SECTION 1 EXECUTIVE SUMMARY

1.1 Introduction

The City of Santa Cruz (City) and the Soquel Creek Water District (District), as joint Lead Agencies, have prepared this Draft Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) and the CEQA Guidelines, to evaluate the potential environmental effects of the proposed **scwd²** Regional Seawater Desalination Project (proposed project). The proposed project entails the construction and operation of a seawater desalination plant and related facilities with a capacity of 2.5 million gallons per day (mgd) and potential expandability to 4.5 mgd that would be shared by the City and the District.

The decision-making bodies of the Lead Agencies, the City Council and the District Board of Directors, are required to consider the information in this EIR, along with any other relevant information, in making their decisions about the proposed project. Although the EIR does not determine or recommend the ultimate decision that will be made regarding approval and implementation of the proposed project, CEQA requires the decision-making bodies to consider the information in the EIR, and, if they choose to approve the project, to make findings regarding each significant effect of the proposed project identified in the EIR (see **Section 2, Introduction** for additional information). Other agencies will also use this EIR when considering permits and other approvals on aspects of the project. **Section 4, Project Description** provides a complete list of other agencies expected to use the EIR during their decision making.

A list of acronyms and abbreviations used within this report is provided starting on page x.

1.2 Project Background

1.2.1 Previous Planning and Environmental Review

The *Integrated Water Plan Program Environmental Impact Report* (IWP Program EIR) was prepared and certified by the City Council in 2005 (City, 2005a). This document evaluated the City's Integrated Water Plan (IWP) elements, including fully implementing the City's Water Conservation Plan, curtailing water use during droughts, and developing a supplemental water supply consisting of a seawater desalination plant and related facilities, to address water supply shortages during droughts. The IWP Program EIR evaluated both a City-only and a regional desalination project in conjunction with the District. The District's Integrated Resources Plan (IRP) adopted in 2006 and updated in 2012, contemplated a shared desalination project in conjunction with the City (Environmental Science Associates, 2006; District, 2012a).

The IWP Program EIR provides programmatic environmental analysis of the regional desalination project currently being evaluated by both agencies, and thus sets the stage for the project-level analysis of the 2.5-mgd desalination plant evaluated in this EIR. Additionally, the

IWP Program EIR evaluated the potential incremental expansions of the plant up to 4.5 mgd that were contemplated in the IWP. Expansion of the proposed project beyond 2.5 mgd would require subsequent discretionary approval and CEQA documentation; however this EIR provides an updated programmatic level of analysis for potential future expansion.

1.2.2 City of Santa Cruz Water Supply Issues

The Santa Cruz Water Department is a municipal utility that is owned and operated by the City. The City provides water service to an area of approximately 20 square miles in size, including the entire City of Santa Cruz, adjoining unincorporated areas of Santa Cruz County (County), a small part of the City of Capitola (Capitola), and coastal agricultural lands north of the City.

The City's water system relies entirely on rainfall, runoff, and groundwater within watersheds located in the County. No water is imported from outside the Santa Cruz area. As a result, the City's system is vulnerable to shortages in dry years. During wet and normal years, the City usually has adequate supplies to meet demand. However, during dry and critically dry years, supplies are not adequate to meet demand as described in detail in **Section 3, Project Background**. During dry years, low surface water flows in North Coast streams and the San Lorenzo River coupled with depleted surface water storage in Loch Lomond Reservoir reduces the available supply to a level that cannot support existing demand, causing water shortages.

This condition will be or has been worsened primarily by: (1) the reduction in surface water diversions from all flowing sources that will result from anticipated Habitat Conservation Plan (HCP) requirements imposed by the fisheries agencies; and (2) the reduction in the production of groundwater from Live Oak wells by almost 50 percent to protect the aquifer from seawater intrusion. Climate change and pending water rights and entitlements could also result in a decrease in long-term water supply during the time frame of the proposed project.

Over 80 percent of the City's water supplies come from flowing sources such as Liddell Spring, Laguna Creek, Majors Creek, Newell Creek and the San Lorenzo River. These sources are important habitat for special-status species, including but not limited to coho salmon and steelhead, both in the anadromous salmonids family. The City is in the process of developing an HCP with the National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW) to obtain incidental take permits under the state and federal Endangered Species Acts (ESAs). In the absence of an approved HCP and incidental take permits, the City faces the threat of possible enforcement actions by the fisheries agencies for unauthorized take under the state and federal ESAs. As part of the HCP, the City needs to significantly reduce the amount of water it has historically diverted from North Coast streams and the San Lorenzo River to provide more water for steelhead and coho salmon. The HCP will, therefore, require the City to reduce its reliance on flowing sources. These reductions, combined with the City's ongoing vulnerability to water supply shortages, are the primary factors driving the need for an additional water supply.

While the HCP negotiations with the fisheries agencies are ongoing, the City has recently evaluated and modeled the likely outcomes of an approved HCP on water supply and the ability to meet customer demands. The evaluation resulted in a range of likely outcomes bracketed both by demand projections, as well as limits placed on surface water supplies. The results of the evaluation indicate that the City would be unable to meet the adopted IWP reliability targets, which are based on the frequency of water supply shortages and the maximum level of acceptable curtailment, under any of the scenarios evaluated. The conclusions of the evaluation are summarized below and described in detail in **Section 3**.

Based on nearly a century of hydrologic data, the City could experience some water shortage approximately every 2 to 3 years, with shortages that could be as high as 39 percent in the near term and up to 46 percent in the long term. These figures include reductions in customer demand through ongoing and new conservation programs. Depending on the outcome of the HCP development process, shortages could be substantially higher than those reported above. Water shortages above 35 percent are considered by the City to be a Stage 5 Critical Emergency that could threaten the health, safety and security of the community, as well as lead to substantial economic impacts to the area.

The water shortages identified above do not take into consideration climate change effects, which are anticipated to result in long-term reductions in water supply. This, coupled with steady increases in water demand, could lead to greater water shortages in the future. Climate change could also result in a decline in groundwater recharge rates; such conditions could further affect the City's use of groundwater from the Live Oak Well System. As a result, the City's vulnerability to water supply shortages over time will likely increase.

The City has been engaged in extensive planning over the past 25 years to address these water supply issues. The City's adopted IWP calls for a diverse strategy that includes increased conservation and up to 15 percent curtailment of water (or water use restrictions) in dry and critically dry years. The City's per capita water usage rate is nearly half of the average rate for California and among the lowest reported for water agencies statewide. Additional conservation measures were determined to be insufficient to prevent severe water shortages in dry years. As a result, a supplemental water supply has been identified as a necessary element of the City's water planning strategy.

A number of water supply alternatives were investigated during a lengthy planning process and only one was determine to feasibly meet all the water supply objectives identified in the IWP: a seawater desalination plant (see **Section 8, Alternatives** for additional information on alternatives). The IWP specifically identified the need for a desalination plant with a capacity of 2.5 mgd, with the ability to expand the plant to 4.5 mgd to meet future needs. Because the needs of the City and District are complementary, the City elected to partner with the District to pursue a seawater desalination plant as a supplemental water supply. This cooperative 2.5-mgd supplemental supply project constitutes the proposed project being evaluated in this EIR. Additional information about the water supply needs of the City is provided in **Section 3**.

1.2.3 Soquel Creek Water District Water Supply Issues

The District is a nonprofit, local government agency formed under the County Water District Law (Water Code, Division 12, Section 30000 et. seq.) that provides potable water service and groundwater resource management within its service area. The District's service area encompasses seven miles of shoreline along Monterey Bay, and extends from one to three miles inland into the foothills of the Santa Cruz Mountains, essentially following the County Urban Services Line.

The District relies entirely on groundwater from the Soquel-Aptos area, which is currently being pumped at an unsustainable rate and is thus in a state of overdraft. This means that more water is pumped out through wells than is replenished by rainfall seeping deep underground into the aquifers. If the total groundwater extractions from the District and other pumpers (including the City, the Central Water District, mutual water companies, and private well owners) continue based on current practices, the groundwater levels will continue to be too low to protect against seawater intrusion. In order to increase the amount of groundwater to protective levels by allowing the basin to naturally recover, the District needs to reduce its groundwater pumping substantially, as the primary user of the basin.

Recent modeling and evaluations indicate that the District's post-recovery pumping goal is 4,000 acre-feet per year (afy), which would be applicable after coastal groundwater elevations recover adequately to prevent seawater intrusion. Groundwater recovery to protective levels is predicted to take at least 20 years if annual District pumping is limited to no more than 2,900 afy (recovery pumping goal). In order to recover groundwater levels to protective elevations and eliminate overdraft, the District must temporarily reduce pumping to this level, and other users must not further increase groundwater pumping in the overdrafted portion of the basin.

Similar to the City, the district water usage rates already reflect substantial efforts in water conservation and the District is continually advancing water conservation strategies. Taking into consideration anticipated conservation savings, approximately 1,500 afy (1.3 mgd) is needed in the near term to allow the District to reduce its pumping to the recovery pumping goal (2,900 afy). The supplemental supply could be reduced to about 1,200 afy by 2030 if the District's projected demand occurs as estimated, assumed conservation is achieved through 2030, and the basin begins to show signs of recovery as anticipated in current modeling. The recovery pumping goal of 2,900 afy cannot be implemented unless a sufficient supplemental supply is available to the District or mandatory rationing is enacted, which would allow the District to reduce its groundwater pumping to this level. Without a supplemental supply this would require an overall cutback of approximately 35 percent continuously for at least 20 years.

The conditions and water shortages identified above do not take into consideration climate change effects, which are anticipated to result in long-term reductions in water supply, as noted above for the City. In particular, a decline in groundwater recharge in the Soquel-Aptos area would exacerbate existing overdraft. The potential decline in recharge rates, coupled with

predicted rises in sea level, are of particular concern to the viability of the District's water supply. Sea-level rise could increase the risk and extent of seawater intrusion as increased pressure from rising seawater pushes the freshwater/seawater transition zone inland at an increased rate.

Given the groundwater overdraft conditions in the Soquel-Aptos area, as well as threats from climate change and changing water quality requirements that may affect the use of a portion of the District's groundwater sources, the District has been actively pursuing a supplemental water supply, along with conservation and groundwater management. Over the last 20 years, a number of supply alternatives have been investigated during open and public planning processes and were determined not to be viable (see **Section 8** for additional information). The District's adopted 2012 IRP Update includes, but is not limited to, development of conservation and demand management programs, drought curtailment, and proactive ground water management, as well as further evaluation of water exchanges and a supplemental water supply project identified as the proposed desalination project. Mandatory rationing would be pursued by the District if a supplemental supply project does not go forward in the near term. Additional information about the water supply needs of the District is provided in **Section 3**.

1.3 Project Description

1.3.1 Project Objectives

The objectives of the proposed desalination project are presented below. Many of them are driven by the environmental and water supply concerns described above. The objectives address the need for a supplemental water supply, as identified by both the City's IWP and the District's IRP. The objectives apply to both agencies, unless otherwise stated.

1. Provide for a supplemental water supply in a timely manner that meets the IWP and IRP program objectives and provides for the amount of supplemental water supply identified as necessary in the City and District 2010 Urban Water Management Plans and/or in other available City and District reports (see **Section 3**) that complements on-going and future water conservation and drought curtailment efforts. The City and District need the supplemental water supply for the following reasons:

    - City - During the dry season of dry and critically dry years, a supplemental supply is needed to limit peak season shortages to 15 percent of normal water needs currently projected through 2030[1], which is the reliability objective set by the City in the long term. The supplemental supply needs to support potable uses given

[1] Use of the desalination plant is anticipated beyond 2030, but it is sized to meet existing and projected demand through 2030 from growth anticipated in existing adopted general plans of the City, County, and Capitola and in the current urban water management plans for the City and District.

that irrigation and other outdoor uses will already be restricted during these periods.

- District - A supplemental supply is needed in the near-term to meet the District's target groundwater yield during the time period in which the basin recovers from overdraft and in the long-term to provide for currently projected water demand through 2030[1].

2. Allow the City to reduce its ongoing effects on listed species in the coastal streams and rivers from which the City currently diverts water by developing a supplemental water supply sufficient to permit the City to reduce the extent of its existing reliance on those coastal streams and rivers, as part of the City's pending habitat conservation planning process.

3. Provide the District with a supplemental water supply that will offset groundwater pumping, and thereby assist the District in operating its wells in a manner that reduces overdraft, allows for aquifer recovery to protective target groundwater levels, and thus reduces the potential for seawater intrusion.

4. Protect the local economy and community from the effects of an uncertain water supply due to high levels of curtailments needed to address drought and/or groundwater quality and quantity issues associated with seawater intrusion in the City and District service areas.

5. Develop a supplemental water supply project that promotes efficient use of resources and infrastructure, avoids duplicative infrastructure and effort, and has regional benefits by serving multiple agencies and water users.

6. Provide a supplemental water supply that serves to diversify the water supplies available to the City and District, is readily available, reliable, drought-proof, and avoids uncertainty and/or risks during project operations and/or maintenance. Reliability and diversification will allow for operational flexibility for the City with the use of Loch Lomond Reservoir and other surface water resources, and for the District to significantly reduce pumping at differing wells.

7. Provide flexibility to efficiently and cost-effectively meet future changed conditions, including changes in demand, changes in regulatory requirements, or changes in source water quality. This flexibility will help to ensure that a supplemental water supply will accommodate planned growth, and will not otherwise support growth above and beyond that allowed in relevant agency planning documents. This flexibility will also allow for adjustments to be made in treatment and/or technologies in response to changing regulatory requirements.

8. Plan for climate change, as summarized below:

    - City - Consistent with the City's Climate Adaptation Plan, diversify and supplement the City's water supply portfolio in anticipation of possible changes in precipitation patterns, greater variability (reduced reliability) in water supply, increased water demand, water quality degradation and reduced quantity and modified seasonal patterns of groundwater recharge resulting from climate change.
    - District - Provide the District with a supplemental water supply in anticipation of reduced quantity and modified seasonal patterns of groundwater recharge, increased water demand, and water quality degradation resulting from climate change.

9. Provide a supplemental water supply that avoids or minimizes significant environmental impacts, including—but not limited to—adverse impacts to marine and coastal resources.

10. Provide a supplemental water supply that does not increase greenhouse gas (GHG) emissions over those generated by the existing water supply systems of the City and District.

11. Provide a supplemental water supply that helps the City to respond to the significantly reduced groundwater yield from the existing over drafted Live Oak well field.

12. Provide a supplemental water supply that is relatively cost-effective in terms of both capital and operation/maintenance costs.

