 (Beltz Well No. 12) is proposed on a vacant lot in Soquel to improve the reliability and flexibility of the City's groundwater well system and to locate the replacement well farther inland to protect the Purisima aquifer from the threat of saltwater intrusion (City of Santa Cruz, December 2010). Groundwater extracted from the proposed Beltz Well No.12 would be from the same zone of the Purisima aquifer as the existing Live Oak well field and Beltz Well No. 4 (Ibid).

The City's existing wells are located within the "West Santa Cruz Terrace Groundwater Basin" as defined by the California Department of Water Resources (EKI, March 2011). Water-bearing sediments within this basin consist of Pliocene Purisima Formation, Quaternary terrace deposits, and alluvium along the San Lorenzo River and other streams crossing the basin (Ibid.). Further description of the physical characteristics of the basin is included in Appendix D.

The water produced from the Live Oak Well system is derived from the Purisima Formation, which is the primary source of groundwater in the mid-Santa Cruz County region. Groundwater from the Purisima Formation is used by the City of Santa Cruz, the Soquel Creek Water District, Central Water District and numerous private wells. Total annual extraction from the Purisima aquifer by all pumpers is estimated at nearly 2,000 million gallons per year (MGY) of which the City produces approximately 167 MGY (8% of total) (City of Santa Cruz Water Department, February 2006). Groundwater level data collected over the past 15 years indicate that water levels across the Purisima Formation have been lowered by a combination of changes in recharge and the gradual increase in overall groundwater production from the aquifer. The City's adopted *Urban Water Management Plan* indicates that there is a potential

for saltwater intrusion to jeopardize the safe production of groundwater from the Purisima aquifer, but also notes that at this time, under normal operations, there appears to be no imminent threat of seawater intrusion and the State Department of Water Resources has not identified the basin as overdrafted or projected to be overdrafted (Ibid.).

The City has not prepared a groundwater management plan; however, a groundwater management plan was prepared by neighboring water districts (Soquel Creek Water District [SqCWD] and Central Water District [CWD]) that extract water from the Purisima Formation in adjacent groundwater basins in 1996 and updated in 2007. In 2005, the City entered into an agreement for groundwater management of the Soquel-Aptos area groundwater, along with the SqCWD, CWD, and the County of Santa Cruz). The goals of the agreement are to establish common basin management objectives, undertake joint research projects, and improve interagency coordination to assure the safe production and protect the quality of the underground resource (EKI, March 2011).

Facilities and Infrastructure

Major facilities include two water treatment plants, several pump stations and 16 distribution reservoirs storing approximately 15 million gallons of treated water. There are also about 300 miles of water pipelines throughout the service area (City of Santa Cruz Water Department, February 2006).

The City operates two water treatment facilities. All surface water is treated at the Graham Hill Water Treatment Plant, which currently has a capacity of approximately 18 million gallons per day (mgd). The 2-mgd Live Oak Water Treatment Plant treats groundwater to remove iron and manganese. Treated water from the Graham Hill plant flows to the Bay Street Reservoir and into the distribution system. Treated water from Live Oak is pumped directly into the distribution system (City of Santa Cruz, February 2006).

The City has 16 treated water storage reservoirs throughout the service area, with Bay Street Reservoir being the largest. In 2007, the City removed the former 35-million gallon reservoir due to age, deterioration, and safety issues. Two permanent 6-million gallon tanks will replace the former reservoir, constructed in two phases. . Temporary storage tanks are currently in place, and the first permanent tank is expected to be in operation sometime in the year 2013.[3]

The City's water system also includes: the 16-mile Coastal Transmission Main that pumps North Coast raw water to the Graham Hill treatment facility and the 9-mile Newell Creek Pipeline that carries water from Loch Lomond to the Graham Hill treatment plant. Additionally, the Felton Booster Pump Station is used to move water into and out of the Loch Lomond Reservoir. The Coast pump station, located next to the Tait Street Diversion, pumps raw water from the North Coast and San Lorenzo River sources to the Graham Hill Treatment Plant.

The City is in the process of implementing a long-term (10-20 year) rehabilitation and replacement program for its North Coast System pipelines and diversions. The 16-mile long

[3] The original reservoir design was significantly oversized for emergency purposes. The capacity has been downsized in order to meet water quality requirements (e.g., how long treated water can be stored), but still meets demand and safety requirements.

North Coast System (NCS) includes five distinct pipeline reaches, and over half of the conveyance pipeline is more than 40 years old. The project includes replacement of pipelines in their current alignments or in new alignments designed to avoid sensitive habitats. Rehabilitation also includes modifications to the 100±-year old diversion structures, which are located above the anadromous reaches of the creeks (i.e., above the locations where fish return to spawn). The City also recently completed construction of a new 24-inch, approximately 2-mile-long water transmission line that has been installed between the Bay Street Reservoir and Highway 1.

Water System Production and Operations

In general, the City's water supply system is managed to take advantage of the better quality and least expensive water sources as a first priority and to retain the maximum amount of water possible in Loch Lomond Reservoir to safeguard against future droughts. In addition to considerations for cost, water quality, and storage, there are legal constraints on the diversion of surface waters contained in the City's water rights that govern the operation of the water system.

Water supplies are generally dispatched to meet daily demands in the following order: North Coast, San Lorenzo River, Live Oak Wells, Loch Lomond Reservoir (City of Santa Cruz Water Department, February 2006). The North Coast sources are used to the greatest extent possible due to excellent water quality and the lowest production cost, and as previously indicated, these diversions are least affected by water rights limitations. Additional water needed to meet daily demands is pumped from the San Lorenzo River at Tait Street. During the summer and fall when the City's flowing sources are inadequate to meet peak season daily demands, supplemental water is brought in from the Live Oak Wells and Loch Lomond Reservoir (City of Santa Cruz Water Department, February 2006).

On average, about 79% of the City's annual water supply needs are met by surface diversions from the coastal streams (32%) and San Lorenzo River (47%), while approximately 17% is supplied by Loch Lomond Reservoir and 4% of the supply is derived from the Live Oak Well system (City of Santa Cruz, February 2006) as summarized in Table 4.5-1. With Loch Lomond production, limited by the City's water rights to a maximum of 1,042[4] MGY, existing water supply availability totals approximately 4,300 MGY (City of Santa Cruz Water Department, February 2006). However, the City recognized that the uncertain nature of groundwater conditions in the western portion of the basin is a serious issue and has limited future maximum extraction during all water years to 645 ac-ft/yr, or approximately 1 MGD (700 GPM) (City of Santa Cruz Water Department, December 2010). Water production has fluctuated over the past ten years; annual production has ranged from a high of approximately 4,400 MGY in 2000 (City of Santa Cruz Water Department, February 2006) to a low of approximately 3,200 MGY in 2009 (City of Santa Cruz Water Department, May 2011) as discussed further in the following subsection.

[4] Of this amount, 104 MGY or 10%, is technically available to the San Lorenzo Valley Water District, but it has taken no action in recent years and has no current plan to exercise its entitlement.

TABLE 4.5-1
Existing City Water Supplies

Source	Million Gallons Per Year (MGY)
Groundwater	187
Surface Diversions:	
▪ North Coast Sources	1,077
▪ San Lorenzo River	2,008
▪ Loch Lomond Reservoir	1,042
TOTAL	**4,314**
Source: City of Santa Cruz Water Department, February 2006	

The City's adopted UWMP indicates that current water supplies will remain relatively unchanged with a total net production capacity of approximately 4,300 MGY through the year 2030 assuming normal water conditions and no change to current operations or water rights. However, as further described below, existing water supplies may be reduced in the future as a result of other permit requirements and water rights issues, and the City is currently pursuing water conservation measures to reduce demand and construction of a desalination plant as a supplemental water source during drought conditions.

WATER DEMAND IN CITY WATER SERVICE AREA

Water use between 2000 and 2010 ranged between approximately 4,000 MGY at the beginning of the decade to approximately 3,200 MGY in 2009 and 3,100 MGY 2010 as summarized in Table 4.5-2 (City of Santa Cruz, May 2, 2011).

Table 4.5-2
Treated Water Production 2000-2010

Year	Gross Water Use (In MGY)
2000	3,987
2001	3,962
2001	3,909
2003	3,898
2004	3,895
2005	3,567
2006	3,570
2007	3,590
2008	3,565
2009	3,169
2010	3,103
Source: City of Santa Cruz Water Department, May 2011	

Water demand forecasts developed for the City in 1997 (Maddaus Water Management, March 1998) were utilized in the preparation of the City's *Integrated Water Plan* and *Urban Water Management Plan*. The forecasts estimated that water demand would increase to approximately 4,900 MGY by 2005 and up to approximately 5,300 MGY in the year 2030 (City of Santa Cruz Water Department, February 2006) based on population and employment trend information and forecasts provided by AMBAG at the time the forecasts were developed. Current City plans estimate that water demand under normal conditions will exceed water system capacity at some time between 2015 and 2020 (City of Santa Cruz Water Department, February 2006). However, actual total water use has been substantially lower than was predicted in these demand forecasts. Based on the treated water production shown on Table 4.5-2, average annual water demand was approximately 3,900 MGY from 2000 through 2004, compared to approximately 4,900 MGY predicted for the year 2005. Water demand has further decreased since 2005 to an average demand of slightly less 3,600 MGY between the years 2005 and 2008, with a low of approximately 3,200 MGY in 2009.

Based on actual use, the City's adopted 2005 *Urban Water Management Plan* (UWMP) indicates that it is more plausible that water use within the entire service area would likely increase at a rate of between approximately 0.4% and 0.8% per year through 2020 (City of Santa Cruz Water Department, February 2006). Based on these percentages, the UWMP estimated a water demand of about 4,365 MGY in the year 2020. These scenarios were not carried beyond the year 2020 in the UWMP.

As discussed below under the "Impacts and Mitigation Measures" subsection, the 2005 UWMP water demand projections for the City's water service area were reviewed and updated as part of the preparation of the Water Supply Assessment and project impact analysis conducted for this EIR. Total water demand in the City's water service area is now estimated as approximately 4,050 to 4,550 MGY in the year 2030 as further described below.

As required by state law, the City prepares updates to its Urban Water Management Plan every five years, which provides for continual review of water demand and supply trends and adjustment of water management strategies as may be needed. The City Water Department is in the process of updating its UWMP, in which water supply availability and water demand projections will be reviewed and revised according to the most recent information and data available.

WATER SUPPLY LIMITATIONS

The primary water reliability issue currently facing the City of Santa Cruz is the lack of adequate water supply during droughts due to the wide range in the yield of surface water sources from year to year and limited storage capacity. The City's water supply system is able to meet 100% of the existing water demand in about 7 out of every 10 years and at least approximately 90% of existing demand in about 9 out 10 years. A significant shortage occurs on average about 1 out of every 10 years (City of Santa Cruz Water Department, February 2006). During normal hydrologic years, the City's water supply totals approximately 4,300 MGY. The total water supply estimated to be available to the City in single dry years (i.e., 1994) is 3,800 MG or approximately 12% less than is available in normal years (Ibid.).

However, during an extreme two-year drought similar to the 1976-77 event, the estimated water supply available to the City in the second year of that event is 2,700 MG. The peak season is between April and October since this is the period that would be most affected by a supply shortage due to peak water demand.