1.3.2 Project Overview

The City and District have partnered to undertake environmental review for the proposed **scwd²** Desalination Program and to implement the project if it gains approvals from the decision-making bodies of both agencies and obtains a favorable vote of the City's electorate. This program proposes to construct and operate a seawater reverse osmosis (SWRO) desalination plant and related facilities to provide up to 2.5 mgd of potable water. The water supply from the proposed project would allow the District to reduce pumping in the Soquel-Aptos area, to allow coastal groundwater levels to recover. It would also help the City meet its water needs during periods of water supply shortages as a result of drought and reduced surface water diversions needed to provide improved river and stream flows for fish and to plan for climate change by diversifying its water portfolio. The City and District propose to cooperatively operate the desalination plant to provide water to each agency concurrently or during different times to meet the specific objectives and needs of the two agencies.

There are four basic functional components of the proposed seawater desalination project: (1) seawater intake; (2) pretreatment and salt removal through reverse osmosis filtration; (3) disposal of by-products including a brine stream and solids that are removed in the pretreatment process;

and (4) conveyance and delivery of the product water to existing City and District water infrastructure. Given these functional components, the proposed desalination project would consist of:

1. A seawater intake and conveyance system consisting of an intake structure, intake pipeline, pump station, and transfer piping;

2. A seawater desalination plant that would provide for pre-treatment processing, desalination treatment and energy recovery, post-treatment processing and distribution, brine storage and disposal, residuals handling and disposal, chemical systems, and their associated support facilities;

3. A brine disposal and conveyance system consisting of brine storage at the desalination plant, a new pipeline to the City's Wastewater Treatment Facility (WWTF) outfall, and outfall improvements;

4. Potable water distribution system improvements, consisting of a new connection to the City distribution system and a new intertie system between the City and District service areas, including new pipelines and pump station improvements; and

5. Environmental design, construction, and operational features, consisting of various features of the components of the project and the project overall that would be implemented to avoid, reduce, or minimize potential environmental effects that might occur in the absence of such elements.

Most below-ground and offshore components of the proposed 2.5-mgd desalination project are designed with the capacity to produce up to 4.5 mgd of product water, but would require some modifications such as installation of additional screens and pumps. Building square footage would also ultimately allow for equipment to support capacity increases up to 4.5 mgd. These features would allow the City to expand the plant in the future, if needed. See **Section 4** for additional information about the possibility that the plant would need to be expanded in the future, and about the additional construction of facilities and installation of equipment that would be required.

1.3.3 Project Location and Characteristics

As described above, the proposed desalination project would consist of: (1) a seawater intake and conveyance system; (2) a seawater desalination plant; (3) a brine storage, disposal, and conveyance system; (4) potable water distribution system improvements; and (5) environmental design, construction, and operational features. These project components include different types of facilities, such as buildings, pumps, pipelines, and other equipment. All of the facilities are described in detail in **Section 4** and are summarized below. Figures showing the project location and characteristics are also included in **Section 4**.

Alternative sites for the seawater intake system and the desalination plant have been included and are evaluated in this EIR. These are referred to as "component alternatives" throughout the EIR. The desalination component alternatives considered in detail in this EIR include eight site alternatives for the seawater intake and three plant site alternatives for the desalination plant site. The EIR evaluates these component alternatives at a sufficient level of detail such that the City Council and District Board of Directors could select from among the alternatives, but ultimately one plant site and one intake site would be selected and pursued for the proposed project. See **Section 1.5.1, Desalination Component Alternatives** and **Section 8.1, Proposed Project Components – Alternatives Summary Evaluation and Comparison** for additional information.

Seawater Intake and Conveyance System

The feasibility and site-specific requirements of both sub-seafloor and screened, open-ocean intake approaches were investigated for the proposed project. Based on specific design, operational, and/or siting requirements for the type of intake, a screened, open-ocean intake is the "apparent best intake approach" in terms of engineering feasibility. See **Appendix H, scwd² Seawater Desalination Intake Technical Feasibility Study** and **Section 8** for additional information about the intake approaches determined not to be feasible or recommended.

The seawater intake and conveyance system would therefore be comprised of a screened open-ocean seawater intake structure in the Monterey Bay to draw in raw seawater (source water), an intake pipeline to deliver the seawater to the shore, and a pump station to pump the seawater to the desalination plant via transfer piping. To produce 2.5 mgd of treated product water reliably, the seawater intake system would be designed to provide a maximum flow of 7 mgd of raw seawater.

Eight alternative locations for the seawater intake and conveyance system are being considered on or near the Municipal Wharf, along West Cliff Drive, and on sites that are on or near the alternative desalination plant sites, as described in detail in **Section 4** and **Appendix I, Seawater Intake Facility Conceptual Design Report scwd² Regional Seawater Desalination Project**.

Seawater Desalination Plant

The 2.5-mgd desalination plant would provide for all the equipment used for the desalination process, except for the seawater intake system and pipeline conveyance systems for source water, brine disposal, and potable water. The plant would provide for the following primary systems:

- **Pre-treatment Processing** - Pretreatment refers to the removal of suspended solids from ocean source water to reduce fouling, clogging, and scaling of the SWRO membranes used for desalination.
- **Seawater Desalination Treatment** - The plant would use a SWRO system to desalinate raw seawater. SWRO is a pressure-driven process using semi-permeable membranes. SWRO membranes separate water molecules from impurities in the seawater by

permitting water to pass, and limiting the passage of salts and other constituents. The results are a permeate stream (or product water) and a concentrate stream (or brine). The desalination system would have the ability to operate with a recovery rate ranging from 40 to 50 percent (40 to 50 gallons of fresh drinking water per 100 gallons of seawater).

- **Post-treatment Processing and Distribution** - Reverse osmosis removes many of the minerals from the water. Lack of hardness and alkalinity makes the water more corrosive to the water delivery system. Post-treatment is required to control the corrosiveness of the water and provide adequate disinfection prior to distribution, as is common for potable water generated from surface and/or groundwater sources.
- **Residuals Handling and Disposal** - Operation of the desalination plant would generate solids from the pre-treatment processing. Two options for handling solids, including sanitary sewer disposal and landfill disposal, are considered for the proposed project and evaluated in the EIR.
- **Chemical Systems** - A variety of chemicals would be required for treatment, disinfection, and membrane cleaning at the desalination plant. The chemicals would be stored in accordance with applicable building and seismic codes, and applicable regulatory requirements for hazardous materials storage.

The desalination plant would also include space for other related and support uses, including but not limited to: (1) operations and control systems; (2) maintenance and facilities storage; (3) electrical operations and utility connections; (4) parking and access; (5) stormwater detention and treatment; (6) landscaping; and (7) outdoor viewing and gathering areas.

Three alternative plant sites are evaluated in this EIR, all of which are located within the Industrial Park Area (Area A) identified in the City's IWP Program EIR as a potential location for a desalination plant site. The approximately 4- to 8-acre sites are located on mostly undeveloped private land on infill parcels. These sites are generally bounded by the Santa Cruz Branch Rail Line tracks on the north, Natural Bridges Drive on the west, Delaware Avenue on the south, and the realigned Arroyo Seco stream on the east. See Section 4, **Appendix L, scwd² Seawater Desalination Plant: Phase 1 Preliminary Design: Volume 1 – Report & Volume 2 – Drawings**, and **Appendix D, scwd² Final Seawater Reverse Osmosis Desalination Pilot Test Program Report & Appendices** for additional information about the seawater desalination component of the proposed project.

Brine Storage, Disposal, and Conveyance System

During the SWRO process at the desalination plant, brine would be generated, and would be approximately twice as saline as seawater. Brine storage would be provided on the desalination plant site to allow for controlled release of the brine. A pipeline would convey the brine from the desalination plant to the City's WWTF outfall pipeline where it would be blended with effluent from the City's WWTF and returned to Monterey Bay via the City's existing outfall. The WWTF

outfall diffuser ports would also be improved by adding new valves (Red Valves©) to the ports. A Dilution Analysis conducted for the proposed project concludes that the WWTF National Pollutant Discharge Elimination System (NPDES) discharge permit minimum initial dilution requirement and ambient salinity at the outfall could be maintained with the above improvements (see **Section 4** and **Appendix J, Dilution Analysis for Brine Disposal via Ocean Outfall**).

Potable Water Distribution System

The pipeline to convey the product water from the plant to the City's existing potable water distribution system would run from the desalination plant location in Area A to the existing adjacent potable water distribution pipe located within Delaware Avenue or in Natural Bridges Drive directly adjacent to the alternative plant site locations.

The new intertie system between the City and District service areas, consisting of new and replacement pipelines and pump station improvements, would run from Morrissey Boulevard in the City, to the DeLaveaga water storage tanks, then through portions of unincorporated County along Soquel Drive to Park Avenue, and into Capitola, South of Highway 1. The pump station improvements would be located at the existing Morrissey pump station and the planned and approved McGregor and Aptos pump stations. See **Section 4** and **Appendix BB, Desalination Plant Hydraulic Modeling and Analysis** for additional information about the potable water distribution system.

Environmental Design, Operation, and Construction Features

The proposed project includes a number of design, construction, and operational features that the City and District would be committed to implementing as part of the proposed project. These elements of the project would serve to reduce or avoid some of the potential environmental effects of the project that might occur in the absence of such elements (see **Section 4** for details). To ensure that the commitments are implemented as specified, each design, construction, and operational feature would be implemented and monitored as part of the Mitigation Monitoring and Reporting Program to be developed and adopted by the City and District for the proposed project. Some of the key features include:

- A commitment of **net carbon neutrality** with the construction and operation of the proposed project, which means that it would be designed and operated such that there would be no net increase in GHG emissions as compared to the existing environmental setting.
- Use of high-efficiency pumps, motors, energy recovery devices, SWRO membrane configuration, and compliance with the City's Green Building Program to reduce energy requirements;
- Implementation of an Energy Minimization and Greenhouse Gas Reduction Plan to ensure that the net carbon neutral objective of the proposed project is achieved on a long-term basis.

- Providing for blending of brine with WWTF effluent such that the combined effluent would not exceed the salinity of ambient seawater or the WWTF NPDES discharge permit minimum initial dilution requirement. This would be accomplished through the use of brine storage, variable speed pumps, automatic control devices and monitoring, outfall injection nozzle, and new outfall diffuser valves.
- Design and operation of seawater intake screens with screen size and intake velocity to minimize impact on marine life.
- Use of tunneling to construct the intake system and other construction approaches to avoid beach and bluff construction and minimize sediment and turbidity in the marine environment.
- Use of stormwater best management practices to minimize runoff and water quality issues; in compliance with the City requirements for Low Impact Development.
- Planting of nectar plants at the desalination plant to provide foraging resources for butterflies and other beneficial insect species.
- Implementation of construction specifications for the control of erosion, dust, noise, vibration, and traffic during construction of the proposed project.

1.4 Summary of Environmental Impacts

Table 1-1, Summary of Environmental Impacts of the Proposed Project, provides a detailed summary of the environmental impacts of the proposed project. The impact conclusions are provided for each of the seawater intake and desalination plant site alternatives, other project components, and the proposed project overall. As indicated above, the proposed project includes a number of design, construction, and operational features that the City and District would be committed to implementing as part of the proposed project. These elements of the project would serve to reduce or avoid some of the potential environmental effects of the project that might occur in the absence of such elements. Applicable environmental design features and mitigation measures are also provided in **Table 1-1**. A narrative summary of environmental impacts is also provided below.

Based on the conclusions of **Section 8.1**, it is assumed that the proposed project would not involve the selection of Plant Site A-2 as the preferred plant site, based on its current configuration and related potentially significant resource impacts. Therefore, the table column showing Plant Site A-2 is shown with gray text to indicate that it is no longer being considered. Given that, the impacts of the proposed project overall presented in the table below are based on the selection of either Plant Site A-1 or Plant Site A-3 for the proposed desalination plant.

The following acronyms and symbols are used in **Table 1-1**:

- **SU** = Potentially significant and unavoidable impacts

- **LTSM** = potentially significant impacts that can be reduced to less than significant with the implementation of identified mitigation measures
- **LTS** = Less than significant impact
- **NI** = No impact
- -- = Impact not applicable, or not applicable to individual project components
- * Impact significance of project overall will depend on the site alternative selected

1.4.1 Significant and Unavoidable Impacts

Desalination Plant Site A-2 is vegetated with a stand of trees (mostly cypress), many of which could be removed if a desalination plant were constructed on this site, based on the current site boundaries and preliminary design. This stand of trees could potentially be providing secondary wind protection to the active monarch butterfly overwintering roost site at Natural Bridges State Beach (NBSB). Overwintering monarch butterflies can be very sensitive to wind conditions at a roost site. Trees and topographical features providing primary and secondary wind protection to the roost trees are important features of overwintering sites. In the absence of an extensive study of wind patterns, trees, topography, and monarch activity within and north of NBSB, it is not known to what extent (if any) the trees on Plant Site A-2 are providing any key wind break protection to the roost site at NBSB.

Given the above, the analysis in the EIR assumes a worst-case impact scenario that the trees on Plant Site A-2 are potentially providing secondary wind protection to the roost site at NBSB. It is also conservatively assumed that potential secondary wind protection to the NBSB monarch overwintering site would be partially eliminated as a result of tree removal associated with construction of a desalination facility at Plant Site A-2. Further, it cannot be assured that any potential secondary wind protection provided by existing trees on Plant Site A-2 could be replaced in a timely or adequate manner with the identified mitigation measures. Therefore, it must be assumed, in the absence of additional study, that construction of Plant Site A-2 could potentially result in significant and unavoidable impacts to the monarch butterfly overwintering site at NBSB (see **Section 5.3, Terrestrial Biological Resources**, Impact 5.3-3). If Plant Site A-2 is selected, the proposed project would also have potentially significant and unavoidable impacts related to partial conflicts with local policies protecting monarch butterfly overwintering sites due to the issues described above (see Impact 5.3-6 and **Section 5.4, Land Use, Planning, and Recreation**, Impact 5.4-1).

However, as indicated above, it is assumed that the proposed project would not involve the selection of Plant Site A-2 as the preferred plant site, based on its current configuration and related potentially significant resource impacts. Therefore, it is assumed that this potentially significant unavoidable impact would be avoided with the selection of either Plant Site A-1 or A-3, as the preferred plant site for the proposed project.

1.4.2 Significant Impacts that can be Reduced to Less than Significant

A number of impacts of the proposed project were found to be potentially significant; however mitigation measures are recommended that would reduce any potential impacts to less than significant. These impacts are summarized below and shown in **Table 1-1**.

Hydrology and Water Quality

Onshore and offshore construction water quality impacts could be potentially significant with the implementation of the proposed project (see Impacts 5.1-1 and 5.1-2). Potential on-shore construction-phase water quality impacts would be controlled through the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) in accordance with Clean Water Act-related permitting requirements (see Mitigation Measure 5.1-1a). An additional mitigation measure would be required for the City-District intertie at the Arana Creek crossing at Brookwood Drive, if the pipeline is installed using tunneling under the stream to prevent water quality degradation specific to tunneling activities (see Mitigation Measure 5.1-1b). Construction-phase best management practices for working in a marine environment would also be implemented to address offshore construction water quality impacts (see Mitigation Measures 5.1-2a and 5.1-2b). With the implementation of the above mitigation measures, construction-phase water quality impacts would be reduced to less than significant.

The proposed desalination plant could increase the rate, amount, or quality of surface runoff in a manner that could result in substantial erosion or siltation on- or off-site, or provide substantial additional sources of polluted runoff (see Impact 5.1-5). The City's existing stormwater regulations will be revised effective September 2013. During final design, Mitigation Measure 5.1-5 requires that more-detailed site investigations, involving soil percolation tests and other design-level studies, be performed as the basis for developing the final revised stormwater management plan for the proposed desalination plant, in compliance with the new regulations. With the implementation of the above mitigation measure, drainage impacts would be reduced to less than significant.

Marine Biological Resources

Offshore construction impacts on marine life and habitats could be potentially significant with the implementation of the proposed project. These impacts include construction noise (see Impact 5.2-4) and placement of fill or structures in the marine environment (see Impact 5.2-5). To ensure that underwater construction noise does not reach injury levels to marine species, Mitigation Measure 5.2-4 would be implemented. This measure requires the implementation of a hydroacoustic, fish, and marine mammal monitoring plan that would include specific measures to avoid exposure to underwater sound levels that could cause injury. Although the current design for the proposed project anticipates setting back from hard-bottom kelp forest habitat by about 100 feet, pre-construction surveys would be conducted and construction-phase measures

implemented to ensure these habitats are avoided under Mitigation Measure 5.2-5. With the implementation of the above mitigation measures, construction-phase impacts on marine life and habitats would be reduced to less than significant.

Terrestrial Biological Resources

Construction impacts related to terrestrial biological resources could be potentially significant with the implementation of the proposed project. These impacts include special-status species impacts related to particular species (see Impacts 5.3-1 and 5.3-5), riparian impacts (see Impact 5.3-2), waters and wetlands (see Impact 5.3-4), wildlife movement impacts (see Impact 5.3-5), and conflicts with local biological plans and policies (see Impact 5.3-6). Impacts to special-status species, including central California coast steelhead, California red-legged frog, foothill yellow-legged frog, San Francisco dusky-footed woodrat, and nesting birds would be reduced to less than significant with the implementation of construction-phase avoidance and minimization measures (see Mitigation Measures 5.1-1a and 5.1-1b, 5.3-1a through 5.3-1d, and 5.3-5).

Potential riparian vegetation and habitat impacts would be reduced to less than significant with establishment of riparian setbacks where needed (Mitigation Measure 5.3-2a) and implementation of construction-phase avoidance and minimization measures to protect riparian and wetland vegetation and trees during construction (see Mitigation Measures 5.3-2b and 5.3-2c). Potential conflicts with local biological plans and policies would be reduced in most cases to less than significant with mitigation measures, except as described above under **Section 1.4.1, Significant and Unavoidable Impacts** (see Mitigation Measures 5.3-1a through 5.3-1d, 5.3-2a through 5.3-2c, 5.3-5, and 5.3-6).

Land Use, Recreation and Planning

Construction and operational impacts related to land use and planning could be potentially significant with the implementation of the proposed project. These impacts include conflicts with local and other land use plans, policies, and regulations (see Impact 5.4-1). Potential conflicts with applicable land use plans, policies, and regulations would be reduced in most cases to less than significant with mitigation measures described elsewhere in this section, except as described above under **Section 1.4.1** (see Mitigation Measures 5.1-1a-b, 5.1-2a-b, 5.1-5, 5.2-4, 5.2-5, 5.3-1a-d, 5.3-2a-c, 5.3-3a-b, 5.3-5, 5.3-6, 5.6-1, 5.7-1a-b, 5.7-3, 5.7-4, 5.8-2a-c, 5.8-3, 5.8-4, and 5.11-1a-e).

Noise

Construction and operational impacts related to noise could be potentially significant with the implementation of the proposed project. These impacts include operational noise (see Impact 5.6-1) and construction-phase vibration (see Impact 5.6-3). Mitigation Measure 5.6-1 would require that an acoustical analysis report be submitted to the City prior to issuance of any building or grading permit, documenting the specific noise control treatments that have been incorporated into the final design of the project, and documenting that the design would reduce

operational noise so as to comply with the Zoning Ordinance performance standards and the 24-hour average day/night noise level (DNL) thresholds set forth in the City of Santa Cruz General Plan 2030. Mitigation Measure 5.6-3 would require a pile-driving monitoring plan to document conditions prior to, during, and after pile driving. The plan would include specific tasks, to be implemented under the direction of a licensed Professional Structural Engineer, which would reduce the potential impacts of construction-phase vibration to less than significant.

Geology and Soils

Construction and operational impacts related to geology and soils could be potentially significant with the implementation of the proposed project. These impacts include seismic, slope, and soils hazards (Impacts 5.7-1, 5.7-3, and 5.7-4). Mitigation Measure 5.7-1a would require that a California-licensed geotechnical engineer complete design-level geotechnical investigations for all project components involving new facility construction, which would address seismic and geologic hazards; slope stability, where warranted; and expansive and/or corrosive soils; and require that all recommendations of the investigation be incorporated into the final design and construction specifications. Mitigation Measure 5.7-1b requires that all new facility designs comply with the most recent edition of the California Building Code (CBC)—or local building codes if they are more stringent—and that all structures have been designed to withstand the "design-level" earthquake, as set forth in the CBC. With the implementation of the above mitigation measures, seismic, slope, and soils hazards would be reduced to less than significant.

Cultural Resources

Construction impacts related to cultural resources could be potentially significant with the implementation of the proposed project. These impacts could include effects resulting from the inadvertent discovery of cultural resources, human remains, and paleontological resources (Impacts 5.8-2, 5.8-3, and 5.8-4). Mitigation Measure 5.8-2b requires a qualified full-time archeological monitor be present during any ground disturbance in areas identified as having sensitivity for buried archaeological resources, and that a monitoring plan, outlining specific protocols, guide such monitoring efforts. Mitigation Measure 5.8-2c requires standard inadvertent discovery procedures, in accordance with the relevant City or County Codes, as relevant, be implemented as part of all construction contracts for components involving ground disturbance.

Mitigation Measure 5.8-3 requires that the specific protocols and channels of communications outlined in the CEQA Guidelines be followed, in relation to inadvertent discovery of human remains. Mitigation Measure 5.8-4 requires a paleontological resources specialist to obtain agreements to provide proper curation of any significant fossil specimens discovered, and to develop a Worker Environmental Awareness Program relating to inadvertent discovery of paleontological resources. With the implementation of the above mitigation measures, cultural resource impacts would be reduced to less than significant.

Utilities and Service Systems

An operational impact related to utilities and service systems could be potentially significant with the implementation of the proposed project. This impact includes wastewater collection system impacts related to the disposal of solids from the desalination plant (Impact 5.9-2), if that option were pursued. Mitigation Measure 5.9-2 requires the City and District to establish design criteria to control solids deposition in the wastewater collection system, and to establish monitoring and maintenance procedures to ensure that any such deposition does not create operational problems in the distribution system. With the implementation of the above mitigation measure, wastewater impacts would be reduced to less than significant.

Aesthetics

An operational impact related to aesthetics could be potentially significant with the implementation of the proposed project. This impact would include effects related to light and glare (Impact 5.10-4). Mitigation Measure 5.10-4 would require new lighting for the desalination plant, intake pump station and Morrissey pump station to comply with the most recent Leadership in Energy and Environmental Design for New Construction (LEED-NC) guidelines for light pollution reduction. With the implementation of the above mitigation measure, lighting impacts would be reduced to less than significant.

Hazards and Hazardous Materials

Construction impacts related to hazards and hazardous materials could be potentially significant with the implementation of the proposed project. These impacts could include effects related to encountering contaminated soils during construction (Impact 5.11-1) and hazardous materials impacts near schools (Impact 5.11-3). Mitigation Measure 5.11-1a requires that due diligence review, including a Phase I Environmental Site Assessment, is conducted for Plant Sites A-1 and A-3 and/or the intake pump station sites for SI-14 and SI-18, and that all recommendations of such an assessment be followed with the intent of conforming to applicable federal and state regulations.

Mitigation Measure 5.11-1b requires that an environmental sampling plan be developed for particular sites with suspected or known contamination, and also for any sites identified through Mitigation Measure 5.11-1a as requiring soil and/or groundwater sampling. Sampling results would be compared to established thresholds to determine areas for soil management, and a soil management plan would be prepared, which would include specific measures for handling and disposing of excavated soil and groundwater in accordance with state and federal regulations and stormwater and sanitary sewer requirements of relevant local agencies.

Mitigation Measures 5.11-1c and 5.11-1d require that inspections for visual evidence of contamination be undertaken, and outlines procedures if such evidence is observed (for onshore and offshore construction work, respectively). Mitigation Measure 5.11-1e requires that plans and specifications to prevent or reduce the likelihood of accidental release of hazardous materials

to the ocean be developed, and includes specific elements to be included in such a plan, while the development of a SWPPP under Mitigation Measure 5.1-1a (discussed above under Hydrology and Water Quality) would reduce the likelihood of accidental release during onshore construction. With the implementation of the above mitigation measures, hazardous materials impacts would be reduced to less than significant.

1.4.3 Less Than Significant Impacts

A number of impacts of the proposed project were found to be less than significant as shown in **Table 1-1**. The following summarizes key findings in a few resource categories that were areas of community interest in comments received on the Notice of Preparation and Initial Study prepared for the proposed project in 2010.

Hydrology and Water Quality (Marine Water Quality): The proposed project would dilute the brine from the desalination process with the City's WWTF effluent prior to discharge through the existing WWTF outfall to avoid potential adverse effects of elevated salinity on the marine environment. The brine discharge would not violate water quality standards and the salinity of the discharge would be similar to existing ocean conditions (see **Section 5.1**, Impact 5.1-3 and **Appendix J**).

Hydrology and Water Quality (Treated Potable Water Quality): The City undertook a comprehensive pilot plant test program from 2008-2009 to evaluate alternative treatment systems for a SWRO desalination plant and to analyze the water quality of potable water produced from the seawater offshore of Santa Cruz. Based on the Pilot Test Program Report (**Appendix D**) and subsequent evaluation conducted for the Seawater Desalination Plant Preliminary Design Report (**Appendix L**), the treatment process chosen would result in highly-purified product water that would not have adverse effects on treated water quality. The pilot study demonstrated that potable water from the desalination plant would meet all regulatory drinking water standards (see **Section 5.1**, Impact 5.1-7).

Marine Biological Resources (Entrainment and Impingement): The operation of the proposed seawater intake system would not have a substantial adverse effect on special-status or other marine species; would not substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; or threaten to eliminate a plant or animal community. A year-long Open Ocean Intake Effects study (**Appendix G, City of Santa Cruz Water Department & Soquel Creek Water District scwd² Desalination Program Open Ocean Intake Effects Study**) was conducted for the proposed project to understand the impact to marine life of entrainment (when marine organisms are drawn along with the ocean water through a screen and through the filtration process).

The study concluded that the proposed project would cause the white croaker (the most abundant species collected) to have a potential loss of up to one female's lifetime reproductive capacity each year. This would be an extremely small amount and represents far less mortality than that

resulting from other natural sources and human activities, such as commercial or recreational fishing, and would not reduce the species to less than self-sustaining levels. During the 13-month sampling period of the study, no larvae of special-status fish species were entrained. The intake screens would further reduce the entrainment by excluding organisms greater in size than the 2 mm screen openings, including adult and juvenile fish, and some of the larger larvae of fish and invertebrate species. Additionally, because the flow rate through the screens would be relatively low, the risk of organisms getting trapped or pinned (impingement) on the outside of the screen is extremely low, as confirmed by extensive monitoring of a test screen (see **Section 5.2**, Impact 5.2-1)

Energy, Greenhouse Gas Emissions, and Climate Change: The proposed project would comply with the City's Green Building Program and would be net carbon neutral. This would be achieved through efficiency measures and the pursuit of one of two options for offsetting the net increase in GHG emissions, including a portfolio of energy and GHG reducing projects and purchase of certified GHG offsets, or an option involving only the purchase of such offsets.

Regardless of portfolio selected, the proposed project would include energy recovery devices that would allow for reuse of energy at the desalination plant and high-efficiency pumps and motors would also reduce energy requirements. With the implementation of environmental design features, the proposed project would not result in substantial adverse effects related to GHG emissions, as no net increase in GHG emissions would result with the proposed project (see **Section 5.5**, Impact 5.5-6). The project would not result in the need for new or expanded energy supplies or distribution facilities and would not conflict with applicable energy standards (see **Section 5.9**, Impact 5.9-4).

Growth: The proposed project would not directly induce growth, because it would not result in the construction of new residential development or the creation of substantial new long-term employment in the City or District service areas. The proposed project also would not indirectly induce growth because it would not result in excess capacity to serve additional growth beyond what has already been planned for in the adopted general plans of the City, County, and Capitola or the University of California Santa Cruz Long Range Development Plan. It would not remove an obstacle to growth, change the service area boundaries of the City, or provide water to an area that is not currently served (see **Section 6, Growth** for additional information). Even without new development in the service area, the project is needed now to meet water demands of existing customers, as described in **Section 3**.

1.4.4 Cumulative Impacts

'Cumulative impacts' refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. **Section 7, Cumulative Impacts** evaluates the effects of the proposed project in conjunction with other relevant local and regional cumulative projects. Based on the analysis conducted, the proposed

project would not result in a considerable contribution to significant cumulative impacts that are or may be occurring locally or elsewhere in the region, in most cases, except as described below.