Furthermore, the City's groundwater supply is near the coast and is particularly vulnerable to seawater intrusion. In normal and wet years, when rainfall and runoff are abundant, base flows in the coast watershed and associated river sources are restored by winter rains, and Loch Lomond Reservoir is typically replenished to full capacity with runoff from the Newell Creek watershed. The water system, however, is vulnerable to shortage in drought years when the San Lorenzo River and North Coast creeks and springs run low. In single dry years, the system relies heavily on water stored in Loch Lomond Reservoir to satisfy demand, which draws down the reservoir level lower than usual and depletes available supply in the event of a subsequent dry year. In multiple dry years, or drought conditions, very low surface water flows in the San Lorenzo River and North Coast creeks and springs, combined with depleted supply stored in Loch Lomond Reservoir, reduces the City's available supply to a level which cannot support water demand, even with an increase in groundwater production.

A basic assumption of the City's *Integrated Water Plan* and UWMP is that the City will continue to use its existing water supply sources in the future without change in current production levels. However, the City faces a series of ongoing challenges that potentially could lead to some loss of existing supply in the future, although it is uncertain at this time to what extent and which supplies might be affected. These considerations are summarized below, in part from the UWMP.

- **North Coast Streams and San Lorenzo River – HCP**. Continued access to the same amount of North Coast supply sources will depend on the outcome of a Section 10 "incidental take" permit application and accompanying Habitat Conservation Plan (HCP) that are being prepared pursuant to the federal Endangered Species Act for City activities designed to prevent take of a listed federal species. The permit and plan must be approved by the U.S. Fish and Wildlife Service and NOAA National Marine Fisheries Service (NMFS). The goal of the HCP is to minimize and mitigate to the maximum extent practicable the effects of City activities on listed and other sensitive species. The City entered into the HCP process in 2001, and over the past 6 years, the City has coordinated and met with U.S. Fish and Wildlife Service and NMFS on HCP-related issues and has conducted a number of studies. At the time of preparation and publication of this Draft EIR, however, a draft HCP has not yet been completed.

  The conservation measures associated with the HCP may result in changes in the City's operation and management activities and potentially affect the timing and use of this component of the City's existing water supply. On April 5, 2011, the Santa Cruz City Council authorized the Water Director to enter into negotiations with NMFS for completing the HCP and obtaining an Incidental Take Permit. At this meeting, City staff presented a proposed phased conservation strategy that improves instream flow for anadromous salmonids while recognizing that the limitations of the existing water supply system do not allow consistent achievement of optimal flows. Given the fact that there is an existing potential "take" of listed species to address, the strategy would result in less available water supply, resulting in a need to draw more heavily on the storage and Loch Lomond and that some augmentation of the City's existing water supply will be

necessary (City of Santa Cruz Water Department. March 28, 2001). Generally, the impacts would be greatest on the North Coast streams during the dry season and during dry water years (Ibid.).

A Draft Conservation Strategy was submitted to the NMFS in August 2011. The primary focus of the strategy is to avoid or minimize existing and potential effects of the City's activities to the maximum extent practicable as required by the Federal Endangered Species Act. A major element of the strategy is identification of minimum in-stream flows at City diversions to minimize the effect of diversions on habitat conditions for steelhead and coho salmon. Three alternatives, or tiers, of instream flow targets are specified which represent increasing levels of habitat protection. These targets vary by location, hydrologic year type and month. The three tiers represent increasing levels of habitat protection. The strategy guarantees minimum flows that ensure no further degradation of habitat (known as Tier 1). The strategy attempts to provide further protection of habitat by offering Tier 2 minimum flows under most hydrologic conditions, reverting to Tier 1 in dry years. With increasing water demand, the City will be able to provide Tier 2 flows less frequently. As the City moves toward augmenting its supply to include additional sources such as some mix of desalination, reclamation, conservation, or additional storage, over the course of the HCP further instream reservations will be possible (City of Santa Cruz, August 2011). Addition of new supply (2.5 mgd desalination, reclamation) would allow Tier 2 flows to be provided in 70% of years. Tier 3 flows would provide approximately 80% habitat value and could be provided in as much as 21% of years well into the future with the addition of 2.5 mgd of desalination.

With the Draft Conservation Strategy now submitted, negotiations can begin with NMFS. When a final strategy has been agreed upon, the Habitat Conservation Plan will be prepared. The HCP will be subject to environmental review, public review, and considered by City Council. The process could take more than two years.

- **Water Rights Conformance Proposal.** The City is in the process of developing and submitting filings to the State Water Resources Control Board (SWRB) to rectify a historical technical deficiency in the water rights on Newell Creek. Based upon the original filings, which were thought to be adequate due to the anticipated use of Loch Lomond Reservoir, these water rights actually allow only for diversion to storage and not for direct diversion, i.e., into the City's water supply distribution system. This circumstance makes the water supply technically unavailable as a source for City use during times when, for example, the reservoir is receiving more inflow from Newell Creek than is released downstream. The water rights filings by the City are intended to correct this historical deficiency and bring the City's legal water rights and current operations into conformance with each other. The proposed direct diversion rights are limited to the same volume of water, purposes and places of use as the existing rights such that they match the existing rights to the extent possible while allowing direct diversion, consistent with historic practice (City of Santa Cruz Water Department, February 2006).
- **Felton Diversion Water Rights Time Extension Project.** Pursuant to the City's permits to divert water at Felton for storage in Loch Lomond Reservoir, the City must put all 3,000 AFY (approximately 980 million gallons) of its entitlement to full beneficial use by

December 2006, in order to maintain its appropriative rights to the water. While the City has been diligently putting water from the Felton Diversion to beneficial use over the years, to date the City has used just half the permitted amount on an annual basis. In the future, however, the City expects to need the full 3,000 AFY and, therefore, has filed petitions with the SWRCB to extend the time allowed for putting the full 3,000 AFY to beneficial use. The water supplied from the Felton Diversion is considered critical to meeting the City's projected future demand, in particular during operational outages, changes in operations in response to environmental concerns, and during dry years (Santa Cruz, 2006).

Three different parties had filed protests to this application and to the City's petition for an extension of time to go to full appropriation on Felton Diversion: the Marine Corps Base, Camp Pendelton (CPEN); the California Department of Fish and Game (CDFG); and NMFS. The CPEN protest raised the legal issue of whether a water right holder or applicant may petition to the State Water Board to change an application, permit or license to allow for direct diversion when the current application, permit or license is for diversion to storage. The City appealed to the SWRCB that the public interest and the law support the use of the change petition process to add direct diversion to its San Lorenzo River and Newell Creek Water Rights. In December 2009, the SWRCB affirmed the legitimacy of the application for a change, finding that it has the authority to approve such a change, and denied the CPEN Petition for Reconsideration. The CDFG petition has been withdrawn.

Regarding the petition for the time extension to go to the full appropriation on the Felton Diversion, the City believes it is premature to conclude that it is unlikely to retain this water right. The City has been granted two other such extensions of time – in the mid-1980s and again in the mid-1990s after negotiations with CDFG and execution of a MOA that modified the manner in which the City operated the facility. The City also is working with DFG and NMFS to consider how the facility could possibly be used to aid the Coho Recovery Plan enhancement strategies.

- **Live Oak Wells System Reliability.** The City's ability to produce water from the Live Oak wells, in drought years and potentially all years, may be compromised by continued deterioration of the groundwater basin conditions due to region-wide over-pumping of the Purisima Formation. According to the City's 2005 UWMP, the threat of seawater intrusion to Purisima Unit A under the City's normal operations does not appear imminent (EKI, March 2011). However, if all users continue to pump groundwater at the present cumulative rate, the City's future use of the Live Oak Well System during peak times (as was done during the 1987-1992 drought) may potentially exacerbate conditions that could lead to seawater intrusion (City of Santa Cruz Water Department, February 2006). Although seawater intrusion does not appear to be an imminent threat to the City's groundwater supply under normal operating conditions, the potential for seawater intrusion exists and could potentially limit the City's future use of groundwater and ability to meet peak demands during dry years (EKI, March 2011). The City recognizes that the uncertain nature of groundwater conditions in the western portion of the basin is a serious issue and has limited future maximum extraction during all water years to 215 MGY or approximately 1 mgd (City of Santa Cruz Water Department, December 2010).

The SqCWD's "Well Master Plan" calls for the addition of the O'Neil Ranch well that will allow for more intense pumping of the western Purisima aquifer and allow SqCWD to decrease pumping from the Aromas Red Sands and coastal Purisima formation. The SqCWD's continued increase in pumping within the western Purisima, which has occurred since the early 1990s, has already noticeably reduced the availability of groundwater stored in the aquifer from which the City draws its water (EKI, March 2011). The City was advised by its consultants that production of up to 2 mgd from its coastal well field may no longer be viable during peak periods, and, as a result of this finding, the City identified sites for potential new wells further inland (EKI, March 2011). The SqCWD also included a mitigation monitoring program for potential impacts to the City's coastal well field. However, SqCWD only committed to mitigate for potential impacts from the Well Master Plan if the City did not exceed an average pumping rate of approximately 170 MGY (approximately 0.8 mgd over seven months) or a drought year production rate of215 MGY (approximately 1.0 mgd over seven months). The City continues to pursue completion of an inland well to supplement its diminished well capacity and maintain its ability to produce up to 1 mgd during peak periods and in drought conditions (Ibid.).

- **Global Climate Change.** There has been increasing attention paid to the issue of global climate change and its potential effects on existing water resources and supplies. However, studies prepared to date by the State of California do not provide sufficient or specific information with respect to predicted effects on coastal water supplies to allow the City to reach a reliable conclusion of how global climate change may affect the City's water supplies. These studies have instead focused on potential effects on the Sierra Nevada snowpack, and how a reduced snowpack could affect water supplies dependent on runoff from that snowpack (e.g., water supplies dependent on the operation of either the federal Central Valley Project or the State Water Project). Nor have specific studies been conducted by the City to address this issue.

  General studies prepared by the State of California indicate that climate change may seriously affect the State's water resources as a result of temperature increases, changes in timing and amount of precipitation, and sea level rise that could adversely affect coastal areas (California Department of Water Resources, July 2006). Trends in precipitation change are hard to determine, but worldwide precipitation is reported to have increased about 2% since 1990. Precipitation and stream flow records indicate an increase in precipitation, and increased precipitation could benefit water supplies and improve environmental conditions in some areas, especially where water supply diversions have significantly affected stream flow (California Department of Water Resources, July 2006).

  The *California Water Plan* provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan, which is updated every five years, presents basic data and information on California's water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs. According to the California Department of Water

Resources ("California Water Plan Highlights"), more changes related to climate change can be expected by the year 2050 and on to the end of the century:

- California's mean temperature may rise 1.5 degrees to 5.0 degrees Fahrenheit by 2050 and 3.5 degrees to 11 degrees by the end of the century.
- Sierra Nevada snowpack may decrease by 25 to 40%.
- Average annual precipitation may show little change, but more intense wet and dry periods can be expected with more floods and more droughts,
- Flood peaks will become higher and natural spring/summer runoff will become lower.
- Global sea levels may rise by 4 to 16 inches by mid-century and 7 to 55 inches by the end of the century, which would increase salinity in California's delta region (California Department of Water Resources, 2009).