It is unknown whether other cumulative projects in the region could affect other known Monarch butterfly overwintering habitats (e.g., Moran Lake County Park). However, if significant cumulative effects are occurring to Monarch butterfly overwintering habitat along the Santa Cruz County coastline, the proposed project could potentially have a considerable contribution to such cumulative impacts, if Plant Site A-2 were selected and pursued. However, as indicated above, it is assumed that the proposed project would not involve the selection of Plant Site A-2 as the preferred plant site, based on its current configuration and related potentially significant resource impacts. Therefore, it is assumed that the proposed project would not contribute to any significant cumulative effects that may be occurring along the Santa Cruz County coastline

1.5 Alternatives

In conformance with CEQA, the range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice by decision-makers when considering the merits of the project. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. The alternatives should avoid or substantially lessen any of the significant effects of the project. Further, the EIR need only examine in detail those alternatives that could feasibly attain most of the basic objectives of the project. Alternatives that avoid or substantially reduce significant impacts should be considered, even if these alternatives would impede to some degree the attainment of project objectives, or would be more costly. Under CEQA, alternatives that are remote or speculative do not need to be addressed.

A wide range of alternatives were screened to determine whether a given alternative should be evaluated in detail or eliminated from further consideration in this EIR. The alternatives considered in this screening process were those that have been previously or currently considered by the City and District, as well as alternatives raised during the scoping process or during other major public review processes conducted by the City and District. Based on the above referenced CEQA requirements, the screening process consisted of reviewing alternatives against three criteria, derived from the CEQA requirements described above. These criteria include:

1. Would the alternative meet most of the identified basic (or primary) project objectives?

2. Would the alternative be potentially feasible, as defined under CEQA?

3. Would the alternative have the potential to avoid or substantially lessen any of the significant effects of the proposed project? This criterion should consider whether the alternative would create other significant effects that would be potentially greater than those of the proposed project.

The results of the screening process are presented in **Section 8**. Those alternatives that did not meet at least the first two criteria were not carried forward in the evaluation, as alternatives need to meet most of the basic objectives of the project and be potentially feasible before they can be reviewed for their ability to reduce the significant effects of the proposed project. The reasons for elimination of any particular alternative or set of alternatives are provided in **Section 8.1** and **Section 8.2, Alternatives to the Proposed Project Considered But Eliminated.**

1.5.1 Desalination Component Alternatives

The desalination component alternatives considered during the screening process included: siting alternatives, technology alternatives, and other alternatives that were considered in conjunction with the development of the proposed project. The desalination component alternatives considered in detail in this EIR include eight site alternatives for the seawater intake and three plant site alternatives for the desalination plant site, as described above. These component alternatives are described in detail in **Section 4** and evaluated at an equal level of detail in **Section 5, Environmental Analysis**. A comparative evaluation of these component alternatives is provided in **Section 8.1**.

Any of the seawater intake and plant site location alternatives could be implemented for the proposed project, as all sites would allow for a facility that would meet the primary objectives of the project and would be technically feasible to construct and operate. In most cases, where impacts are determined to be significant in the EIR, feasible mitigation measures are available to reduce impacts to less than significant and distinctions between the site alternatives from an environmental perspective are not substantial. However, Plant Site A-2 could result in a substantial adverse effect to monarch butterfly overwintering habitat in NBSB, if trees to be removed provide a secondary wind break to that habitat, even with the implementation of identified mitigation measures. Additionally, Plant Site A-2 would not fully meet the project objective that seeks to avoid significant impacts. Therefore, as described previously, it is assumed that the proposed project would not involve the selection of Plant Site A-2 as the preferred plant site, based on its current configuration and related potentially significant unavoidable resource impacts.

Ultimately, the City Council and District Board will weigh all the information on these component alternatives to select one intake site and one desalination plant site.

1.5.2 Alternatives to the Proposed Project

Alternatives to the proposed project included numerous water supply alternatives that were considered during the IWP and IRP planning processes or related background studies, or were reviewed as a result of scoping or other comments received. **Section 8.2** describes alternatives that were considered but eliminated from further consideration, based on the above process. The alternatives evaluated in detail in **Section 8.3, Alternatives to the Proposed Project** include:

- **City No Project Alternative:** the City would continue its current water supply practices and facilities and the proposed project would not be constructed.
- **District No Project Alternative:** the District would continue to rely solely on groundwater from the Purisima and Aromas aquifers in the Soquel-Aptos area and the proposed project would not be constructed.
- **City-only Desalination Alternative:** a desalination plant and related facilities would be constructed and operated for the sole purpose of the City. All of the facilities associated with the proposed project, except the City-District intertie system, would be constructed and operated under this alternative. The City-District intertie system would not be constructed, as the project would not provide supplemental water to the District under this alternative. This alternative would be sized with a capacity of 2.5 mgd with expandability to 4.5 mgd. However, the plant would be operated on a more intermittent basis, likely only during the dry season of drought years.
- **District-only Desalination Alternative:** a desalination plant and related facilities similar to the proposed project would be constructed and operated for the sole purpose of the District. The District would likely have sole ownership of the desalination plant and all or some of the related facilities. All of the facilities associated with the proposed project would be constructed and operated on an on-going basis under this alternative, unlike the intermittent operation under the City-Only Desalination Alternative. The capacity of the alternative project would be at least 1.25 mgd to allow the District to achieve its recovery pumping goal, but could be up to 2.5 mgd, if the District were to sell water to other nearby water agencies. The desalination plant and related facilities would not need to be expandable to 4.5 mgd under this alternative.
- **Proposed Project Plus Direct Potable Reuse Pilot Plant Alternative:** a desalination plant and related facilities similar to the proposed project would be constructed and operated, and in addition, a small direct potable reuse (DPR) pilot plant would be constructed and operated within the footprint of the desalination plant site. This alternative also considers the possibility that the desalination plant could ultimately be transitioned and converted to a DPR plant in the long term, if and when regulations allow.
- **Regional Recycled Water for Irrigation Alternative:** considers the regional use of recycled water for landscape irrigation to reduce the demand on the City and District potable supply systems.
- **City Package Alternative:** a variety of actions and programs are considered that could potentially reduce the City's demand for water or have other beneficial effects on the water supply system, including: (1) conservation and demand management, (2) water-neutral development, (3) reservoir operations, and (4) water exchanges with neighboring districts.

- **District Package Alternative:** a number of measures and programs are considered that could potentially reduce the District's water supply shortfall allowing the District to achieve its recovery pumping goal of 2,900 afy, so that the basin can recover, including: (1) mandatory water rationing, and (2) water exchanges with neighboring districts.

The City and District No Project Alternatives would avoid most of the significant environmental impacts of the construction and operation of the proposed project. However, they would result in continued unavoidable impacts related to groundwater overdraft and would hinder the City's ability to commit to or implement stream flows for special-status fish under an HCP and, therefore, could result in continued unavoidable impacts on listed anadromous fish and fisheries habitat. Additionally, the No Project Alternatives for the City and District would not meet any of the objectives of the proposed project and would have corresponding adverse impacts related to water supply. Specifically, these alternatives would result in significant adverse impacts related to the water supply availability, distribution, and treatment.

The City-Only and District-Only Desalination Alternatives would result in similar environmental impacts as the proposed project, but those impacts would be somewhat reduced for the City-Only Desalination Alternative in certain categories, due to intermittent use and the fact that the City-District intertie system would not be needed. If either the City or District pursues a desalination project alone, then the supplemental water supply objectives of the other agency would not be met. Additionally, if either of these alternatives are pursued, the costs would be the responsibility of the entity pursuing the project and no cost-sharing advantages to the rate payers would be realized.

The Proposed Project Plus DPR Pilot Plant Alternative would have similar impacts as the proposed project, as the capacity and siting would be the same, and all components of the project would be implemented. In the long-term, if the desalination plant were converted to a DPR plant, the withdrawal of seawater from the ocean would be reduced or eliminated and the salinity of the brine generated by the plant would be reduced accordingly. The conversion of the plant would also lower overall electrical energy use and associated GHG emissions. This alternative would meet all project objectives and would have a similar capital cost as the proposed project.

Of the three remaining alternatives (the Regional Recycled Water Alternative and the City and District Package Alternatives); all would reduce impacts in certain categories. For example, all three would avoid any marine-related impacts, as no construction or operational activities would occur in the marine environment. However, similar to the No Project Alternatives, they could possibly also result in unavoidable adverse environmental impacts related to ongoing groundwater overdraft and ongoing adverse effects on anadromous fish and fisheries habitat. An exception is possible though for the District Package Alternative, as the effect of this alternative on groundwater conditions is unknown. Both approaches for water rationing under this alternative, however, are unproven and carry risk, meaning that there is no guarantee that they will provide the water savings needed to meet the District's recovery goal, which would affect the recovery of the basin.

Some of the project objectives related to the District could be met with the Regional Recycled Water Alternative and the District Package Alternative; however, neither alternative would provide a reliable and adequate source of water for the District. The project objectives related to the City would not be met with either the Regional Recycled Water Alternative or the City Package Alternative, as neither would provide a reliable and adequate source of water for the City. The capital costs for the Regional Recycled Water Alternative would be similar to the proposed project, but the unit cost per acre-foot would be higher given that less water would be provided by this alternative. The costs for the City Package Alternative would be less than that for the proposed project, but this alternative would not provide a reliable and adequate source of water for the City. The costs for the District Package Alternative would likely be greater than that for the proposed project given the costs for mandatory rationing using the preferred "Full Tool Box" approach, and this alternative would not guarantee that a reliable and adequate source of water would be provided for the District. **Table 1-2, Overall Comparison of Alternatives,** provides a summary comparison of the alternatives evaluated in detail.

1.6 Areas of Controversy and Issues to be Resolved

During the project scoping process in response to the Notice of Preparation, concerns were expressed and issues were raised by the public and commenting agencies relative to the proposed project. While the EIR considers these issues and concerns in the analysis of environmental effects of the project, there are likely certain issues contained within those comments that represent areas of known controversy relative to the project. Areas of controversy and issues to be resolved are summarized below. The Notice of Preparation comments are contained in their entirety in **Appendix A, Scoping Report City of Santa Cruz and Soquel Creek Water District (scwd²) Regional Seawater Desalination Project** of this EIR.

1.6.1 Areas of Controversy Based on Scoping Comments

- Whether the proposed project is needed by the City and/or the District.
- The extent to which growth contributes to the need for the proposed project.
- Whether alternatives to the proposed project could meet the water supply needs of the City and District.
- Energy use of desalination and associated GHG emissions.
- Effects of the project on the marine environment.
- Costs of desalination and implications for the rate payer.
- Where the project components will be located and their effects to the shoreline, beach, and marine environment.
- Quality of the desalinated product water.

1.6.2 Issues to be Resolved

The Final EIR will be considered by the City Council and the District Board in a joint public meeting, or meetings, and considered for certification if it is determined to be in compliance with CEQA, as described in **Section 2**. Upon certification of the EIR, the Lead Agencies will subsequently consider a proposed project for conditional approval, subject ultimately, to a vote of the City electorate.

In considering whether to approve a project, the City Council and District Board will need to consider the environmental implications of the project and the alternatives, as discussed in this document, as well as a number of other issues including costs, changes to water rates, feasibility of alternatives, and social and economic impacts to businesses, parks, schools, residents, and visitors. The City and District have been and are in the process of updating information relating to these other issues that, together with the EIR, will provide the City Council, District Board, and the public with the full scope of information needed for a decision on the project.

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Table 1-1, Summary of Environmental Impacts of the Proposed Project

Impact	LEVEL OF SIGNIFICANCE														Project Environmental Design Features and Mitigation Measures
	Seawater Intake Site Alternatives								Plant Site Alternatives			Other Components	Project Overall[1]	Possible Future Expansion	
	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
5.1 Hydrology and Water Quality															
5.1-1: Construction Water Quality – Onshore Components	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTS	ENVIRONMENTAL DESIGN FEATURES The City and District shall prepare and implement an erosion control plan/BMPs under Municipal Code Chapter 18.45, Excavation and Grading Regulations. The erosion control plan shall include the City's mandatory BMPs as detailed in the latest BMP Manual, published by the City's Public Works Department. BMPs shall be maintained in full force and effect for the duration of the project, under Municipal Code Chapter 16.19, Stormwater and Urban Runoff Pollution Control. MITIGATION MEASURES Mitigation Measure 5.1-1a: This mitigation measure applies to all project components involving ground disturbance. The City and District shall prepare a NOI to be submitted to the Central Coast RWQCB, which indicates the intent to comply with the Statewide NPDES General Construction Permit (Order No. 2009-0009-DWQ) prior to construction being initiated. Prior to submittal of the NOI, the City and the District shall prepare an SWPPP to comply with the Statewide NPDES General Construction Permit. The SWPPP shall identify BMPs to prevent or reduce pollution into surface waters, including Monterey Bay. BMPs shall include—but shall not be limited to—construction or installation of sediment retention or erosion control structures such as hay bales, coconut fiber rolls, geofabric, sand bags, and water filters over storm drains; reseeding of exposed soils; stockpiling of topsoil removed during construction; wetting of dry and dusty surfaces to prevent fugitive dust emissions; and clear water diversions to protect channels during trenching/pipeline installation. The SWPPP shall also establish good housekeeping measures such as construction vehicle storage and maintenance, handling procedures for hazardous materials, and waste management BMPs. Additional required components of the SWPPP shall include run-on and runoff control measures; inspection, maintenance, and repair of BMPs; and periodic reporting to show compliance with the NPDES Construction General Permit. Depending on the Risk Level assessed to the project discharges, the City and District shall ensure that project construction complies with Numeric Action Levels for pH and turbidity, which is required for Risk Level 2 and 3 projects. Risk Level 2 and 3 projects also require development of Rain Event Action Plans by qualified individuals, and water quality sampling of non-stormwater discharges and stormwater runoff during qualifying rain events. Exceedance of the Numeric Action Levels shall require mandatory follow-up, including additional evaluation, BMPs, and/or corrective action. Corrective actions will be implemented to bring the discharge to within the Numeric Action Levels. The City and the District shall ensure that a copy of the SWPPP is available at each construction site at all times, and shall be implemented and amended as necessary to ensure compliance with the NPDES Construction General Permit. Mitigation Measure 5.1-1b: This mitigation measure applies to the City-District intertie and the Arana Creek crossing at Brookwood Drive if trenchless construction is used. Prior to construction, a drilling-fluids management and response plan shall be prepared to address the potential for fluid releases. The plan shall include—but not be limited to—the following measures and actions: • Conducting a pre-construction geologic study to examine the work area to determine soil types, ground conditions, and appropriate construction procedures. • Isolating the work area with siltation fencing so that any fluid leaks are contained within a controlled area. • Maintaining materials and equipment on site to allow for the cleanup of any leak that may occur. • Constantly monitoring the work site by having inspector(s) maintain constant radio contact with equipment operators. • If a fluid leak does occur, the contractor shall stop work immediately and assess the nature of the leak. Remedial actions shall be implemented and may include spot cleanup with adsorbent materials, or sub-containment of a localized area for the duration of the work. • Once construction is complete, the site shall be restored to existing conditions. The City and District shall include the requirement for a drilling fluids management and response plan in construction specifications and bid document for the City-District intertie, and shall ensure its implementation during construction.

Table 1-1, Summary of Environmental Impacts of the Proposed Project

Impact	LEVEL OF SIGNIFICANCE													Project Environmental Design Features and Mitigation Measures
	Seawater Intake Site Alternatives								Plant Site Alternatives			Other Components	Project Overall[1]	Possible Future Expansion	
	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
5.1-2: Construction and Maintenance Water Quality – Offshore Components	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	--	--	--	--	LTSM	LTSM	ENVIRONMENTAL DESIGN FEATURES Tunneling and other construction approaches will be used to construct the intake system to avoid beach and bluff construction and minimize sediment and turbidity in the marine environment. MITIGATION MEASURES Mitigation Measure 5.1-2a: This mitigation measure applies to the use of trenchless construction for the installation of the seawater intake pipeline. Prior to construction, a drilling-fluids management and response plan specifically for the marine environment shall be prepared to address the potential for fluid releases. The plan shall include—but not be limited to—the following measures and actions: • Conducting a pre-construction geologic study to examine the work area to determine soil types, ground conditions, and appropriate construction procedures. • Maintaining materials and equipment on site and/or on the off-shore barge to allow for the cleanup of any leak that may occur. • Constantly monitoring the work site through inspector(s)/divers evaluating the tunneling operation to determine the presence of any leaks, and maintaining constant radio contact with equipment operators. • If a fluid leak does occur, the contractor shall stop work immediately and assess the nature of the leak. Remedial actions shall be implemented, and may include spot cleanup with adsorbent materials or sub-containment of a localized area for the duration of the work. The City and District shall include the requirement for a drilling fluids management and response plan for the marine environment in construction specifications and bid document for the seawater intake system, and shall ensure its implementation during construction. Mitigation Measure 5.1-2b: This mitigation measure applies to the seawater intake structure and intake pipeline project components. Contractors shall implement specific measures that reduce sediment disturbance during underwater construction that results in disturbance of the ocean floor. Where dredging is conducted, a closed "environmental" bucket dredging system with a lid to reduce turbidity (or equivalent) shall be employed. Turbidity screens shall be used during the rock excavation work at SI-4, SI-5, SI-7, SI-14, and SI-16, as appropriate, due to the presence of kelp forests nearby. Water quality monitoring inside and outside the construction zone shall be performed to detect increased turbidity levels, if required by the RWQCB Clean Water Act 401 Water Quality Certification. If increased turbidity is detected, the certification may require a specific time of attenuation or further isolation of the work area with additional turbidity screens. In addition, work shall be stopped, or monitored carefully, during periods of high swell (such as for the period from October 15 through February 15 due to the high incidence of large swells), and work shall be avoided during extreme high tides, or during other periods of extreme tidal fluctuations such as during full and new moons.
5.1-3: Brine Discharge	--	--	--	--	--	--	--	--	--	--	--	--	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES • Brine from the desalination plant to be blended with WWTF effluent. Automatic control of blending ratio of brine flow to WWTF effluent flow to meet minimum initial dilution requirement of the existing NPDES permit and to ensure that the combined effluent would not exceed the salinity of ambient receiving water; • On-site storage of brine such that the rate of disposal can be controlled; and • New valves over existing ports on the WWTF outfall diffuser to spread effluent flow. MITIGATION MEASURES None required
5.1-4: Groundwater	--	--	--	--	--	--	--	--	--	--	--	--	B	--	MITIGATION MEASURES None required
5.1-5: Drainage	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTSM	LTSM	LTSM	LTS	LTSM	LTS	ENVIRONMENTAL DESIGN FEATURES • Stormwater handling at the plant site will follow the City of Santa Cruz requirements for Low Impact Development, as specified in the City's BMP Manual, and per pending revisions effective September 2013; • Swales and smaller bio-retention/detention basins shall be distributed throughout the sites, rather than concentrating

Table 1-1, Summary of Environmental Impacts of the Proposed Project

Impact	LEVEL OF SIGNIFICANCE													Project Environmental Design Features and Mitigation Measures
	Seawater Intake Site Alternatives								Plant Site Alternatives			Other Components	Project Overall[1]	Possible Future Expansion	
	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
															stormwater in one area; • The drainage facilities will handle a 25-year storm event with a safety factor of 1.25; and • Peak stormwater runoff rates and sediment loading from the desalination plant site shall not exceed the estimated pre-development rate for this peak storm event. MITIGATION MEASURES Mitigation Measure 5.1-5: This measure applies to the proposed desalination plant. The City and District shall revise the stormwater management plan for the selected desalination plant site to ensure that it complies with the City's pending stormwater regulations. To accomplish this and to provide for additional bioretention area expected to be needed; soil percolation tests will be conducted on the selected plant site to determine the site-specific soil percolation characteristics, and whether runoff from the 95th percentile 24-hour rainfall event can be infiltrated on site. If onsite conditions limit the ability to fully infiltrate the runoff at this rate, the desalination plant portion of the project will have to provide treatment of the runoff from the 85th percentile 24-hour rainfall event. To provide for this treatment, an underdrain with an orifice can be used to ensure that a minimum 48 hours of extended detention is provided for the water quality treatment volume. The use of pervious pavement shall be considered as a mechanism for maximizing infiltration.
5.1-6: Flooding and Inundation	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES Any project facilities (intakes, intake structures, and pipelines) subject to coastal wave action would be designed to account for wave heights, storm surge, water levels, scouring and erosion, maximum and minimum tides, and currents associated with a 100-year storm event and factoring in anticipated water levels due to sea-level rise and global warming over the life of the structures. Design standards may be subject to modification based on regulatory requirements and policies of permitting agencies. MITIGATION MEASURES None required
5.1-7: Water Supply Quality	--	--	--	--	--	--	--	--	LTS	LTS	LTS	--	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES Each SWRO membrane skid or unit would be configured with a hybrid arrangement of high-boron-rejection SWRO membranes and low-energy-consumption SWRO membranes. This hybrid arrangement would provide the optimum balance of boron removal to meet treatment objectives, while minimizing system energy requirements. MITIGATION MEASURES None required
5.2 Marine Biological Resources															
5.2-1: Entrainment/ Impingement	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	--	--	--	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES • Provide intake screens with 0.08-inch (2-mm) slot size. • Provide low through-screen velocity of less than or equal to 0.33 ft/sec. MITIGATION MEASURES None required
5.2-2: Brine Discharge Water Quality	--	--	--	--	--	--	--	--	--	--	--	--	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES • Brine from the desalination plant to be blended with WWTF effluent. Automatic control of blending ratio of brine flow to WWTF effluent flow to meet minimum initial dilution requirement of the existing NPDES permit and to ensure that the combined effluent would not exceed the salinity of ambient receiving water; • On-site storage of brine such that the rate of disposal can be controlled; and • New valves over existing ports on the WWTF outfall diffuser to spread effluent flow. MITIGATION MEASURES None required
5.2-3: Construction	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	--	--	--	--	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES Tunneling and other construction approaches will be used to construct the intake system to avoid beach and bluff

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	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
and Maintenance Water Quality															construction and minimize sediment and turbidity in the marine environment. MITIGATION MEASURES While not required, **Mitigation Measures 5.1-2a and 5.1-2b** would also apply, see above.
5.2-4: Underwater and Airborne Construction Noise	LTSM	LTSM	LTSM	LTS	LTSM	LTSM	LTSM	LTS	--	--	--	--	LTS/ LTSM*	LTS	ENVIRONMENTAL DESIGN FEATURES Tunneling and other construction approaches will be used to construct the intake system to avoid beach and bluff construction. This construction feature will also minimize construction in the ocean and associated construction disturbance to marine life. MITIGATION MEASURES **Mitigation Measure 5.2-4:** This mitigation measure applies to underwater noise generated by offshore construction activities involving rock excavation (SI-4, SI-5, SI-7, SI-14, and SI-16) and pile driving (SI-17). The City and District shall prepare and implement a hydroacoustic, fish, and marine mammal monitoring plan. This plan shall be developed and implemented in consultation with NMFS. The plan shall include specific measures to minimize exposure of marine mammals and fish to high sound levels. Avoidance and minimization measures that shall be implemented include the following: Fish • Underwater noise shall be measured during pile-driving and underwater rock excavation activities to verify that sound levels do not exceed injury thresholds for fish (206 dB peak). • If an activity produces underwater sound levels that exceed the injury threshold for fish, sound levels will be reduced through noise-control measures, such as the installation of NMFS-approved attenuation devices (bubble curtains). If bubble curtains are established, a biologist will clear the work area of fish prior to starting pile driving or rock excavations, and will monitor the work area for incursions. Marine Mammals • Marine mammal observations shall be conducted to determine use of the area by marine mammals before pile driving or rock excavation begins. Observations could be conducted from a boat, adjacent cliffs, or the wharf, depending on the intake location. • An underwater "exclusion zone"—defined as the distance where underwater sound levels exceed180 dB if whales are present, and 190 dB if seals and sea lions are present—will be established. An initial exclusion zone of 100 feet for underwater work activities will be established. This distance exceeds the expected distances from the work where underwater sound levels are likely to exceed NMFS criteria. This will be refined based on hydroacoustic measurements in the field and in consultation with NMFS. • Marine mammal monitoring of the exclusion zone will be conducted prior to commencement of pile driving and underwater excavation activities. • Pile-driving activities will not commence until marine mammals are not sighted in the exclusion zone for 15 minutes. This would avoid exposing marine mammals to sound levels in excess of the Level A criteria. • Underwater noise will be measured with a hydrophone during pile-driving and underwater rock excavation activities to verify sound levels and adjust the size of the exclusion zone as necessary. • During pile driving at SI-17, airborne noise measurements will also be made to determine if Level B airborne thresholds are exceeded. Behaviors of marine mammals hauled-out beneath the Municipal Wharf will be noted. • Data collected during the hydroacostic, fish and marine mammal monitoring will be reported to NMFS in a post-construction monitoring report (usually required to be completed between 60 and 90 days after construction is complete). Observations and data will be reported more frequently, if required by NMFS.
5.2-5: Fill/ Placement of Intake Structures	LTSM	LTSM	LTSM	LTS	LTSM	LTSM	LTS	LTS	--	--	--	--	LTS/ LTSM*	LTS	ENVIRONMENTAL DESIGN FEATURES Setback seawater intake structure 100 feet from the edge of the rocky kelp forest habitat. MITIGATION MEASURES **Mitigation Measure 5.2.5:** This mitigation measure applies to any intake site located on rocky bottom habitat (SI-4, SI-5, SI-7, SI-14, and SI-16). The City and District shall site the intake structure outside of the Rocky Reefs HAPC and kelp

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	Seawater Intake Site Alternatives								Plant Site Alternatives			Other Components	Project Overall[1]	Possible Future Expansion	
	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
															forest habitat, such that the structure avoids these habitat areas. The precise location shall be based on existing kelp forest mapping (see Figure 5.2-2) and a pre-construction survey of the selected intake location, which is required to identify the precise site for the proposed seawater intake structure, given the dynamic nature of the kelp forest habitat. Additionally, all construction vessels shall use moorings placed in the areas identified during the pre-construction surveys as free of kelp forest habitat.
5.2-6: Movement of Fish or Wildlife	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	--	--	--	LTS	LTS	MITIGATION MEASURES None required
5.3 Terrestrial Biological Resources															
5.3-1: Special-Status Species	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTSM	LTS	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measures 5.1-1a and 5.1-1b, above. Mitigation Measure 5.3-1a: This mitigation measure applies to the Arana Creek/Brookwood Drive crossing of the City-District intertie system, if instream work is pursued. The following measures shall be implemented to minimize the effects to central California coast steelhead and its designated critical habitat, if instream work is pursued to provide for the pipeline crossing of Arana Creek at Brookwood Drive. Because the project would require formal consultation with NMFS pursuant to Section 7 of the federal ESA, additional measures to avoid and minimize impacts to steelhead may be identified during the consultation process. Any such additional measures shall also be implemented in addition to the requirements of this mitigation measure. • Diversion of the stream in the construction area shall occur only in the dry summer months between June 15 and October 15 when flows in Arana Creek would be greatly reduced. • A preconstruction survey shall be conducted by a qualified fisheries biologist immediately prior to project disturbance activities for the presence of special-status species. These surveys shall be conducted immediately prior to disturbance activities, such as the installation and removal of diversion facilities. Prior to all dewatering activities, the fisheries biologist shall survey the water using appropriate survey techniques to capture and relocate steelhead. Dewatering activities shall begin once the biologist has relocated any steelhead present. • Prior to any instream work in the bed and banks of Arana Creek that requires the construction of cofferdams or dewatering of the creek bed, a stream diversion plan shall be prepared by a qualified biologist after consultation with NMFS and CDFW, and per an approved Streambed Alternation Agreement. The stream diversion plan shall require that: (1) a qualified fisheries biologist be present during the closing and dewatering of all cofferdams; (2) a qualified fisheries biologists collect, handle, and relocate fish in dewatered areas; and (3) all pump intakes are screened according to CDFW and NMFS criteria. Construction specifications shall incorporate the terms of the stream diversion plan. • Diversion and routing of the stream channel to a temporary diversion channel to allow construction work in the existing channel shall be supervised by the qualified fisheries biologist after consultation with NMFS and CDFW, consistent with any terms imposed by those two agencies pursuant to their regulatory authorities under the federal ESA and/or Section 1602 of the California Fish and Game Code. The diversion and routing shall not disrupt the connectivity of the upstream reaches with the lower reaches of the creek. The existing channel shall remain untouched until the temporary diversions are constructed and the erosion control measures are in place. Diversion channels shall be opened from the downstream end first; and only clean washed material shall be used to close existing channels to divert water to temporary diversion channels. The temporary diversion channel shall be designed to accommodate the flow of expected storm events, and have gradient controls to ensure that diversion channel slopes correspond to the existing channel gradients. Mitigation Measure 5.3-1b: This mitigation measure applies to Plant Site A-2 (CRLF) and the Arana Creek/Brookwood Drive crossing (FYLF). The following measures shall be implemented to minimize any potentially significant impacts to CRLF or FYLF: • A qualified biologist shall conduct preconstruction surveys of the above identified portions of the project area where