Global climate models vary considerably in projecting precipitation patterns, and climate change could potentially alter California's historical precipitation patterns. Simulations conducted by the State of California predict drier conditions in the future, although at the same time there is continued risk from intense rainfall events that can generate more frequent and/or more extensive runoff (California Natural Resources Agency, "2009 California Climate Adaptation Strategy"). While many of the state reports have focused on changes on Sierra snowpack and other major California water sources, recent reports indicate that warming temperatures, combined with changes in rainfall and runoff patterns will exacerbate the frequency and intensity of droughts. Although average annual precipitation may not change, more intense wet and dry periods are anticipated (California Department of Water Resources, October 2009). Regions that rely heavily upon surface water (rivers, streams, and lakes) could be particularly affected as runoff becomes more variable (California Department of Water Resources, October 2008).

It is possible that coastal watersheds such as the one above Santa Cruz could experience changes in frequency and amounts of precipitation (they currently don't receive much snow), which could affect the amounts of water available for diversion and storage in the City's existing facilities. Another study indicates that sea level is expected to rise an additional 22 to 35 inches by the end of the century (California Climate Change Center, July 2006). Generally, there are two ways it is thought that the Santa Cruz water supply system may be impacted: 1) sea level rise that would create greater likelihood of groundwater contamination from seawater intrusion; and 2) rainfall events that would likely be heavier and less frequent, thus affecting storage in Newell Creek Reservoir and stream flow.

The City has acknowledged that climate change may impact City water supplies that are largely dependent on surface water flows. To the extent that rain events are more intense but less frequent, the base flow in streams and rivers from which the City diverts could change. Predictions regarding the extent of climate change on water resources are dependent on many variables. Models are being developed to assist water utilities

in looking at climate change variables in their water planning efforts,[5] but the timing and quantification of potential climate changes effects are too speculative to try to predict with any certainty at this time. However, the City is working with other County water agencies to look at the models that are being developed and will consider new information as it becomes available.

WATER SUPPLY PLANNING & ADOPTED PLANS

Water Supply Alternatives

The City of Santa Cruz has been actively considering possible new water supplies for the past 20± years due to chronic, insufficient water supplies to meet existing demand during drought events (Gary Fiske & Associates, June 2003). The City's 1989 *Water Master Plan* identified alternatives to increase the City's water supply based on water demand projections developed at that time. Subsequently, nine projects were evaluated in a 1994 study (Camp Dresser & McKee, Inc., January 1994) that was overseen by a Technical Advisory Committee comprised of City Water Commission members, City Council members and Water Department staff. Of the evaluated projects identified below, the new wells at Thurber Lane and treatment of brackish groundwater in the Majors Creek area were selected as the highest ranking projects.

- Four new reservoir projects – two in the San Lorenzo River watershed and two on North Coast creeks;
- Three projects involving the expansion of Loch Lomond and treatment of brackish groundwater in the Majors Creek area;
- One groundwater project including new wells at Thurber Lane in Live Oak and treatment of brackish groundwater in the Majors Creek area; and
- One smaller reservoir project with groundwater wells at Thurber Lane and reclaimed water from the Scotts Valley Wastewater Treatment Plant.

In 1997, the City initiated an "integrated water planning" approach to consider all practical options for decreasing demand and increasing supply, which included preparation of studies related to water demand, water conservation, water curtailment, alternative water supplies, and evaluation of regional water supply alternatives. As part of this effort, a series of background studies were undertaken, including the following (City of Santa Cruz Water Department, EDAW, June 2005):

- Water Demand Investigation (Maddaus Water Management 1998
- Water Conservation Plan (Gary Fiske & Associates 2000)
- Water Curtailment Study (Gary Fiske & Associates 2001
- Alternative Water Supply Study (Carollo Engineers November 2000)
- Evaluation of Regional Water Supply Alternatives (Carollo Engineers March 2002)

[5] See Water Utility Climate Alliance. January 2010. "Decision Support Planning Methods: Incorporating Climate Change Uncertainties into Water Planning."

An Integrated Water Plan (IWP) was prepared utilizing the results of these studies and was adopted by the City Council an *Integrated Water Plan* in November 2005. As part of the IWP process, ten potential water supply alternatives were identified and evaluated (Carollo Engineers, November 2000). These included:

- **Groundwater Options**
  1. Brackish groundwater supply from wells in the San Lorenzo River Alluvial Plain near the mouth of the river.
  2. Fresh groundwater supply from wells in the San Lorenzo Alluvial Plain.
  3. Groundwater supply from the Purisima Aquifer near the Beltz wells.
  4. Groundwater supply from the Santa Margarita Aquifer.
  5. Groundwater supply near the Wilder Ranch gravel quarry.

- **Other Supplemental Sources**
  6. Seawater desalination.
  7. Wastewater reclamation.
  8. Reservoir storage in the Olympia Quarry in the San Lorenzo Valley.

- **Other Options**
  9. Maximized use of existing sources and storage in Loch Lomond Reservoir. This alternative includes increased capture and/or storage of surface water from existing north coast and San Lorenzo River supplies, in conjunction with optimized use of existing diversions.
  10. Conjunctive use with Soquel Creek Water District (SqCWD).

A screening of these alternatives was conducted as part of the 2000 Carollo Engineers study; screening criteria included whether the source would be reliable and sustainable during a multi-year drought and whether the alternative is feasible to be implemented, taking into account cost, environmental constraints and other public acceptance and regulatory concerns. A conceptual engineering analysis was then completed for each of the potentially viable alternatives. Table 4.5-3 summarizes the evaluated alternatives and associated constraints.

ALTERNATIVES DETERMINED NOT TO BE VIABLE

Based on this screening process, the following alternatives were determined not to be viable: brackish and fresh groundwater from the San Lorenzo River alluvial plain (Options 1 and 2), conjunctive use with SqCWD (Option 10), and reservoir storage in Olympia Quarry (Option 8) (Carollo Engineers, November 2000). The primary constraints on the brackish and fresh groundwater from the San Lorenzo River alluvial plain included: 1) potential impacts to riparian habitat or introduction of seawater into the aquifer as a result of pumping; 2) water rights issues since the brackish groundwater is likely hydraulically linked to the San Lorenzo River and may result in conflicts with the City's other water rights related to its Tait Street diversion; and 3) high treatment costs. In addition, the yield from these sources was expected to be limited (Ibid.). Conjunctive use with Soquel Creek Water District was not deemed viable due to limited surface water supplies potentially available to the City of Santa Cruz Water Department water

rights issues, and continued groundwater pumping. Lastly, numerous technical and institutional issues were identified that deemed the storage at Olympia Quarry to not be viable (Ibid.).

TABLE 4.5-3
City Water Supply Alternatives Summary

Alternative	Recommend Further Evaluation	Comment
Groundwater Options		
Fresh Groundwater from the San Lorenzo Alluvium	No	(1) Quantity limited (2) Potential conflict with existing water rights at Tait Street (3) Supply not reliable or sustainable during drought
Brackish Groundwater from the San Lorenzo Alluvium	No	(4) Quantity uncertain (5) Potential conflict with existing water rights at Tait Street (6) Supply not reliable or sustainable during drought
Groundwater Supply from Purisma Aquifer near Beltz Wells	No	(7) Existing users present institutional constraints (8) Quantity uncertain (9) Supply not reliable or sustainable during drought
Groundwater Supply from Santa Margarita Aquifer near Beltz	No	(10) Quantity uncertain (11) Supply not reliable or sustainable during drought
Groundwater from Santa Margarita Aquifer near Wilder Ranch	No	(12) Existing users present institutional constraints (13) Quantity uncertain (14) Supply not reliable during drought
Other Supplemental Sources		
Desalination	Yes	(15) Reliable or sustainable supply of needed capacity
Wastewater Reclamation	Yes	(16) Net supply may be limited and cost high; additional work required to quantify these elements
Reservoir Storage in Olympia Quarry	No	(17) Numerous technical and institutional issues to be addressed
Other Options		
Maximize Use of Existing Sources and Storage in Loch Lomond Reservoir	Yes	(18) Benefit in drought and nondrought years (19) Improves system reliability and operation
Conjunctive Use with Soquel Creek Water District	No	(20) Water rights constraint (21) Quantity uncertain (22) Supply not reliable or sustainable during drought
Source: Carollo Engineers, November 2000		

The other groundwater options ultimately were determined not to be viable because as groundwater sources they are also affected during drought conditions and storage is not readily replenished. The analysis also estimated that the maximum reliable yield from four combined groundwater sources was approximately 300 MGY or less during drought conditions (Carollo Engineers, November 2000b). Thus, while overall, groundwater is potentially available in a limited quantity, none of the groundwater resources could provide a significant portion of the projected drought demand shortfall (Ibid.). Additionally, there were other environmental,

regulatory and/or cost issues associated with some groundwater options that would affect overall feasibility for implementation. For example, the two biggest aquifers analyzed in the study (Santa Margarita aquifer near Wilder Ranch and Purisima aquifer) have existing users. The available (reliable) yield during a prolonged drought is also uncertain because the yield from the aquifers will likely decrease as other users increase their reliance on this supply (Carollo Engineers, September 2000).

Artificial groundwater recharge was considered as a means to improve reliability/sustainability during a drought, but was not found to be a viable alternative as there are no surplus water sources available for recharge. Even if the City's surface water supplies were available for recharge, a water rights change (from diversion for direct use to diversion for storage) would be required, which would effectively preclude all conjunctive use alternatives with surface water and groundwater (Carollo Engineers, September 2000).

Groundwater recharge with reclaimed water was also considered. However, state guidelines stipulate that approximately 50% of the recharge water be reclaimed wastewater, thus requiring other water sources to be blended with the reclaimed water. Additionally, as indicated above, groundwater availability would be limited. The analysis found that even in a favorable scenario, approximately 100 MG would be available for blending that would result in about 200 MG of groundwater supply during a drought, which was considered low. Furthermore, state guidelines require that reclaimed water for potable use remain in the ground 6-12 months prior to use depending on the level of treatment and method of discharge. Lastly, the City's wastewater treatment plant would need to be upgraded to produce the quality of reclaimed water required for recharge, along with construction of associated pipelines.

RECOMMENDED ALTERNATIVES

As a result of this screening and evaluation process, three alternatives were recommended for further review: desalination, wastewater reclamation, and maximizing use of existing sources and storage in Loch Lomond Reservoir. A refined regional analysis of desalination and wastewater reclamation as a potential joint project with the Soquel Creek Water District was conducted in 2002. The IWP identified seawater desalination as the most feasible alternative for a backup supply of drinking water during a drought. These alternatives are summarized below.

Desalination. The IWP identified seawater desalination as the most feasible alternative for a backup supply of drinking water in times of drought with a plant capacity of 2.5 mgd (City of Santa Cruz Water Department, February 2006). The plant would be for drought protection, and would only be used by the City intermittently during the dry seasons of dry and critically dry years when existing supplies fall short (Ibid.). The desalination facility could be expanded at a future time to provide additional supply up to 4.5 mgd in two increments of 1 mgd; the potential expansion is also intended for protection from drought conditions that could be exacerbated by future growth (Ibid.).

The City currently is planning to construct a seawater desalination facility as a backup water supply in times of drought. The proposed desalination facility is a joint partnership between the City of Santa Cruz and the Soquel Creek Water District (SqCWD), which is also looking for a long-term supplemental water source to reduce its reliance on well water and avert the threat

of seawater intrusion in local groundwater aquifers. Currently, the SqCWD obtains all its water from groundwater sources and operates 16 active production wells with an estimated capacity of over 14 million gallons per day. The current annual water use for the SqCWD exceeds the available water supply by 15% even during non-drought conditions. The SqCWD would use up to 1 mgd of the future plant's capacity when the City doesn't need it, and would share in the cost of building and operating the plant. In early 2006, the SqCWD adopted the Integrated Resources Plan (IRP) that identified a regional seawater desalination plant with the City of Santa Cruz as the preferred conjunctive use project to be investigated (City of Santa Cruz Water Department, 2008, desalination web site at: http://www.scwd2desal.org/).

A pilot desalination plant was in operation between March 2008 and April 2009 to gather information to establish the optimal design and operating parameters for the future construction and operation of a 2.5-mgd seawater desalination plant. The 13 months of testing provided a full range of performance information that will be used to plan the full-scale seawater desalination facility. Additional technical studies and design development are currently underway. The environmental review process was initiated with an EIR Notice of Preparation released in November 2010 in which three potential sites and different intake options will be analyzed in an EIR. A permanent facility is expected to be constructed and in operation by the year 2016, pending completion of project-level environmental review and regulatory permit approvals, e.g., approval of a coastal development permit from the California Coastal Commission.[6]

Recycled Water. The City of Santa Cruz owns and operates a regional wastewater treatment facility providing service to the cities of Santa Cruz and Capitola and parts of unincorporated Santa Cruz County. The City's treated wastewater is potentially suitable for some agricultural applications and for limited public access irrigation. However, the level of treatment is not sufficient for general irrigation or unrestricted use on playgrounds, parks, schoolyards, etc. Additional treatment above that currently provided would be needed to meet the state public health and safety requirements. In addition to the treatment upgrades, a distribution system, including pumps, meters, storage facilities, and separate piping, would be required to convey the recycled water to customers (City of Santa Cruz Water Department, February 2006).

The potential for using recycled water as a supplemental water supply was examined in the City's Alternative Water Supply Study (Carollo Engineers, 2000) and Evaluation of Regional Water Supply Alternatives (Carollo Engineers, 2002) during the IWP process. The following five project concepts for recycled water use were evaluated in the two reports (City of Santa Cruz Water Department, February 2008). The UWMP provides a description of these programs and indicates that a long-term water savings of nearly 300 MGY could be achieved.

- Recycled water for groundwater recharge,
- Recycled water for direct use,
- Recycled water from Scotts Valley
- Recycled water for landscape irrigation in the City, and
- Recycled water for North Coast agricultural application.

[6] Other potential permits, approvals and/or consultations for a permanent desalination plant and supporting infrastructure (i.e., intake facility and distribution pipeline) may be required from various agencies, including, but not limited to U.S. Fish and Wildlife Service, State Lands Commission, and California Department of Health Services.

Of these concepts, two were determined to be viable projects: recycled water for in-City landscape irrigation and recycled water for North Coast agricultural application. The other three projects were determined to be infeasible, unacceptable, or of too little benefit to pursue further. Even though these two recycled water concepts were carried forward in the water supply studies, only the one involving the use of recycled groundwater for agricultural irrigation was developed further. The use of recycled water for landscape irrigation was eliminated due to a number of reasons, including the limited yield and high cost. The potential users of the recycled water were determined to be parks, schools, cemeteries, golf courses, and UCSC, with an estimated outdoor irrigation demand of approximately 170 to 230 MGY. This amount was considered too small by itself to meet the City's drought-year needs and also had a high capital cost. The City also considered the high cost of investing in a recycled water system to maintain turf areas during times of drought versus instituting drought management measures and curtailing those same outdoor uses of water at a relatively low cost when supplies fall short. Coupled with the fact that the recycled water concept did nothing to add to the supply of potable water, curtailment was favored in developing alternative strategies for the City's IWP (City of Santa Cruz Water Department, February 2006).

The evaluation of the option to exchange groundwater with recycled wastewater (for agricultural irrigation on State Park lands north of the City) estimated groundwater availability of about 400 MGY. However, this concept ultimately proved to be infeasible for a number of reasons. The additional supply would have been limited given the estimated yield from the groundwater basin. Coupled with costs as high as desalination, this option was not considered the superior option. Additionally, the California Department of Parks and Recreation, the landowner of the agricultural lands to be irrigated with recycled water, opposed the exchange given legal and policy issues that could affect the entire state (City of Santa Cruz Water Department, February 2006). Some of the farmers, mostly organic growers, also opposed the concept of irrigation with reclaimed water.

Recycled water for landscape irrigation remains a potentially viable alternative that could be pursued in the future. However, currently it is not the City's preferred water supply strategy for the reasons outlined above. The 2005 UWMP indicates that the steps and actions to encourage and optimize recycled water will be defined in the future if and when recycling is selected and pursued to diversify the City's water supply portfolio (City of Santa Cruz Water Department, February 2006).

Recycled water as an option for both the City and Soquel Creek Water District was again investigated in 2010 (Kennedy/Jenks Consultants, January 2010). Current California regulations do not allow recycled water to be discharged directly into a potable/drinking water distribution system (otherwise known as direct potable use), and therefore would not meet the City's drought water supply needs. Current state regulations do allow recycled water to be used for indirect potable reuse whereby highly-treated wastewater is injected into the ground via percolation ponds or pumping, and extracted later for use. However indirect potable reuse is not practical for the City or SqCWD because: 1) it requires blending recycled water with surface or groundwater prior to injection and both surface and groundwater supplies are already limited; 2) injection wells are required to be located a prescribed distance away from any public or private drinking water well, which is difficult due to the thousands of wells within

Soquel-Aptos area groundwater basin; and, 3) local land limitations are not conducive to percolation/blending ponds (Ibid).

Recycled water for the City and SqCWD could potentially provide irrigation water for parks, sports fields, and/or golf courses during a drought, but would require a new dedicated distribution system that would be prohibitively expensive compared with the relatively small volumes of water delivered for appropriate use (Kennedy/Jenks Consultants, January 2010). Importing recycled water from a nearby producer is an alternative to producing recycled water at the City of Santa Cruz wastewater plant. The Scotts Valley Water District (SVWD) and the Pasatiempo Golf Course (Pasatiempo), which presently receives potable water from SCWD for irrigation, entered into a Memorandum of Agreement (MOA) expressing the intent to implement a "Pasatiempo Water Conservation Initiative" in cooperation with the City of Santa Cruz. However, this solution does not significantly offset potable water needs for SCWD during drought.

Improvements to Existing Facilities. Improvements to maximize use of existing water sources and storage were identified that collectively could provide approximately 600 MGY during a two-year drought. The upgrades could include additional treatment for turbidity on the North Coast supply; capacity upgrades of the North Coast pipeline; treatment and/or facility upgrades for turbidity at the Tait Street intake; capacity upgrades at the Coast pump station; and/or upgrading the hydraulic capacity of the Felton/Loch Lomond supply system. The upgrades would provide additional supply during drought and non-drought years and would also improve operational reliability and flexibility, but shortfalls during multiple dry year scenarios would continue to occur (Carollo Engineers, November 2000).

City-Adopted Water Plans

INTEGRATED WATER PLAN (IWP)

The purpose of the IWP is to:

> "to respond to the current drought-related crisis and plan for future growth. Specifically, it must help the City: 1) reduce near-term drought year shortages; and 2) provide a reliable supply that meets long-term needs while ensuring protection of public health and safety" (Gary Fiske & Associates, June 2003).

The IWP evaluated options for balancing water supply and demand that included conservation, curtailment, and new water supplies and infrastructure. Based on the water supply studies conducted since the mid-1980s, the water supply options considered in the IWP focused on the four following options:

- Seawater desalination was considered with construction of reverse osmosis, pretreatment and ancillary facilities. A specific location was not identified, although it was indicated that probable locations would be in the industrial area of Santa Cruz (southwest area of city) or on the University's Long Marine Lab site (now known as the Coastal Marine Science Campus). A sequence of desalination sizing increments was reviewed for three curtailment profiles and for a facility serving only the City of Santa Cruz and for a facility serving the City and Soquel Creek Water District

- Reclamation with a coast groundwater exchange arrangement was considered, which involved construction of a 4-5 mgd tertiary wastewater treatment plant, and associated facilities to deliver that water to North Coast farmers for irrigation purposes in exchange for City access to the groundwater supplies currently being used by the farmers.
- Development of the Santa Margarita Aquifer in Live Oak was also considered as a potential small source of supply. The aquifer is below the Purisima aquifer from which the current Beltz wells draw supply. However, little information was available regarding this supply when the IWP was prepared, although it assumed that this source will yield 100 million gallons annually (approximately 2,307 AF).

Based on evaluation of these options and combination thereof, under various drought curtailment options, the IWP determined that Strategies D-1 and D-2 (City-Only and Regional Desalination) at Curtailment Profile 2 (15% worst-year curtailment) as the preferred alternative. The final choice between the City-Only and Regional Desalination strategies was deferred to completion of the Environmental Impact Report on the IWP. For the desalination options, the IWP (and EIR) considered a 2.5-mgd desalination facility that could be upgraded by 1.0 mgd in two increments for a total capacity of 4.5 mgd.

In November 2005, the City Council certified the IWP EIR and unanimously adopted the IWP as the City's long-term water resource strategy that includes the following three components (City of Santa Cruz Water Department, February 2006):

- **Conservation**. Implementation of water conservation programs to maximize the use of the existing water resources.
- **Curtailment during a Drought.** The IWP calls for supplying 85% of normal demand in critical drought years (e.g., the 1976-77 event) with a corresponding reduction in peak season water use of up to 15%.
- **Desalination as a Supplemental Water Supply.** The IWP identified seawater desalination as the most feasible alternative for a backup supply of drinking water in times of drought that would be provided by a 2.5 mgd seawater desalination facility that would be expandable in 1.0 mgd increments up to 4.5 mgd, if needed in future years. A full-scale desalination facility site was proposed to be located in the industrial area along Delaware. The certified IWP EIR evaluates impacts of the construction of a desalination facility and associated pipelines on a programmatic level for the initial construction of a 2.5 mgd facility for drought protection and two subsequent expansions (3.5 and 4.5 mgd).

URBAN WATER MANAGEMENT PLAN (UWMP)

In 2006, the City adopted the *2005 Urban Water Management Plan* (UWMP) that was prepared in accordance with state law requirements. The plan evaluates and describes water resource supplies and projected needs over a twenty-year planning horizon, and addresses a number of related subjects, including water conservation, water service reliability, water recycling, opportunities, water transfers, and contingency plans for drought events.

As previously indicated, pursuant to state law, the City of Santa Cruz Water Department must prepare and adopt an urban water management plan and update it every five years. Thus, the City's water resource supplies and projected needs over a 20-year planning horizon will be assessed and updated every five years, which will enable the City to review water demand trends and review its water supply management and options. The City's existing 2005 UWMP is being updated and a draft is expected to be completed during the fall of 2011. The water demand projections will reflect the proposed *General Plan 2030*. As part of the UWMP update, the City Water Department will continue to review conservation and other strategies.