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Impact	LEVEL OF SIGNIFICANCE														Project Environmental Design Features and Mitigation Measures
	Seawater Intake Site Alternatives								Plant Site Alternatives			Other Components	Project Overall[1]	Possible Future Expansion	
	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
															any potential dispersal habitat occurs. Surveys for CRLF, to be conducted by a USFWS-approved biologist, will be conducted if Plant Site A-2 is selected. Surveys for FYLF shall be conducted for the Brookwood Drive crossing of Arana Creek if instream work is required. These surveys shall be conducted no more than 48 hours prior to start of construction activities. If CRLF or FYLF are found in the project area during any preconstruction surveys, the USFWS or the CDFW would be contacted, as appropriate for these species, and the frogs shall be relocated to a safe location outside the project area and prevented from reentering the project area with the installation of silt fencing or other exclusion fencing. Only a USFWS-approved biologist with a permit to handle CRLF shall participate in any relocation of CRLF. Construction specifications shall account for this measure. • Construction fencing shall be installed at the margins of the work area, where any potential habitat for CRLF or FYLF occurs, to prevent workers from encroaching into adjacent habitat and to prevent CRLF or FYLF from entering the construction area. All fencing shall be periodically monitored and maintained for the duration of construction, and removed upon project completion. Construction specifications shall account for this measure. • Before construction activities begin in these areas, a USFWS-approved biologist shall conduct a training session for all construction personnel, if Plant Site A-2 is selected. At a minimum, the training shall include a description of the CRLF and its habitat, the importance of the CRLF and its habitat, general measures that are being implemented to conserve the CRLF as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books, and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions. This training shall be provided before construction begins, and as new construction crews arrive at Plant Site A-2. A similar training for FYLF shall be conducted by a qualified biologist (USFWS approval not required) prior to construction activities associated with the Brookwood Drive crossing of Arana Creek. Construction specifications shall account for this measure. • A USFWS-approved biologist shall be present at Plant Site A-2 until such time as all removal of CRLF, instruction of workers, and disturbance of habitat have been completed. After this time, the contractor or City and District shall designate a person to monitor on-site compliance with the above minimization measures and any future staff training. The USFWS-approved biologist shall ensure that this individual receives training as outlined above. The monitor and the USFWS-approved biologist shall have the authority to stop work if CRLF are in harm's way. Mitigation Measure 5.3-1c: This mitigation measure applies to the City-District intertie system where woodland, forest, or riparian habitats exist near the DeLaveaga tanks and the Brookwood Drive crossing of Arana Creek. At least 2 weeks prior to the start of construction, a qualified biologist shall conduct preconstruction surveys for San Francisco dusky-footed woodrat in woodland, forest, or riparian habitats where vegetation removal could occur. If active woodrat nests are located in the project area, the biologist shall consult with CDFW to determine an appropriate course of action to relocate the nest outside of the project area in a way that does not cause excessive stress, injury, or mortality to the resident woodrats. If nests occur within 10 feet of the construction area, the nests shall be separated from construction as an environmentally sensitive area with fencing, and the fence shall be regularly monitored and maintained throughout the duration of construction in the area before it is removed, following the completion of work. Construction specifications shall include this measure. Mitigation Measure 5.3-1d: This mitigation measure applies to the City-District intertie system near DeLaveaga tanks and the Brookwood Drive crossing of Arana Creek. All open holes, trenches, or pits shall be covered overnight and when not in use to avoid any wildlife (e.g., San Francisco dusky-footed woodrat) being trapped. If covering is not possible, escape ramps shall be used.

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	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
5.3-2: Riparian Habitat	LTSM	LTS	LTS	LTS	LTS	LTS	LTS	LTSM	LTS	LTSM	LTS	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measures 5.1-1a and 5.1-1b, above. Mitigation Measure 5.3-2a: This mitigation measure applies to Plant Site A-2, if this site is selected for the desalination plant. Prior to initiation of final design, riparian setbacks shall be established per the City-Wide Creeks and Wetland Management Plan methodology for the northern end of the ephemeral drainage on Plant Site A-2. This shall involve establishment of the riparian corridor, development setback, and management area, as called for in the above plan. The preliminary design for Plant Site A-2 shall be redesigned where needed to avoid construction, and the placement of structures in the established riparian corridor and development setback for this drainage. Mitigation Measure 5.3-2b: This mitigation measure applies to Plant Site A-2 and the City-District intertie system at the Brookwood Drive crossing of Arana Creek. Where construction activities would be in or adjacent to riparian habitats, these areas would be protected from construction activities with fencing. Construction fencing backed by silt fencing shall be installed to prevent construction personnel or equipment from entering or impacting these sensitive areas. This fencing shall be installed prior to the initiation of construction activities, at the direction of a qualified biologist. Construction specifications will account for this measure. Mitigation Measure 5.3-2c: This mitigation measure applies to the City-District intertie system at the Brookwood Drive crossing of Arana Creek. Prior to construction, prepare an arborist report for the Brookwood Drive pipeline segment between Prospect Heights and the Arana Creek bridge crossing. Implement measures from the report to protect trees to be retained, in order to minimize inadvertent damage to protected trees and their root zones during construction. Measures shall include, but not limited to, the following: installation of temporary construction fencing around the dripline of the trees, prohibition of storage or dumping of any kind inside the fenced area, protection of the trees and root zones as specified, and pruning as may be specified in the report. Should the arborist determine that construction activities would result in enough root damage so as to cause any mature native riparian tree to die, then the arborist shall recommend replacement plantings at ratios appropriate to that species in or near the affected area. The project arborist shall be retained throughout the duration of the trenching along this segment of pipeline to inspect and monitor tree protection zones at regular intervals and to ensure that all arborist recommendations are implemented.

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	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
5.3-3: Monarch Butterfly Overwinter Habitat	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	SU	LTS	LTS	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES Nectar plant species preferred by foraging adult monarch butterflies during the fall and winter months would be planted and maintained at the desalination plant site. The plantings would be in sunlit areas, preferably on the southern and western portions of the site and away from substantial vehicle traffic and human activity. A qualified biologist specializing in monarch butterflies would review the planting plans prior to construction. Planting would occur as soon as possible following ground disturbing activities. Should future changes or expansion of the plant result in unsuitable conditions for the nectar plants, additional suitable areas on the desalination plant site or offsite in close proximity to NBSB would be planted and maintained with nectar species. MITIGATION MEASURES Mitigation Measure 5.3-3a: This mitigation measure applied to Plant Site A-2. Final design of Plant Site A-2 shall avoid, to the extent feasible, removal of tree species that may provide wind protection to the monarch butterfly roost in NBSB. See Mitigation Measure 5.3-6 for tree protection measures during construction. Mitigation Measure 5.3-3b: This mitigation measure applies to Plant Site A-2. A mixture of tall, medium, and short tree species known to function as wind protection for monarch butterfly roost sites shall be planted on the desalination plant site or offsite to provide wind protection to the monarch butterfly roost area in Natural Bridges State Beach. Trees shall either be faster growing species or mature trees. Evergreen tree species that provide good windscreen function include Coast redwood (*Sequoia sempervirens*), Monterey cypress (*Hesperocyparis macrocarpus*), swamp mahogany (*Eucalyptus robusta*), Sydney blue gum (*Eucalyptus saligna*), and coolibah (*Eucalyptus microtheca*). These evergreens should be planted in the drier locations of the southwestern portion of Plant Site A-2. In the wetter portions of Plant Site A-2, California white alder (*Alnus rhombifolia*), red alder (*Alnus rubra*), and willows (*Salix hindsiana*, *S. lucida*, and *S. lasiolepis*) are appropriate trees for this purpose. Replacement trees should be planted at a minimum 2:1 ratio to those removed to the extent available land and any landowner approvals allow. Plantings should be timed, to the extent feasible, to minimize any time lag in the loss of wind protection to the NBSB monarch roost area.
5.3-4: Waters and Wetlands	LTSM	NI	NI	NI	NI	NI	NI	LTSM	NI	LTSM	LTS	LTSM	LTSM	LTS/LTSM*	MITIGATION MEASURES Mitigation Measures 5.1-1a and 5.1-1b, and Mitigation Measures 5.3-2a and 5.3-2c, above.
5.3-5: Wildlife Movement	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.3-1a, above. Mitigation Measure 5.3-5: This mitigation measure applies to all project components. Within 30 days prior to initiating any construction activity during the nesting period (February 1 to August 31st), a pre-construction nesting bird survey for the presence of nesting birds protected under the MBTA, including raptors and other special-status bird species, shall be conducted by a qualified biologist to establish the status of these species in the project area, and identify any active nests within 500 feet of the various construction sites. If ground-disturbing activities are delayed or suspended for more than 30 days after the pre-construction survey during the nesting period, the site shall be resurveyed. If occupied raptor nests or other nesting MBTA are observed within 500 feet of proposed construction activities, the City shall consult with a qualified biologist and CDFW, as needed, to develop measures, including establishing an appropriate buffer distance to avoid disturbance of nesting species, prior to the initiation of any construction activities. Minimum buffer zones are typically 50 feet, and they may be larger for sensitive species. If a buffer distance is established around an active nest, no activities of any kind will occur within the buffer until chicks have fledged (actual time to be determined by qualified biologist).
5.3-6: Conflict with Local Plans	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	SU	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measures 5.3-1a through 5.3-1d, Mitigation Measures 5.3-2a through 5.3-2c, Mitigation Measures 5.3-3a and 5.3-3b, and Mitigation Measure 5.3-5, above. Mitigation Measure 5.3-6: This mitigation measure applies to Plant Site A-2. Prepare an arborist report if Plant Site A-2 is selected. Implement measures from the report to protect trees to be retained in order to minimize inadvertent damage to protected trees and their root zones during construction. Measures shall include, but not limited to, the following: installation of temporary construction fencing around the dripline of the trees, prohibition of storage or dumping of any kind

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	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
															inside the fenced area, protection of the trees and root zones as specified, and pruning as may be specified in the report. Require that the project arborist be retained throughout the duration of the project to inspect and monitor tree protection zones at regular intervals and to ensure that all arborist recommendations are implemented.
5.3-7: Adopted HCPs	--	--	--	--	--	--	--	--	--	--	--	--	B	--	MITIGATION MEASURES None required
5.4 Land Use, Planning, and Recreation															
5.4 1: Conflicts with Land Use Plans, Policies, and Regulations	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	SU	LTSM	LTSM	LTSM	LTSM	ENVIRONMENTAL DESIGN FEATURES See environmental design features identified for other impacts. MITIGATION MEASURES Mitigation Measures 5.1-1a-b, 5.1-2a-b, and 5.1-5, Mitigation Measures 5.2-4 and 5.2-5, and Mitigation Measures 5.3-1a-d, 5.3-2a-c, 5.3-3a-b, 5.3-5, and 5.3-6, above. Mitigation Measure 5.6-1, Mitigation Measures 5.7-1a-b, 5.7-3, and 5.7-4, Mitigation Measures 5.8-2a-c, 5.8-3, and 5.8-4, and Mitigation Measures 5.11-1a-e, below.
5.5 Air Quality and Climate Impacts															
5.5-1: Conflicts with Air Quality Plan	--	--	--	--	--	--	--	--	--	--	--	--	LTS	LTS	MITIGATION MEASURES None required
5.5-2: Violation of AAQS - Construction	--	--	--	--	--	--	--	--	--	--	--	--	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES The City and District shall implement the following dust-abatement best management practices at all construction sites: • Water all active construction areas with exposed soil at least twice daily, as warranted, to control dust. Frequency shall be based on the type of operation, soil moisture and other conditions, and wind exposure. • Prohibit all grading activities during periods of high wind (over 15 miles per hour). • Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least 4 consecutive days). • Cover all trucks hauling dirt, sand, or loose materials. Haul trucks shall maintain at least 2 feet of freeboard. • Sweep streets if visible soil material is carried out from the construction site. • Replace ground cover in disturbed areas as soon as possible. • Cover inactive storage piles. MITIGATION MEASURES None required
5.5-3: Violation of AAQS - Operations	--	--	--	--	--	--	--	--	--	--	--	--	LTS	LTS	MITIGATION MEASURES None required
5.5-4: Sensitive Receptors	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	MITIGATION MEASURES None required
5.5-5: Odors	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	MITIGATION MEASURES None required
5.5-6: GHG and Plan Conflicts	--	--	--	--	--	--	--	--	--	--	--	--	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES • A commitment of net carbon neutrality with the construction and operation of the proposed project, which means that it would be designed and operated such that there would be no net increase in GHG emissions as compared to

Table 1-1, Summary of Environmental Impacts of the Proposed Project

Impact	LEVEL OF SIGNIFICANCE														Project Environmental Design Features and Mitigation Measures
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	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
															the existing environmental setting. • Use of high-efficiency pumps, motors, energy recovery devices, SWRO membrane configuration, and compliance with the City's Green Building Program to reduce energy requirements; • Implementation of an energy Minimization and Greenhouse Gas Reduction Plan to ensure that the net carbon neutral objective of the proposed project is achieved on a long-term basis. MITIGATION MEASURES None required
5.6 Noise and Vibration															
5.6-1: Operational Noise	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTS	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.6 1: This mitigation measure applies to the desalination plant and the intake pump station. The final design of the desalination plant and intake pump station shall include noise control treatments including, but not limited to: • Sound-insulating building structures. • Noise control enclosures for individual pieces of equipment, both inside and outside of the buildings, for major noise generators such as high-pressure pumps. • Sound-absorbing materials to minimize reverberation within enclosures. • Fan sound attenuators. • Acoustical barriers such as solid equipment screen walls or quilted noise control blankets. • Landscape berms. • Orientation away from sensitive receivers, and behind buildings or other structures that could provide shielding. The specific design and details of these treatments shall be completed during project design, and shall be included in the construction plans and specifications for the project. Prior to the issuance of any building or grading permit, an acoustical analysis report shall be submitted to the City documenting the noise control treatments that have been incorporated into the project. The acoustical report shall also document that the design would reduce noise so as to comply with the Zoning Ordinance performance standards established in Municipal Code Section 24.14.260. These standards indicate that maximum sound levels shall not be more than 6 dBA above the local ambient for noise sources at the plant site; and 5 dBA above the local ambient for noise sources at the pumping station, if in a residential area. Meeting these standards will also ensure that the 24-hour average DNL thresholds set forth in the General Plan will be met.
5.6-2: Construction Noise	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES • Construction equipment shall be properly outfitted and maintained with noise-reduction devices to minimize construction-generated noise. Wherever possible, noise-generating construction equipment shall be shielded from nearby residences by noise-attenuating buffers, such as temporary structures, equipment, or trucks. Stationary construction equipment shall be situated on site at the greatest distance possible from nearby noise-sensitive receptors. • Impact tools (e.g., jackhammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered whenever possible to avoid noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed-air exhaust shall be used; such mufflers can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, which could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible. • Require contractors to assure that mobile noise-generating equipment and machinery are shut off when not in use. • At least 72 hours prior to commencing nighttime construction, if required, the City shall notify (in writing) all residents within 300 feet of proposed construction sites of the date and time construction will occur. The notice will provide a contact name, phone number, and a location where noise complaints may be submitted. MITIGATION MEASURES None required