The UWMP provides a description of water conservation programs as the IWP calls for continued implementation of a broad set of conservation programs. Conservation programs include water survey programs, plumbing retrofits, water audits and leak detection and repair, large landscape conservation programs and incentives, high-efficiency clothes washer rebate program, and other public information programs. The UWMP indicates that a long-term water savings of nearly 300 MGY could be achieved. A savings of approximately 153 MGY had been achieved by 2005 (City of Santa Cruz Water Department, February 2006). The plumbing fixture retrofit and rebate program have produced the most water savings of any program, totaling about 136 MGY (Goddard, City of Santa Cruz Water Department, personal communication, August 2011.). As a result, conservation programs continue to offset new water demand from development and growth in new accounts, and then some, for the time being (Ibid.). It is estimated that approximately 250 MGY have been saved to date through conservation in part due to rate and price changes and restrictions in recent year (Goddard, personal communication, June 2011).

The IWP calls for supplying 85% of normal demand in critical drought years (e.g., the 1976-77 event), and for a corresponding reduction in peak season water use of up to 15%. This cutback would be achieved through temporary watering restrictions or rationing that target landscape irrigation and other outdoor uses.

The UWMP includes a "Water Shortage Contingency Plan" that was updated in March 2009. This plan was developed to fulfill two fundamental purposes:

- To establish the procedures and actions necessary to achieve the up-to-15% percent cutback in system-wide demand established in the City's Integrated Water Plan, and
- To describe how the City would respond if faced with much larger shortages in water supply ranging as high as 50%.

The updated Water Shortage Contingency Plan uses a staged approach that classifies a shortage event into one of five levels spanning a water shortage range from 5-50%. The overall concept is that water shortages of different magnitudes require different measures to overcome the deficiency. Because there is so little the City can do in the short run to increase the supply of water, the focus of this plan is primarily on measures that reduce demand. Each stage includes a set of demand reduction measures that become progressively more stringent as the shortage condition escalates. Normally, only one of these five stages would be put into effect early in the year at the recommendation of the Water Director and remain in force for the entire dry season (City of Santa Cruz Water Department, March 2009). These stages are outlined below:

Stage	Magnitude of Water Shortage Stage	Title
1	0-5%	Water Shortage Alert
2	5-15%	Water Shortage Warning
3	15-25%	Water Shortage Emergency
4	25-35%	Severe Water Shortage Emergency
5	35-50%	Critical Water Shortage Emergency

Stages 1 and 2 represent a level of curtailment that is envisioned as being necessary to balance water supply and demand from time to time under the City's Integrated Water Plan. Shortages of 15% or less, while inconvenient, do not directly threaten public safety or pose undue economic impact. Stages 3-5 are characterized as emergency water shortages since they result in more widespread hardships being felt throughout the community, may threaten public health and welfare, and cause more economic harm. Customer demand reduction goals were established for major water demand groups based on the following priorities: 1) health/safety, i.e., all domestic and sanitary uses, 2) business and industrial uses and, 3) irrigation and other outdoor uses) (City of Santa Cruz Water Department, March 2009).

The 2005 UWMP indicates that in addition to pursuing desalination, the City remains open to exploring other water supply alternatives that would not be feasible to develop in the short-term, but may be useful to consider over a 20-year or longer time frame. The UWMP identifies the possible longer term options as:

- Recycled water
- Groundwater recharge
- Reservoir expansion
- Aquifer storage and recovery
- Off-stream storage.

Other Water Planning Efforts

As indicated at the beginning of this chapter, the state of California enacted SB7 in 2009, which sets a goal of reducing urban per capita water use by 20% by December 31, 2020. Under the law, each urban retail water supplier must include a base daily water use, a 2020 urban water use target and an interim (2015) water use target in the UWMP. Technical methodologies have been prepared by the California Department of Water Resources (DWR) to ensure consistent implementation of the law throughout the state (City of Santa Cruz Water Department, May 2, 2011).

According to a February 2010 report issued by the DWR, the baseline water use value for California as a whole is 192 gallons per capita per day (gpcd); the value for the Central Coast Region, which encompasses the area from Santa Cruz to Santa Barbara, is 154 gpcd (City of Santa Cruz Water Department, May 2, 2011). Over the last 10-year period, per capita water use within the City of Santa Cruz service area has declined from about 126 gpcd in 2001 to 93 gpcd in 2010 (Goddard, personal communication, August 2011). The City's 10-year baseline (ending 2010), determined in accordance with the state's technical methodologies, is 113 gpcd; the 5-year baseline (2003-2007) is 116 gpcd (Goddard, personal communication, June 2011).

Water suppliers have a choice of four methods under the law for determining their 2020 urban water use target. City staff recommended using Method 3, which is based on 95% of the applicable hydrologic region's target, which would be 123 gpcd. .In accordance with state methodologies, the Water Department is recommending a 2020 target of 110gpcd, and the City would be in compliance with state law if it maintains its per capita demand at or below this level.

4.5.2 RELEVANT PROJECT ELEMENTS

PROPOSED GOALS, POLICIES & ACTIONS

The proposed *General Plan 2030* includes goals, policies and actions that address provision of public services and facilities. In general, Policies LU1.3 and LU1.4 seek to ensure that facilities and services required by future development are available and that new development pays its proportional share. The Plan also seeks to provide community services and facilities to meet the needs of the population (CC2.1) and update and replace facilities (CC2.1.1).

The CIVIC AND COMMUNITY FACILITIES chapter of the draft *General Plan 2030* includes one goal with 11 associated policies and nearly 50 accompanying actions that address water service. Goal CC3 seeks a reliable and adequate water supply.

GOAL CC3 A safe, reliable and adequate water supply.

Policy CC3.1 supports implementation of the City's Integrated Water Plan, and its three accompanying actions support reduction in long-term demand with conservation, periodic updates of the City's Water Shortage Contingency Plan, and development of a 2.5 mgd desalination plant for drought protection with the potential for incremental expansion to 4.5 mgd. Other proposed policies address water demand and conservation, water management, protection of water supplies, including groundwater supplies, development of new water sources and provision of adequate water facilities. Several policies and actions in other chapters of the proposed General Plan also pertain to the City's water supplies and/or demand. Water conservation and audits at park facilities are supported (NRC1.1.3), as well as water conservation education related to creeks and wetlands (NRC1.1.5).

FUTURE DEVELOPMENT POTENTIAL

The *General Plan 2030* Land Use Map and land use designations are largely unchanged from the 1990-2005 General Plan / Local Coastal Program, except for three new mixed use land designations that have been developed and applied to the following major transportation corridors: Mission Street, Ocean Street, Soquel, Avenue, and Water Street. Some of the draft *General Plan 2030* policies and actions support specific types of land uses and/or development, including new mixed-use use districts and/or intensified redevelopment, as summarized in the LAND USE (Chapter 4.1) section of this EIR.

The *General Plan 2030* supports some specified new or improved community facilities. The draft plan supports development of a desalination plant (CC3.1.3) as part of the actions outlined to implement the City's adopted *Integrated Water Plan*. A specific site is not identified in the proposed General Plan, although the plan does support amendment of the General Plan as needed for a new community facility with the selection of a desalination plant site (LU3.10.2). Other specific water system improvements are not identified, but the plan supports maintenance and improvement of water facilities (CC4.3.1) and adequate provision of pumping, treatment and distribution facilities for production of groundwater of 1 mgd during normal years and 2 mgd during droughts (CC3.3.9).

4.5.3 IMPACTS AND MITIGATION MEASURES

CRITERIA FOR DETERMINING SIGNIFICANCE

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines (including Appendix G), City of Santa Cruz plans, policies and/or guidelines, and agency and professional standards, a project impact would be considered significant if the project would:

5a Have insufficient water supplies available to serve the project from existing entitlements and resources and/or require new or expanded entitlements to serve the project;

5b Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; or

5c Deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table.

IMPACT ANALYSIS

The following analysis assesses impacts to the City of Santa Cruz water supplies as a result of the proposed *General Plan 2030* (5a) and potential impacts on groundwater supplies (5c). The City Water Department indicates that the proposed project will not result in the need to construct or expand its water treatment facility or other water infrastructure/facilities to accommodate future water demand resulting from the proposed project (5b) (Kocher, City of Santa Cruz Water Department, personal communication, June 2011).

Potential Future Development & Buildout

Adoption and implementation of the proposed *General Plan 2030* would not directly result in increased new development. However, the draft General Plan includes policies and a land use map that support additional development. This potential development, as summarized in the LAND USE (Chapter 4.1) section of this EIR, could result in development of 3,350 residential units, 3,140,000 square feet of commercial, office and industrial development and 300 new

hotel rooms. This level of development could result in an increased population of 8,040 residents and 8,665 new jobs by 2030. The proposed General Plan also includes other policies and actions that could result in development that supports Santa Cruz as a year-round conference and arts destination (ED1.4, HA3.2.4).

New development accommodated under the proposed General Plan will result in the demand for water services. The impacts associated with water demand and service are presented below.

Preparation of a Water Supply Assessment (WSA)

The City has voluntarily chosen to prepare a Water Supply Assessment (WSA) pursuant to Water Code Section 10910 et. seq. to inform the City's environmental review for the proposed *General Plan 2030*. The findings and conclusions of the WSA regarding project water demand and availability are summarized below. The WSA is intended to provide the kind of information required of a formal "water supply assessment" required by Water Code section 10910 et seq. (commonly known as SB 610), even though the City does not believe that SB 610 actually applies to a comprehensive general plan update. Rather, SB 610 applies to categories of "projects" subsidiary to city-wide general plan updates (e.g., specific plans or general plan amendments contemplating the construction of more than 500 dwelling units). The limited application of these Water Code requirements was very clear in the predecessor to SB 610, known as SB 901 (see former Water Code sections 10910, subd (a) and 10913.) When SB 901 was in effect (1996 through 2001), it was intended to complement the requirements of Government Code sections 65352, subdivision (b)(7), and 65352.5, which remain in effect and require cities and counties, in updating their general plans, to consult with "public water agencies" and to receive from them detailed information regarding water supply availability.

Even though the City believes that SB 610 was not intended to change the approach that was in effect during the lifetime of SB 901, the City has nevertheless undertaken preparation of a WSA with the intent of having it function as a de facto water supply assessment, despite the general nature of the project at issue and the unavoidably general nature of discussion included herein. It is important to acknowledge, however, that this document is not a substitute for the formal consultation required by Government Code sections 65352 and 65352.5.

The WSA was presented to the City Water Commission on April 4, 2011, and the Commission recommended that the assessment be forwarded to the City Council. The City Council considered and approved the WSA at a public hearing on April 26, 2011.

Impact 4.5-1 Water Supply
Adoption and implementation of the proposed *General Plan 2030* could indirectly result in increased development and population growth that would result in an increased demand for water supply in a system that currently has inadequate supplies during dry years and may have inadequate supplies in normal years in the future. This is considered a *potentially significant impact*.

Project Water Demand

Future development accommodated by the proposed *General Plan 2030* could result in construction of new residential units and non-residential square footage as described above. Based on water use rates developed by the City Water Department, development accommodated under the proposed general plan could result in a new water demand of nearly 240 MGY as summarized on Table 4.5-4.

TABLE 4.5-4
Estimated *General Plan* 2030 Water Demand

Type of Use	Amount	Water Demand Rate [2]	Total Demand (MGY)
Residential – SFD	840 [1]	194/gpd/unit	60
Residential -- MFD	2,510 [1]	70 gpd/unit	64
Commercial	1,087,983 sf	66 gp/sf/year	72
Hotel Rooms	311	93/gpd/room	11
Office	1,273,913 sf	18/gpsf/year	23
Industrial	776,926 sf	12gp/sf/year	9
		TOTAL	239 MGY

[1] Assume 75% MFD and 25% SFD of new dwelling units.
[2] Water Demand Rates developed by City of Santa Cruz Water Department

In developing water demand forecasts, the WSA also took into account municipal and irrigation water demands until 2030, which was estimated at approximately 12 MGY. Thus, the additional incremental water demand associated with development and growth under the proposed *General Plan 2030* by the year 2030 is estimated to be 251 MGY.

Effects of Project Water Demand within Service Area

Water demands in the 2005 UWMP were primarily based on estimates of population- and water account-growth through 2020 in a water demand investigation that was completed in 1998. The 2005 UWMP indicated that these projections significantly overestimated actual water demand within the City's service area, and the UWMP presented two plausible projections (i.e., scenarios) of potential water demand growth between 2005 and 2020. *Scenario 1* assumed that the City's accounts for the three largest customer classes (residential, business, and irrigation) would grow at an annual rate of 0.8% (i.e., in proportion to the amount of growth envisioned in existing housing elements and general plans and that water use at UCSC would increase by 2020 as predicted in the draft 2005 LRDP). *Scenario 2* assumed that

the City's accounts would increase at a lower annual rate of 0.4% (based on actual growth rates experienced since 1997), and that water use at UCSC would increase at half the rate predicted in the Draft 2005 LRDP. Neither of the 2005 UWMP scenarios extended beyond the year 2020, as the City considered these projections to be too speculative at that time.

The water demand estimates presented in the 2005 UWMP were further updated in the WSA prepared in 2009 for the City's proposed Sphere of Influence Amendment and Provision of Extraterritorial services EIR (City of Santa Cruz, July 2010). In order to extend the City's demand projection out to the year 2030, the City looked at the updated AMBAG (2008) population projection and multiplied this additional growth by the average per capita water use projected for 2010 through 2020 in the *UWMP Scenarios 1 & 2*. In addition to extending the UWMP scenarios by 10 years (i.e., to the year 2030), two additional modifications were made to the 2005 UWMP to include revisions to the UCSC 2005 LRDP EIR water demand projections pursuant to the 2005 LRDP Final EIR and the Settlement Agreement, and the inclusion of the full volume of the projected water use for UCSC for the lower-end scenario, instead of just half of the UCSC water demand, as was assumed in the 2005 UWMP. The updated water demands generally fall within the range of projected water demands presented in the UWMP.

The WSA prepared for this EIR develops new water demand projections and updates the UWMP projections based on the following methods:

- Land use changes and development estimated for the *General Plan 2030* buildout;
- Water demand for UCSC are based on its adopted 2005 LRDP and estimates of additional water demand after the LRDP's projected timeframe; and
- Estimates of population growth developed by AMBAG serve as the basis for water demand projections for the remainder of the City's water service area outside City limits.

The estimated demand is compared with two baseline existing waster use scenarios as described below. The two estimates are intended to bracket the upper and lower range of water demand that may reasonably be expected to occur in the future, and reflect long-term conservation reductions already realized by existing customers (EKI, March 2011). The estimated water demand outside of the City is further addressed in "Cumulative Impacts" subsection 5.4 of the CEQA CONSIDERATIONS (Chapter 5.0) section of this EIR.

- Existing Water Demand Estimate 1" (1999-2004). This time period represents an extended period of stable water use before the onset of several factors that have affected recent water use, such as economic downturn, drought conditions, and increase in billing rates.

- "Existing Water Demand Estimate" 2 (2007 through 2008). This time period reflects water usage after the economic downturn, drought conditions and increase in billing rates. This scenario does not consider water use in 2009 as water use restrictions were imposed during this period due to drought conditions (EKI, March 2011).

Based on these scenarios, the WSA models indicate that existing water demand within the City is 2,069 MGY under Estimate 1 and 1,843 MGY under Estimate 2. With addition of the

proposed project, water demand within City limits would increase by 251 MGY, resulting in a total city demand of 2,320 MGY in Estimate 1 and 2,094 MGY under Estimate 2.

NORMAL YEAR SUPPLY AND DEMAND WITH PROJECT

Based upon the updated water demand projections in the WSA, the City's water supply for a normal hydrologic year is sufficient to meet the existing water demand and the incremental water demand associated with development accommodated by the proposed General Plan through about the year 2020. Under normal years, the City's water supplies provide approximately 4,300 MGY of water. Existing estimated water demand within the entire service area with the addition of the proposed project water demand would total approximately 4,244 MGY under the "Estimate 1" water demand scenario and 3,773 MGY under the "Estimate 2" scenario in the year 2030 (EKI, March 2011). Water supplies would be adequate to serve buildout accommodated by the proposed General Plan without any other increased water demand in the City's service area.

With other growth and development, water demand within the City's entire service area in 2030 is estimated as 4,537 MGY under "Estimate 1" and 4,046 MGY under "Estimate 2". With other growth and development in the service area taken into account, the City's normal water supply may not be sufficient after the year 2020 under the Estimate 1 growth scenario, which is based on average water use between 1999 and 2004. However, there would be sufficient water supplies until the year 2030 under the Estimate 2 growth scenario in which average water use would continue along the same trend as experienced in the last few years (Ibid.). This does not take into account potential reductions in water supply that could reduce the City's estimated normal year capacity of approximately 4,300 MGY due to potential changes in North Coast or San Lorenzo River diversions resulting from federal and state agency decisions. Other growth in the City's water service area is addressed in the "Cumulative Impacts" subsection of the CEQA CONSIDERATIONS (Chapter 5.0) section of this EIR.

DRY YEAR SUPPLY AND DEMAND WITH PROJECT

The WSA concludes that the City does not have sufficient water to meet current or future projected water demand during dry years, irrespective of future development and growth accommodated by the proposed General Plan. As previously indicated, during a dry year, the City currently has is approximately 3,800 MGY available and approximately 2,700 MGY available during the second year of a drought (City of Santa Cruz, February 2006). An annual average deficit of 5% may exist between the City's water supply during a single dry year and the existing water demand. If development associated with the proposed *General Plan 2030* and elsewhere within the City's water service area is also considered, then an annual average deficit of 12% between 2010 and 2020, and up to 16% by 2030, may be experienced during a single dry year. Annual average deficits are greater for multiple-dry year periods. The annual average deficit between the City's water supply during a second dry year and existing demand is estimated to be 23% to 32%. This deficit increases to 33% to 40% by 2030 in a multiple-dry year if planned development also is taken into account. It is important to note that these deficits are annual average values that do not address peak season cutbacks, which can be significantly greater than the annual average deficits due to seasonal variations in demand and supply, and limitations on the City's water storage facilities (EKI, March 2011). These estimates also do not take into account potential reductions in water supply that could reduce the City's estimated normal year capacity of approximately 4,300 MGY (e.g., potential

changes in North Coast or San Lorenzo River diversions resulting from federal and state wildlife agency decisions discussed above).

CONCLUSION – SUPPLY AVAILABILITY

Water supplies are sufficient to serve the proposed project in a normal year with existing water demand until approximately 2020, or until 2030 if reduced water demand trends throughout the service area continue. If reduced demand trends do not continue, water supplies in a normal year may be insufficient after the year 2020 with other new development and growth in the City's water service area, which is further addressed in the "Cumulative Impacts" subsection (5.4) of the CEQA CONSIDERATIONS (Chapter 5.0) section of this EIR.

Water supplies are not sufficient under existing conditions in dry years. Due to existing insufficient water supplies during dry waters, additional demand from the proposed project would be considered significant. Furthermore, supplies in normal years may become inadequate between 2020 and 2030, and, thus, additional demand from the proposed project would be considered significant.

Reasonably Foreseeable City Water Supply Sources

As previously indicated, a basic assumption of the City's *Integrated Water Plan* and 2005 UWMP is that the City will continue to use its existing water supply sources in the future without change in current production levels. However, the City faces a series of ongoing challenges that potentially could lead to some loss of existing supply in the future, although it is uncertain at this time to what extent and which supplies might be affected. These considerations include the preparation of a HCP that could adjust diversions in some scenarios, water rights petitions, and reduction of groundwater production to protect against saltwater intrusion.

The HCP is being developed to prevent impacts to endangered fish, which are generally the greatest on the North Coast streams during the dry season and during dry water years, as well as wet season salmonid migration and spawning (City of Santa Cruz Water Department, April 2011). The proposed strategy consists of provision of specified instream flows during different periods and with and without water supply augmentation and other mitigation strategies. The proposed strategy consists of three tiers. The water supply implications of providing Tier 1 flows are minimal as these flows would maintain existing habitat levels by maintaining current status quo for operations to ensure no further degradation in habitat and can currently be met in most years (88% of years) with the City's current water supply system and without exacerbating the magnitude of dry weather shortages (currently about 35% shortage under 1977 drought hydrology) (Ibid). The situation gets worse over time as water demands grow with the frequency of dry weather shortages increasing and the magnitude of drought year shortages growing more severe. Tier 2 flows would provide better than existing habitat in North Coast streams and San Lorenzo Lagoon (with priority to Laguna Creek and San Lorenzo Lagoon due to their relatively greater habitat value for anadromous salmonids). While this magnitude of instream flows is possible in most years in the near term during wet and average water years, it results in a Critical Water Shortage Emergency (33 – 43% peak-season shortage) in dry years, which are 10% of years. By 2030, the Critical Water Shortage Emergency grows (42 – 50% peak-season shortage) and can occur in 28% of years without the development of 2.5 mgd of additional dry weather water supply (Ibid.).

The utilization of any one water source varies monthly and throughout the year and also during wet, normal and dry years. Thus, the City cannot confidently predict at this time, the actual amount of potential water supply reduction that may occur due to the HCP effort, which is an ongoing process that has not been completed. However, the City acknowledges the uncertainty of the future water supply capacity. The estimated demand and supplies presented in this EIR are based on estimates and updates of current adopted plans and existing known supply limits. The UWMP is being updated and is likely to be adopted in Fall 2011, and will present any new information that may be available regarding water supply availability.

As previously mentioned, the City is pursuing construction of a desalination plant to provide a reliable supplemental water supply in dry years, which is necessary even without the proposed project. This is part of the City's overall water supply strategy that also includes conservation and curtailment during droughts as set forth in the City's adopted *Integrated Water Plan* and *Urban Water Management Plan*. This water supply strategy is further described below.

DESALINATION

The City is actively pursuing construction of a desalination plant as the preferred supplemental water source identified in the City's adopted IWP and UWMP. The City's adopted IWP reviewed six alternatives and identified seawater desalination as the only feasible alternative for a backup supply of drinking water during a drought to meet demand with a 15% curtailment level set forth in the adopted IWP. The other alternatives would not provide the yield needed to accommodate existing and future drought demands during a multiple-dry year period. As currently envisioned, the desalination facility would initially provide 2.5 mgd for supplemental supply during a drought and could be expanded to 4.5 mgd.