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	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
5.6-3: Vibration	LTS	LTS	LTS	LTS	LTS	LTS	LTSM	LTS	LTSM	LTS	LTS	LTS	LTS/ LTSM*	LTS	ENVIRONMENTAL DESIGN FEATURES Notify land uses within 200 feet of scheduled pile-driving activities and other activities producing vibration (jackhammers and other high-power tools), and schedule construction activities involving pile driving with the highest potential to produce perceptible vibration to the hours with least potential to affect nearby businesses. MITIGATION MEASURES Mitigation Measure 5.6-3: This mitigation measure applies to pile driving that could occur at the desalination plant at Plant Site A-1, and/or the intake pump station at SI-17. A pile-driving vibration monitoring plan shall be implemented to document conditions prior to, during, and after pile driving. All plan tasks shall be undertaken under the direction of a licensed Professional Structural Engineer in the State of California, and shall be in accordance with industry-accepted standard methods. The pile-vibration monitoring plan should include the following tasks: • Identification of the sensitivity of nearby structures to ground-borne vibration. Vibration thresholds (0.3 in/sec PPV) should be applied to all vibration-sensitive structures within 75 feet of the project site. • Performance of a photo survey, elevation survey, and crack monitoring survey for each sensitive structure within 75 feet of pile-driving activities. Surveys shall be performed prior to any pile driving, in regular intervals during and after the pile driving, and shall include internal and external crack monitoring in each sensitive structure, settlement, and distress; and shall document the condition of foundations, walls, and other structural elements in the interior and exterior of said structures. • Development of a vibration monitoring and construction contingency plan to: identify structures where monitoring would be conducted; establish a vibration-monitoring schedule; define structure-specific vibration limits; and address the need to conduct photo, elevation, and crack surveys to document before and after construction conditions. Construction contingencies would be identified for when vibration levels approached the limits. • If vibration levels approach the 0.3 in/sec PPV threshold, suspend construction and implement contingencies to either lower vibration levels or secure the affected structures. • Designate a person responsible for registering and investigating claims of excessive vibration. The contact information of such person shall be clearly posted on the construction site. • Conduct post-survey on structures where either monitoring has indicated high levels of damage, or complaints of damage have been made. Make appropriate repairs or compensation where damage has occurred as a result of construction activities.
5.7 Geology and Soils															
5.7-1: Seismic Hazards	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.7 1a: This mitigation measure applies to all proposed project components involving new facility construction. Once project component locations have been selected, a California-licensed geotechnical engineer, or engineers, shall complete design-level geotechnical investigations for all project components to inform final design and construction. These investigations shall address seismic and geologic hazards. Slope stability shall also be evaluated, where warranted. These investigations shall address, among other things, the best means for complying with all applicable state and local code requirements and other protective standards. The investigations shall include soil sampling and laboratory testing of materials in order to provide design criteria and recommendations applicable to foundation design, earthwork, backfill, site preparation, trenching, tunneling, materials, and other factors related to all project components. All recommendations of the geotechnical investigations and of the geotechnical engineer(s) shall be incorporated into the final design and construction specifications for each project component, and shall be implemented by the construction contractors. Mitigation Measure 5.7-1b: This mitigation measure applies to all project components involving new facility construction. All facility designs shall comply with the most recent edition of the CBC—or local building codes, if they are more stringent. In particular, a California-licensed geotechnical engineer shall ensure that all structures associated with the proposed project have been designed to withstand the “design-level” earthquake, as set forth in the CBC.
5.7-2: Coastal Bluff Retreat	LTS	LTS	LTS	LTS	NI	NI	NI	LTS	NI	NI	NI	NI	LTS/NI*	LTS	MITIGATION MEASURES None required

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	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
5.7-3: Other Slope Stability	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.7-1a, above. Mitigation Measure 5.7-3: This mitigation measure applies to Plant Sites A-1, A-2, and A-3; and portions of the potable water distribution system in proximity to slopes or unstable soils at or near the DeLaveaga tanks and the Arana Creek crossings. As part of the geotechnical investigations performed under Mitigation Measure 5.7-1a, a survey of slope stability at selected sites shall be conducted by a geotechnical engineer. Recommendations based on the survey shall be incorporated into the design and construction specifications. Recommendations could include, but would not be limited to: (1) appropriate foundation design, setbacks from slopes, retaining walls for facilities to be constructed near slopes, and/or regrading of cut slopes to a stable configuration, such as at Plant Sites A-1, A-2, and A-3; (2) installing additional shoring in trenches where sediments are non-cohesive or saturated; and (3) burying pipelines at a greater depth to reduce risk from landslides or to key into more stable sediment. Recommendations shall be incorporated into the final design and construction specifications for applicable project components, and shall be implemented by the construction contractors.
5.7-4: Expansive and Corrosive Soils	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.7-1a, above. Mitigation Measure 5.7-4: This mitigation measure applies to all project components requiring new facility construction. As part of the geotechnical investigations performed under Mitigation Measure 5.7-1a, site-specific soil surveys shall be conducted to identify areas of expansive and/or corrosive soils. For areas with expansive and/or corrosive soils, a geotechnical engineer shall make recommendations regarding alternative construction materials and methods. Recommendations may include appropriate foundation design; excavation and replacement of highly expansive or corrosive soils with appropriate fill material; treatment of expansive soils; subsurface drainage for high-groundwater issues; and use of corrosion-resistant materials for new below-ground construction. Recommendations shall be incorporated into the final design and construction specifications for each project component, and shall be implemented by the construction contractors.
5.8 Cultural Resources															
5.8-1: Known Historical or Archaeological Resources	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	MITIGATION MEASURES None required
5.8-2: Unknown Historical or Archaeological Resources	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.8-2a: This mitigation measure applies only to Plant Site A-2. Prior to ground-disturbing activities, a qualified archaeologist shall conduct a field investigation of Plant Site A-2 for surficial evidence of archaeological deposits. If such evidence is found, the archaeologist shall evaluate the deposit for potential significance under CEQA and/or make recommendations for supplemental testing if necessary to characterize and evaluate the significance of the resource. If potential historical or unique archaeological resources are encountered, and avoidance is determined to not be feasible, no ground disturbing activities shall be initiated until any potential historical or unique archaeological resources have been evaluated and appropriately mitigated for, consistent with Mitigation Measure 5.8-2c (Items 5 and 6). If no historical or unique archaeological resources are found during the field investigation, Mitigation Measure 5.8-2c providing for standard inadvertent discovery procedures shall apply during construction. Mitigation Measure 5.8-2b: This mitigation measure applies to areas having sensitivity for buried archaeological resources (see Figures 5.8-1a and 5.8-1b). A qualified full-time archaeological monitor shall be present during ground disturbance in areas identified in the figures above as sensitive for buried archaeological resources. Monitoring shall be conducted in these areas by a qualified archaeologist and guided by a monitoring plan. The monitoring plan shall include the following elements/protocol: pre-construction assessment; construction worker training; construction monitoring; site recording and evaluation; mitigation planning (e.g., data recovery protocol); curation; guidelines for tribal coordination; and report of findings. If archaeological resources are identified during construction, all construction activities shall be halted in the vicinity, in full compliance with Santa Cruz City Code 24.12.430 (for portions of the project area in the City) or Santa Cruz County Code

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	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
															16.40.040 (for portions of the project area in the County). Specific discovery procedures under Mitigation Measure 5.8-2c shall be implemented. Mitigation Measure 5.8-2c: This mitigation measure applies to all project components involving ground disturbance. Standard inadvertent discovery procedures, in accordance with City Code 24.12.430 or County Code 16.40.040, as relevant, shall be implemented as part of all construction contracts. The following steps, which summarize the relevant procedures from the regulations above, should be taken in the event of any unanticipated discoveries of any artifact or any other object which reasonably appears to be evidence of an archaeological/cultural resource: • Immediately cease all further excavation, ground disturbance, and work on the project site; • Place visible stakes completely around the area of discovery not more than ten feet apart forming a circle having a radius of not less than one hundred feet from the point of discovery; provided, that such staking need not take place on adjoining property unless the owner of the adjoining property authorizes such staking; • Notify the City of Santa Cruz planning director of discoveries in the City, and the County of Santa Cruz planning director of discoveries in the County; • If any artifacts or remains are discovered, the planning director shall arrange an on-site inspection of the property to be made. The purpose of the inspection shall be to determine whether the discovery is a historical resource or a unique archaeological resource; • Upon determining that the discovery is a historical resource or a unique archaeological resource, no further excavation or development shall take place until a mitigation plan has been prepared and approved (City and County, as applicable) and an archaeological site development approval and excavation approval have been obtained (County only), as relevant per City and County requirements. The mitigation plan is further described below. • If the find is determined to be either an historical resource or a unique archaeological resource, the feasibility of avoiding the resource shall be evaluated. If avoidance is determined to be infeasible, a qualified archaeologist shall prepare and implement a research design and archaeological data recovery plan (mitigation plan) for the resource for approval, as per the City and County Codes. The archaeologist shall also conduct appropriate technical analyses, prepare a comprehensive written report and file it with the appropriate information center (NWIC), and provide for the permanent curation of the recovered materials.
5.8-3: Human Remains	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.8-3: This mitigation measure applies to all project components involving ground disturbance. In the event of accidental discovery of human remains, the specific protocol and channels of communication outlined by CEQA Guidelines, Section 15064.5(e)(1), and in accordance with Section 7050.5 of the Health and Safety Code, Section 5097.98 of the PRC (Chapter 1492, Statutes of 1982, Senate Bill 297), Senate Bill 447 (Chapter 44, Statutes of 1987), and City Code 24.12.430 or County Code 16.40.040, as relevant given the location of the discovery, would be followed. Section 7050.5 (c) shall guide the potential Native American involvement, in the event of discovery of human remains, at the direction of the County Coroner. Per City Code 24.12.430 and County Code 16.40.040 the Planning Director of either the City or the County, depending on the location, would also be notified about the find upon its discovery and by the Coroner after his or her determination. If the Coroner determines that the remains are not subject to his or her authority and if the Coroner recognizes the remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she will contact the NAHC by telephone within 24 hours. The NAHC shall identify the person or persons it believes to be the most likely descended from the deceased Native American. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in PRC, Section 5097.98. Such recommendations will be made as part of the mitigation plan prepared under Mitigation Measure 5.8-2c, in accordance with City Code 24.12.430 and County Code 16.40.040, as relevant depending on the location of the resource.
5.8-4: Paleontological Resource	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.8-4: This mitigation measure applies to all project components involving ground disturbance. Since construction-related activities may result in the disturbance of paleontologically-sensitive sediments in all project

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															components, this mitigation measure applies to all areas of new ground disturbance. Prior to construction, a paleontological resources specialist (PRS) shall be designated for the project by the City and District. The PRS shall obtain an agreement with UCMP or SCMNH prior to the start of ground disturbance activities to provide proper curation of any significant fossil specimens discovered. The PRS shall also be responsible for developing the Worker Environmental Awareness Program (WEAP) for use during construction of all project components. The WEAP shall include a written description of preconstruction coordination procedures; emergency discovery procedures; sampling and data recovery procedures; procedures for the preparation, identification, analysis, and curation of fossil specimens and data recovered; and procedures for reporting the results of any discoveries. All management and supervisory personnel and construction workers involved with ground-disturbing activities shall be required to take WEAP training prior to beginning work on the project. The field construction manager(s) shall be responsible for ensuring the implementation of all relevant aspects of the WEAP, including but not limited to ensuring workers attend WEAP training. If fossil or fossil-bearing deposits are discovered during construction, construction activity in the immediate vicinity of the discovery shall cease. Work shall not resume until the PRS completes an assessment of the potential find and gives the approval to resume field activities in that area. The PRS shall document any discoveries, as needed, evaluate the potential resource, and assess significance of the find, and coordinate the curation of fossil specimens and data recovered with UCMP or SCMNH. The City and District shall incorporate the requirements of this mitigation measure into all bid documents and construction contracts involving ground disturbance.
5.9 Utilities and Service Systems															
5.9-1: Water Supply	--	--	--	--	--	--	--	--	LTS	LTS	LTS	--	LTS	LTS	MITIGATION MEASURES None required
5.9-2: Wastewater	--	--	--	--	--	--	--	--	LTSM	LTSM	LTSM	LTS	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.9-2: This mitigation measure would apply only to the desalination plant if the sewer disposal option for solids handling is pursued. The City and District shall establish design criteria related to percent solids by weight, timing of disposal, and other relevant factors, to control solids deposition in the wastewater collection system. The City and District shall establish monitoring and maintenance procedures to ensure that the settling of solids in the collection system does not create operational problems in the distribution system, (e.g., lost capacity, system blockage). The design criteria and monitoring and maintenance procedures will be developed in conjunction with City Public Works Department. The monitoring and maintenance procedures will apply only to the portion of the collection system located between the point of discharge from the proposed project to the collection system and the City's WWTF.
5.9-3: Solid Waste	--	--	--	--	--	--	--	--	LTS	LTS	LTS	--	LTS	LTS	MITIGATION MEASURES None required
5.9-4: Energy	--	--	--	--	--	--	--	--	--	--	--	--	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES • Use of high-efficiency pumps, motors, energy recovery devices, SWRO membrane configuration, and compliance with the City's Green Building Program to reduce energy requirements. • A commitment of net carbon neutrality with the construction and operation of the proposed project, which means that it would be designed and operated such that there would be no net increase in GHG emissions as compared to the existing environmental setting. Net carbon neutral operations would be achieved through the incorporation of high-efficiency design features, and the pursuit of one of two options for offsetting the net increase in GHG emissions. These options are anticipated to also reduce energy through the implementation of various energy reduction projects (e.g., solar photovoltaic panels, micro-hydro turbines). • Implementation of an energy Minimization and Greenhouse Gas Reduction Plan to ensure that the net carbon neutral objective of the proposed project is achieved on a long-term basis. MITIGATION MEASURES None required