As a preliminary step, the City recently completed operation of a "pilot project" to gather information to establish the optimal design and operating parameters for a permanent facility. Based on these results, the City is moving forward with design plans and environmental review for a permanent facility for drought protection, which is expected to be constructed and in operation by the year 2015, pending completion of project-level environmental review and regulatory permit approvals, including approval of a coastal development permit from the Coastal Commission.[7]

The City acknowledges some uncertainty related to the approval and timing of the permanent desalination plant construction and operation. The likelihood of construction of a permanent plant is currently uncertain as design plans have not been completed, and it cannot be predicted at this time whether the Coastal Commission and other agencies would issue the necessary approvals. For these reasons, the City concludes that it cannot "confidently determine" that this source is "reasonably likely," as spelled out in the guidance provided by the California Supreme Court in its decision in *Vineyard Area Citizens et al. v. City of Rancho Cordova* (2007) 40 Cal.4th 412. Nonetheless, the City has identified a desalination plant as its best option to alleviate supply

[7] Other potential permits, approvals and/or consultations for a permanent desalination plant and supporting infrastructure (i.e., intake facility and distribution pipeline) may be required from various agencies, including, but not limited to U.S. Fish and Wildlife Service, State Lands Commission, and California Department of Health Services.

shortages in drought conditions, and therefore has committed to pursuing this option with the intent of working diligently with the other agencies with regulatory and/or permitting authority over the plant to obtain all necessary approvals. Thus, the future desalination facility, which is planned and being pursued, is considered to be the most likely future water source, although it nonetheless remains somewhat uncertain until design, environmental review and regulatory approvals are completed.

Another consideration regarding whether a desalination plant is likely to be constructed and operated is the fact that the City and Soquel Creek Water District (SqCWD) are pursuing the desalination plant as a joint project. The SqCWD would use some or all of the future plant's capacity when the City doesn't need it to reduce SqCWD's reliance on groundwater and avoid potential seawater intrusion. The SqCWD would share in the cost of building and operating the plant. In 2006, the SqCWD Board adopted its updated Integrated Resource Plan, which identifies this regional desalination plant as its preferred use alternative, and SqCWD has provided assistance with funding for the pilot desalination plant.

POTENTIAL IMPACTS OF DESALINATION FACILITY

The desalination concept adopted by the City involves constructing a seawater intake system using an existing, abandoned wastewater outfall, building a new desalination plant and installing the associated pipelines and pump stations for delivering treated water to the Bay Street Reservoir and conveying seawater concentrate to the City's wastewater facilities, where it would be blended with municipal wastewater flows and disposed via a deep ocean outfall (City of Santa Cruz Water Department, February 2006). A desalination facility site was identified along the Delaware corridor. The certified IWP EIR evaluates impacts of the construction of a desalination facility and associated pipelines on a programmatic level for the initial construction of a 2.5 mgd facility for drought protection (Alternative D-1) and the same with participation of the SqCWD (Alternative 2) and two subsequent expansions (3.5 and 4.5 mgd) for each alternative. The EIR document, which consists of the following two documents, is hereby incorporated by reference in accordance with the provisions of the State CEQA Guidelines section 15150.[8]

- City of Santa Cruz Water Department. June 2005. *Draft Integrated Water Plan Program Environmental Impact Report*. State Clearinghouse #2003102140. Prepared by EDAW.
- City of Santa Cruz Water Department. October 2005. *Final Program Environmental Impact Report, Response to Comments Document*. State Clearinghouse #2003102140. Prepared by EDAW.

Construction of a desalination plant could have physical environmental effects, and the IWP EIR identified potentially significant impacts that could be mitigated to a less-than-significant level, except for temporary construction noise, which was found to be a significant unavoidable impact. Potentially significant impacts that could be mitigated are summarized in Chapter 1 of the Draft EIR and updated in Chapter 3 of the Final EIR and include the following: hydrology

[8] The EIR documents are available for review at the City of Santa Cruz Water Department, 809 Center Street, Room 102, Santa Cruz, California 95060; phone: 831-420-5200 and are also available for review online at: http://www.ci.santa-cruz.ca.us/.

and water quality, marine resources, land use, biological resources, air quality, noise, geology and soils, cultural resources, public services and utilities, visual resources, hazardous materials, and traffic. The identified impacts included both impacts of plant operation and construction. These are summarized below. It should be noted, however, that further project-specific environmental review will be conducted once permanent plant design plans are prepared.

Potentially significant desalination plant operational impacts include:

- *Water Quality Degradation* (5.1-2) due to discharge of seawater concentrate from the desalination plant and potential improper storage, use and disposal of chemicals at the desalination plant (5.1-3). The seawater concentrate produced from the desalination plant is proposed to be mixed with the effluent from the City's wastewater treatment plant. The analysis found that this combination would not exceed the City's wastewater plant discharge requirements and the salinity level would be lower than that of the ambient ocean water. With proper management, impacts would be reduced to a less-than-significant level. This includes construction of concentrate storage at the treatment plant for times when effluent flow is not adequate for mixing with the concentrate being generated by the desalination facility, and control of mixing with automatic and continuous monitoring. Chemicals would be required to be properly stored and disposed, and the facility would be designed to prevent unauthorized disposal of chemicals into the concentrate waste stream.
- *Impacts to Marine Resources* due to operation of the seawater intake which could entrap marine organisms (5.2-1). Construction of intakes, pumps and other facilities could result in disturbance to marine and/or nearshore habitat and species (5.2-4, 5.2-9). The impacts of the intake were determined to probably not be significant because the maximum daily intake is much lower than volumes that have been found to have significant adverse impacts on marine organisms, and because the intake would be designed to reduce losses. However, this issue would require more detailed studies and analyses for a 4.5 mgd facility. Construction of facilities would proceed after site-specific reviews determine that none are located in sensitive areas. According to the Initial Study and Notice of Preparation prepared for the project-level EIR that is being prepared, two types of intake systems are being evaluated: sub-seafloor intakes and screened, open-ocean intakes with a number of alternatives being considered for each of these types of intakes (scwd[2], November 2010).
- *Exposure to Flood* (5.1-4), *Seismic Hazards* (5.7-1), and/or *Soils Limitations* due to project siting (including distribution facilities) and operation that could be mitigated by implementation of recommended engineering and design measures to withstand and minimize damage from these hazards.
- *Impacts to Cultural Resources* due to inadvertent disturbance of potential or unknown cultural resources during (5.8-1, 5.8-2, 5.8-3) that can be mitigated by pre-construction and during construction surveys and protection.
- *Removal of Emergency Wastewater Discharge Pipeline* (5.9-4) with use of the wastewater plant's abandoned outfall line for the intake system that would be mitigated with upgrades to the treatment plant facilities.

- *Visual Impacts* (5.10-2, 5-10.3) that can be mitigated with proper design and vegetative screening.
- *Hazardous Exposure* to workers due to accidental spills and/or release of chemicals (5.11-1, 5.11-3) or disturbance of contaminated soils during construction (5.11-2) that can be mitigated with implementation of proper storage, containment, and emergency controls.

Construction impacts include:

- *Water Quality Degradation* (5.1-1) due to construction of the pipeline in locations close to surface water bodies and potential erosion during construction (5.7-2). These would be mitigated with implementation of construction controls and best management practices.
- *Impacts to Biological Resources* due to construction that may disturb sensitive habitat or special status species (5.4-1, 5.4-2, 5.4-3, 5.4-4, 5.4-5) or result in indirect impacts related to sedimentation (5.4-6). These impacts can be mitigated with standard pre-construction surveys, siting to avoid sensitive resources, establishment of construction buffer zones, and other construction controls and best management practices to prevent indirect impacts.
- *Air Emissions*, primarily related to air emissions during construction (5.5-2) that would be mitigated with standard dust control measures during construction.
- *Construction Traffic* for temporary periods during construction (5.12-1, 5.12-2) that can be mitigated with implementation of traffic control plans and measures.
- *Solid Waste Generation* (5.9-3) that would be mitigated with construction specifications regarding excavation reuse and recycling.
- *Construction Disturbance to Adjacent Land Uses* (5.3-1) due to construction noise, dust, etc. and potential interference with utility lines (5.9-1) that could be mitigated to some extent, although not to a less-than-significant level, with construction controls, such as limits on hours of operation.

The EIR also found that the first construction increment for both alternatives would have no growth-inducing impacts, and that the subsequent plant expansion increments would require further review of population projections and City/County land use planning documents prior to any expansion of a plant to ensure that development of an additional water supply is consistent with, but does not outpace, planned growth projections (City of Santa Cruz Water Department & EDAW, June 2005). In most cases, the EIR concluded that the CEQA significance level of impact between Alternatives D-1 and D-2 is similar (with D-1 being the City building a desal plant exclusively for its own use, and D-2 being a joint project between the City and the SqCWD), except for the impact on local and regional groundwater supply. For this environmental issue area, Alternative D-2 is likely to provide a beneficial impact on the groundwater basin. The delivery of desalinated water to SqCWD during normal and wet years would allow reduced pumping in the district and potentially contribute to additional groundwater in storage (Ibid.).

Based on the programmatic review conducted as part of the IWP, nearly all physical impacts are expected to be minimized or adequately mitigated. Expansion to provide additional

capacity for planned growth would involve minimal physical expansion to add additional filters, but would also be subject to additional environmental review to further analyze growth inducement potential based on review of City, County and Capitola General Plans.

Project-level environmental review is currently underway, concomitant with preparation of design plans for a permanent facility. An EIR is being prepared that will address potential impacts at two plant sites along Delaware Avenue with several intake options, and brine disposal. According to the EIR Notice of Preparation released in November 2010, the proposed desalination project would consist of: (1) a seawater intake structure, associated pump station, and conveyance piping; (2) a seawater desalination plant that would provide for pretreatment filtration, seawater reverse osmosis (SWRO), post-treatment conditioning and disinfection, and solids handling processes and their associated support facilities; (3) a brine disposal and conveyance system; and (4) water supply delivery system improvements. The EIR will provide comprehensive project-level analyses, including topics not included in the IWP EIR, such as greenhouse gas emissions and climate change. Global climate change is predicted to result in a sea level rise. The area in which a desalination plant is being considered is located approximately 20 feet above sea level, and not within areas that have been estimated to be affected by sea level rise within the City. Nonetheless, project design plans and future site-specific environmental reviews will need to assess and address this issue based on the most up-to-date information available.

ADDITIONAL CONTINGENT CITY WATER SOURCES

As previously discussed, several possible water supply options were carefully evaluated, including drilling more wells, upgrades to the North Coast system, and a water transfer involving exchange of groundwater with recycled wastewater for agricultural use on State Park lands north of the City. Both the wells and groundwater exchange concept ultimately proved infeasible, leaving seawater desalination as the only practicable solution available to the City (City of Santa Cruz Water Department, February 2006).

Recycled wastewater was determined to be potentially feasible for agricultural irrigation, but would produce high cost, limited yields that were too small to meet the City's drought-year needs (City of Santa Cruz Water Department, February 2006). Recycled water for landscape irrigation remains a potentially viable alternative that could be pursued in the future. However, currently it is not the City's preferred water supply strategy. The use of recycled water for landscape irrigation was previously rejected from further consideration due to a number of reasons, including the limited yield and high cost. The potential users of the recycled water (i.e., parks, schools, cemeteries, golf courses, UCSC) have an estimated outdoor irrigation demand of approximately 170 to 230 MGY. This amount was considered too small by itself to meet the City's drought-year needs and also had a high capital cost. Additionally, water recycling would be as expensive as desalination and would not provide a sustainable yield for a multiple-year drought scenario, and thus, would not be a reliable, cost-effective supplemental source.

The City's 2005 UWMP indicates that, in addition to pursuing desalination, the City remains open to exploring other water supply alternatives that would not be feasible to develop in the short-term, but may be useful to consider over a 20-year timeframe, such as water recycling, groundwater recharge, reservoir expansion, aquifer storage and recovery and off-stream storage. These potential alternatives have not yet been fully studied and consideration of such

sources would occur at some point further in the long-term, if the desalination project is not ultimately approved.

Proposed General Plan Policies & Future Plans

The Draft *General Plan 2030* includes goals, policies and actions that set forth comprehensive measures to avoid and minimize adverse impacts on water supply. These include: measures to reduce water demand and promote conservation; protect and manage existing water supplies; develop new water sources; provide watershed management and water management planning; and maintain water system facilities. A summary of the proposed *General Plan 2030* policies that serve to reduce/mitigate impacts of increased water demand on City water supplies are summarized in Table 4.4-5. The plan calls for implementation of the City's IWP and UWMP with annual status reports to the City Council on water demand and supplies and updates of the UWMP. The proposed General Plan seeks to reduce demand through continued and improved conservation, as well as to investigate new water sources (CC3.10).

Additionally, the proposed plan also seeks to coordinate major land use planning decisions in all three jurisdictions served by the City water system (CC3.6), including implementing the City's Urban Water Management Plan and updating it periodically as required by State law (CC3.6.1). The plan calls for provision of annual updates to the City Council on the status of remaining water supply (CC3.6.2) as part of a process to confirm or adjust the estimate of remaining supply to avoid oversubscribing the water system (CC3.6.3). As required by State law, the City is in the process of updating its 2005 UWMP, which will further review water supply availability and demands based on the most recent available information.

Conclusion. Future development accommodated by the proposed *General Plan 2030* would result in an increased water demand under a conservative, "worst-case" growth scenario that may exceed available water supplies after the year 2020 for normal year conditions, and would contribute additional demand in dry years for which supplies are currently inadequate. Estimated water demand associated with buildout accommodated by the proposed General Plan 2030 would not exceed existing supplies in a normal year, but supplies could become insufficient during the General Plan timeframe with consideration of all demand within the water service area. Thus, the increased water demand would be considered a significant impact. With implementation of the proposed *General Plan 2030* policies and actions to reduce water demand, promote additional water conservation, manage and protect water supplies, and develop a reliable, supplemental water source, such as desalination, the impact could be reduced to a less-than-significant level. However, despite the City's intent to pursue an additional water supply for dry-year conditions, there are some uncertainties associated with these future actions. The City acknowledges the inherent uncertainty about its ability to obtain all necessary approvals for, and completion of, the planned desalination facility. Furthermore, further reductions in surface water supplies due to implementation of wildlife protection strategies under an HCP may require that the City seek additional supplies and/or expansion of a desalination facility beyond that which is currently planned for drought supply. Therefore, the project impact on City water supplies during both normal and during dry year conditions is considered significant.

TABLE 4.5-5
Proposed General Plan Policies & Actions that Reduce Water Supply Impacts

Type of Measure / Action	Policies / Actions
WATER DEMAND MANAGEMENT AND/OR REDUCTION	◆ Reduce demand through Conservation: CC3.1.1 and promote conservation: CC3.11, CC3.11.1 ◦ Implement urban water conservation BMPs: CC3.5.1 ◦ Economic incentive with rates: CC3.9.1 ◦ Offer home audit programs: CC3.5.3 ◦ Financial incentives to install low-flow fixtures: CC3.5.4 ◦ Provide info on onsite water catchment systems: CC3.5.5 ◆ Updated landscaping guidelines and offer irrigation audits: CC3.11.2, CC3.11.3 ◦ Parks Irrigation Audits: NRC1.1.3 ◦ Offer water audit programs: CC3.5.3 ◆ Promote maximum water use efficiency & implement urban water conservation measures: CC3.5, CC3.5.7 ◆ Support gray water collection and reuse: NRC7.4.3 ◆ Require high efficiency fixtures in City projects: NRC7.4.1, NRC7.4.2 ◆ Audit water system to minimize losses: CC3.5.9 ◆ Administer retrofit & landscaping standards for new development: CC3.5.6 ◆ Regional collaborations and cooperation: CC3.5.10, CC3.5.11
WATER MANAGEMENT PLANNING	• Implement IWP: CC3.1 & actions (conservation, contingency, desalination) • Implement & update Urban Water Management Plan: CC3.6.1 • Provide annual updates to Council on status of water: CC3.6.2 • Confirm/adjust estimate of remaining supply to avoid oversubscribing the water system: CC3.6.3 • Complete Climate Risk Assessment: NRC4.5.1
LAND USE DECISIONS	• Coordinate land use planning between jurisdictions served by City: CC3.6 • No new North Coast connections: CC3.8 • Allow extension of water service area only if approved by City Council and/or LAFCO: CC3.7 • Consider developing significance criteria for development projects: CC3.6.4
MAINTAIN, PROTECT & MANAGE WATER SUPPLIES	• Ensure development does not lead to water source overdraft through environmental review process: LU1.2, LU1.2.1 • Secure and maintain water rights: CC3.3.3 • Safeguard existing surface and groundwater sources: CC3.3., CC3.3.4 • Meet or exceed regulatory drinking water standards: CC3.2 & actions
PROTECT & MANAGE GROUNDWATER SUPPLIES	• Safeguard existing surface and groundwater sources: CC3.3., CC3.3.4 • Manage City watershed lands to protect drinking water: CC3.3.1 • Monitor groundwater levels and quality: CC3.3.9 **CONTINUED ON NEXT PAGE)**

TABLE 4.5-5
Proposed General Plan Policies & Actions that Reduce Water Supply Impacts

Type of Measure / Action	Policies / Actions
	• Participate with the Soquel-Aptos Groundwater Management Alliance in cooperative efforts to assure the quality and production of groundwater resources: CC3.3.10
DEVELOP WATER SUPPLIES	• Develop desalination plant: CC3.1.3, LU3.10.2 (Initiate GP amendments when desal site selected) • Investigate new water sources: CC3.10 • Explore recycled water : CC3.10.1, CC4.3 • Provide adequate facilities for groundwater production: CC3.3.8
WATER FACILITY MAINTENANCE	• Provide adequate pumping, treatment, and distribution facilities for production of groundwater of 1 mgd in normal years and 2 mgd during droughts: CC3.3.8 • Update Water Shortage Contingency Plan to respond to water shortages: CC3.1.2 • Maintain and improve the water system., including for fire flow, treatment plants, storage & distribution facilities CC3.4, CC3.4.1, CC3.4.3

Mitigation Measures

Implementation of the proposed *General Plan 2030* policies and actions to reduce water demand, promote water conservation, and support development of reliable supplemental water supplies will not reduce this impact to a less-than-significant level due to uncertainties regarding funding and implementation of desalination or another adequate alternative water supply, which may be needed to serve future growth. Therefore, the conservative conclusion is that the project impact on City water supplies during both normal and during dry year conditions is significant and unavoidable, even with implementation of proposed *General Plan 2030* policies and actions.

Impact 4.5-2 Groundwater
Adoption and implementation of the proposed *General Plan 2030* could indirectly result in increased development and population growth that would result in an increased demand for water supply. However, the draft *General Plan 2030* plan does not propose expansion of groundwater supplies, and with implementation of proposed policies and actions, groundwater supplies would not be depleted, nor would development accommodated by the plan interfere with groundwater recharge. This is considered a *less-than-significant impact*.

Adoption and implementation of the proposed *General Plan 2030* would not directly result in increased new development. However, the draft General Plan includes policies and a land use

map that support additional development, as summarized above. As indicated in the "Environmental Setting" section above, groundwater constitutes only approximately 4% of the City's entire water supply, but it has been a crucial component of the water system for meeting peak season demands and during periods of drought. The groundwater supply consists of three production wells in the Live Oak area outside of the City. The average annual production is approximately 160 MGY, but the system was operated at its full 2 mgd capacity at times during the 1987-1992 drought, during which time annual production reached 430 MGY. A replacement well is currently proposed and undergoing project-level environmental review by the City However, the City recognizes that the uncertain nature of groundwater conditions in the western portion of the basin is a serious issue and has limited future maximum extraction during all water years to 215 MGY or approximately 1 mgd (City of Santa Cruz Water Department, December 2010 and Kocher, personal communication, June 2011).

Development that would be accommodated by the *General Plan 2030* is located within City limits, which is primarily developed, and would not be located in areas of groundwater recharge. The groundwater basin utilized as part of the City's water supplies is located outside city limits.

The Draft *General Plan 2030* includes goals, policies and actions that set forth comprehensive measures to protect groundwater resources as summarized on Table 4.5-5. Policy CC3.3 and its supporting actions seek to safeguard existing surface and groundwater sources. Action CC3.3.8 supports provision of adequate pumping, treatment, and distribution facilities for production of groundwater of 1 mgd in normal years and 2 mgd during droughts, which are the historical levels at which the City's groundwater supplies have been utilized, and thus, they do not represent an increase in use or expanded production of groundwater sources. However, as indicated above, the City has limited maximum extraction to 1 mgd.

The City's *Urban Water Management Plan* indicates that there is a potential for saltwater intrusion to jeopardize the safe production of groundwater from the Purisima aquifer, but also notes that at this time, under normal operations, there appears to be no imminent threat of seawater intrusion, and the State Department of Water Resources has not identified the basin as overdrafted or projected to be overdrafted. Proposed Policy LU1.2 and Action 1.2.1 seek to ensure that development does not lead to water source overdraft through evaluation during the environmental review process. Additionally, proposed Action CC3.3.9 proposes monitoring groundwater levels and quality, and continued participation with the Soquel-Aptos Groundwater Management Alliance in cooperative efforts to assure the quality and production of groundwater resources (CC3.3.10). The goals of the agreement are to establish common basin management objectives, undertake joint research projects, and improve interagency coordination to assure the safe production and protect the quality of the underground resource (EKI, March 2011).

> **Conclusion.** Future development accommodated by the proposed *General Plan 2030* would result in an increased water demand, but there are no plans to expand groundwater pumping. Similarly, development accommodated by the proposed plan would not be located within groundwater recharge areas and would have no effect on recharge capabilities. Therefore, the project would not deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table. Implementation of

proposed policies and actions to monitor and protect groundwater resources would ensure that groundwater supplies are protected and not depleted in the future. Thus, this is a less-than-significant impact.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified. However, revision of the following *General Plan 2030* action is recommended.

Recommended Revisions to the *Draft General Plan 2030*

Revise or add policies/actions as indicated below. Deleted text is shown in ~~strikeout~~ typeface, and new text is shown in underlined typeface.

CC3.3.8 Provide adequate pumping, treatment, and distribution facilities for the reliable production of groundwater of 1 mgd in all ~~normal~~ years. ~~and 2 mgd during droughts~~.

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