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5.10 Aesthetics															
5.10-1: Scenic Vistas	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	MITIGATION MEASURES None required
5.10-2: Scenic Resources	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	MITIGATION MEASURES While not required, Mitigation Measures 5.3-3a and 5.3-3b, above, would also apply.
5.10-3: Visual Character	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	MITIGATION MEASURES While not required, Mitigation Measure 5.3-3b, above, would also apply.
5.10-4: Light and Glare	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.10-4: This mitigation measure would apply to the desalination plant, the intake pump station, and the Morrissey pump station. New facility lighting shall implement the most recent LEED-NC guidelines for light pollution reduction. These guidelines require that directional and other lighting methods be used to minimize light trespass from buildings and outdoor areas. Available methods include but are not limited to: directional and design methods to reduce spillage; automatically controlled turn off of interior spaces during non-business hours; lighting exterior areas only for safety and comfort; and using lower intensity lights.
5.11 Hazards and Hazardous Materials															
5.11-1: Construction Impacts	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	MITIGATION MEASURES Mitigation Measure 5.1-1a, above. Mitigation Measure 5.11-1a: This mitigation measure applies only to Plant Sites A-1 and A-3 and intake pump station sites for SI-14 and SI-18. Prior to issuance of Grading Permits, the City and District shall conduct due diligence review of the selected desalination plant and/or intake pump station site to ensure that known hazardous materials contamination is avoided or properly addressed. This shall include preparation of a Phase I Hazardous Materials Site Assessment in conformance with American Society for Testing and Materials Standard E1527-05. All recommendations of the Phase I, which may include soil and/or groundwater sampling, shall be followed with the intention of conforming to applicable federal and state regulations. If recommended, soil and/or groundwater sampling shall be performed in accordance with Mitigation Measure 5.11.1b below. The specifications in Mitigation Measure 5.11-1c would also be implemented, as warranted. Mitigation Measure 5.11-1b: This mitigation measure applies only to the raw water, brine discharge, and intertie pipeline corridors; and to Plant Sites A-1 and A-3 and intake pump station sites for SI-14 and SI-18, if soil and/or groundwater sampling is recommended for those sites following implementation of Mitigation Measure 5.11-1a, above. Prior to issuance of Grading Permits, an environmental sampling plan shall be developed to analyze soil and groundwater, in advance of construction within 100 yards of 1500, 4860, and 5505 Soquel Drive and 411 Swift Street, or at those plant sites or pump station sites identified as requiring soil and/or groundwater sampling through a Phase I investigation in accordance with Mitigation Measures 5.11.1a above. Sampling results shall be compared to established thresholds such as the DTSC California Human Health Screening Levels or the USEPA's Regional Screening Levels to determine areas for soil management. A soil management plan shall be prepared, which should include the following: • Background information, including details of prior investigations and most recent analytical results; • Minimum requirements for a health and safety plan, prepared by a qualified and approved industrial hygienist, to protect the general public and workers in the construction area. (Note: sampling results shall be provided to contractors who shall be responsible for developing their own construction worker health and safety plans and training requirements); • Training and health and safety requirements for construction workers; • Identification and delineation of contaminated areas and procedures for limiting access to such areas to properly trained personnel; • Procedures for excavating, characterizing and managing excavated soils including potential procedures for managing

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	Seawater Intake Site Alternatives								Plant Site Alternatives			Other Components	Project Overall[1]	Possible Future Expansion	
	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
															and disposing of hazardous wastes soil; • Information on how to identify additional suspected contaminated soil during excavation activities and procedures for temporary cessation of construction activity and evaluation of the level of environmental concern; and • Procedures for notification and report, including internal management and local agencies, as needed. The soil management plan shall be formulated with the objective of handling and disposing of excavated soil and groundwater in accordance with state and federal hazardous waste disposal laws, including the federal RCRA and the state HWCL; and in accordance with the stormwater and sanitary sewer requirements of NPDES, the Santa Cruz Storm Water Management Plan, and the Santa Cruz County Sanitation District. Excavated soil and groundwater determined to be hazardous waste shall be removed by personnel who have been trained through the Occupational Safety and Health Administration-recommended 40-hour safety program (29 CFR 1910.120) with an approved plan for groundwater extractions, soil excavation, control of contaminant releases to the air, and off-site transport or on-site treatment. The specifications in Mitigation Measure 5.11-1c would also be implemented, as warranted. Mitigation Measure 5.11-1c: <u>This mitigation measure applies to all project components.</u> During all project excavation activities at all sites, the contractor(s) shall inspect the exposed soil for visual evidence of contamination. If visual contamination indicators are observed during excavation or grading activities, all work shall stop, and an investigation shall be designed and performed to verify the presence and extent of contamination at the site. The investigation shall include collecting samples for laboratory analysis, and quantifying contaminant levels within the proposed excavation and surface disturbance areas. If contamination is confirmed, a soil management plan, as described above under Mitigation Measure 5.11-1b, shall be prepared and implemented. Mitigation Measure 5.11-1d: <u>This mitigation measure applies only to offshore construction.</u> During offshore construction, if visual evidence of contamination is observed (e.g., oily sheen), all work shall stop and appropriate containment measures (e.g., sorbent booms) shall be used, and the County's Environmental Health Services or DTSC shall be contacted. The source of the contamination shall be identified (e.g., creosote piles), and methods to remove the source shall be investigated. Any hazardous materials needing to be removed shall be handled and disposed of in accordance with the requirements of RCRA and State Title 22. Mitigation Measure 5.11-1e: <u>This mitigation measure applies only to offshore construction.</u> Prior to any construction activity in the ocean, the City and District shall develop plans and specifications to prevent or reduce the likelihood of accidental release of chemicals or petroleum hydrocarbons into the ocean. The plans and specifications shall be incorporated into construction contracts for the intake structure and pipelines. These plans and specifications shall require the following, at a minimum: • Secondary containment shall be required for all liquid hazardous material. • Secondary containment shall be required for storage of petroleum products in containers. • All vessels shall prepare and implement an emergency response plan detailing proposed response procedures for the accidental spill of hazardous materials. The plan shall identify a responsible person and include a written commitment of resources necessary to contain the spills; procedures to shut down operating equipment which could malfunction resulting in a release of petroleum or chemicals; and procedures to follow to minimize the potential for spills or releases in the event of other reasonably anticipated upset conditions including on-board fire, earthquake, or tsunami warning.
5.11-2: Operational Impacts	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	<u>MITIGATION MEASURES</u> None required
5.11-3: Hazardous Materials Impacts Near Schools	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTSM	LTS	<u>MITIGATION MEASURES</u> Mitigation Measures 5.11-1a, 5.11-1b, and 5.11-1c, above.

Table 1-1, Summary of Environmental Impacts of the Proposed Project

Impact	LEVEL OF SIGNIFICANCE														Project Environmental Design Features and Mitigation Measures
	Seawater Intake Site Alternatives								Plant Site Alternatives			Other Components	Project Overall[1]	Possible Future Expansion	
	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2[1]	A-3				
5.12 Traffic and Transportation															
5.12 1: Traffic	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	ENVIRONMENTAL DESIGN FEATURES Prior to construction, prepare and implement a traffic control plan or plans for the affected roadways and intersections for the various pipelines and any other construction in roadways. The traffic control plan(s) must comply with the affected jurisdiction's encroachment permit requirements and will be based on detailed design plans. The affected jurisdiction will review and approve the plan(s) prior to construction. The traffic control plan(s) shall include, but not be limited to the following measures: • Limit the construction work zone in each block to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone using appropriate signage and flagmen. If this cannot be achieved, a detour plan shall identify appropriate and safe detour routes and installation of signage warning of road closure and detour routes. • Identify areas where construction traffic and construction activities will be limited to non-peak hours to reduce traffic flow restrictions or delays, such as temporary road closures required when a pipeline corridor crosses an intersection. • Prepare a truck routing plan for each work site to minimize impacts from construction truck traffic during equipment or material delivery and/or disposal. • Provide continued access to individual properties adjacent to construction sites and ensure that emergency access will not be restricted. Maintain steel trench plates at the construction sites to restore access across open trenches, as needed. During non-working hours or in the event of an emergency, trenches shall be covered with such plates or backfilled. • Access for emergency vehicles shall be maintained at all times. The emergency service providers shall be notified of the timing, location, and duration of construction activities throughout the construction period. • If the seawater intake will be located adjacent to the Municipal Wharf (SI-17) or one of the Beach Area (SI-9) or West Cliff Drive (SI-4, SI-5, or SI-7) locations, the traffic control plans will minimize or avoid temporary loss of parking and lane closures in these coastal locations due to worker parking and construction staging. Remote parking and staging will be used where necessary to accomplish the above. Minimal construction staging would take place on the Municipal Wharf. • Conduct tours of the plant outside the a.m. and p.m. peak hours. The peak hours are currently defined as roughly 7 a.m. to 10 a.m. (a.m. peak) and 4 p.m. to 7 p.m. (p.m. peak). MITIGATION MEASURES None required
5.12 2: Emergency Access	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	MITIGATION MEASURES None required

Levels of Significance:
SU = Potentially significant and unavoidable impact
LTSM = Less than significant impact after mitigation
LTS = Less than significant impact
NI = No impact
-- = Impact not applicable, or not applicable to individual project components
* Impact significance of project overall will depend on the site component alternative selected

Acronyms:
AAQS = Ambient Air Quality Standards
BMP = best management practices
CBC = California Building Code
CDFW = California Department of Fish and Wildlife
CEQA = California Environmental Quality Act
CFR = Code of Federal Regulations
CRLF = California red-legged frog
dBA = A-weighted decibels
DNL = day/night noise level
DTSC = Department of Toxic Substances Control
ESA = Environmental Species Act
FYLF = Foothill yellow-legged frog
GHG = greenhouse gas
HAPC = Habitat Area of Potential Concern
HCP = Habitat Conservation Plan
HWCL = Hazardous Waste Control Law
LEED-NC = Leadership in Energy and Environmental Design - New Construction
MBTA = Migratory Birds Treaty Act
NAHC = Native American Heritage Commission
NBSB = Natural Bridges State Beach
NMFS = National Marine Fisheries Service
NOI = Notice of Intent
NPDES = National Pollutant Discharge Elimination System
PRC = Public Resources Code
PRS = Paleontological Resource Specialist
RCRA = Resource Conservation and Recovery Act
RWQCB = Regional Water Quality Control Board
SCMNH = Santa Cruz Museum of Natural History
SWPPP = Stormwater Pollution Prevention Plan
SWRO = seawater reverse osmosis
UCMP = University of California Museum of Paleontology
USEPA = United States Environmental Protection Agency
USFWS = United States Fish and Wildlife Service
WEAP = Worker Environmental Awareness Program
WWTF = Wastewater Treatment Facility

Note:
1. Based on the conclusions of Section 8.1, it is assumed that the proposed project would not involve the selection of Plant Site A-2 as the preferred plant site, based on its current configuration and related potentially significant resource impacts. Therefore, the table column showing Plant Site A-2 is shown with gray text to indicate that it is no longer being considered. Given that, the impacts of the proposed project overall presented in the table above are based on the selection of either Plant Site A-1 or Plant Site A-3 for the proposed desalination plant.

Table 1-2, Overall Comparison of Alternatives

ALTERNATIVE	DOES ALTERNATIVE MEET PROJECT OBJECTIVES?						DOES ALTERNATIVE REDUCE POTENTIAL ENVIRONMENTAL IMPACTS OF PROPOSED PROJECT?	DOES ALTERNATIVE CAUSE OTHER POTENTIAL ENVIRONMENTAL IMPACTS?	AMOUNT OF SUPPLEMENTAL WATER SUPPLIED BY ALTERNATIVE				APPROXIMATE COSTS[1]	
	City			District					City		District		Capital Costs (million $)	Annualized Unit Cost ($ per AF)[2]
	No	Yes	Partial	No	Yes	Partial			MGY	AFY	MGY	AFY		
Proposed Project[3]		✓			✓		NA	NA	Up to 910	Up to 2,800	490-910	1,500-2,800	$115	$3,500–4,300
City No Project Alternative[4]	✓			✓			YES Alternative would avoid most of the environmental impacts of the construction and operation of the proposed project.	YES Alternative would hinder the City's ability to commit to or implement stream flows associated with a HCP and, therefore, could result in continued unavoidable impacts on listed anadromous fish and fisheries habitat. The alternative would also result in adverse impacts related to the City's water supply, including availability, distribution, and treatment.	0	0	NA	NA	NA	NA
District No Project Alternative[5]	✓			✓			YES Alternative would avoid most of the environmental impacts of the construction and operation of the proposed project.	YES Alternative would result in continued unavoidable impacts related to groundwater overdraft. The alternative would also result in adverse impacts related to the District's water supply, including availability, distribution, and treatment.	NA	NA	0	0	NA	NA
City-only Desalination Alternative[4]			✓	✓			SOMEWHAT Alternative would result in similar environmental impacts as the proposed project, but those impacts would be somewhat reduced in certain categories due to intermittent use of the plant by the City and the fact that the City-District intertie system would not be needed.	NO Alternative would result in similar environmental impacts as the proposed project.	Up to 910	Up to 2,800	0	0	$108	$3,300–5,200
District-only Desalination Alternative[5]	✓					✓	NO Alternative would result in similar environmental impacts as the proposed project.	NO Alternative would result in similar environmental impacts as the proposed project.	0	0	490-910	1,500-2,800	$107	$3,300–3,700
Proposed Project Plus DPR Pilot Alternative[3,6]		✓			✓		NO Alternative would result in similar environmental impacts as the proposed project.	NO Alternative would result in similar environmental impacts as the proposed project.	Up to 910	Up to 2,800	490-910	1,500-2,800	$117	$3,500–4,300
Regional Recycled Water for Irrigation Alternative[7]	✓					✓	SOMEWHAT Alternative would avoid any marine-related impacts, as no construction or operational activities would occur in the marine environment. Other impacts would be similar to proposed project as the City's wastewater treatment plant would need to be upgraded and a new separate recycled water distribution system would need to be built.	YES Given that the Alternative would not provide adequate water, it would result in continued unavoidable impacts related to groundwater overdraft and would hinder the City's ability to commit to or implement stream flows associated with a HCP and therefore could result in continued unavoidable impacts on listed anadromous fish and fisheries habitat. The alternative would also result in adverse impacts related to the City's and District's water supplies, including availability, distribution, and treatment.	305	950	80	250	$100	$5,100

Table 1-2, Overall Comparison of Alternatives

ALTERNATIVE	DOES ALTERNATIVE MEET PROJECT OBJECTIVES?						DOES ALTERNATIVE REDUCE POTENTIAL ENVIRONMENTAL IMPACTS OF PROPOSED PROJECT?	DOES ALTERNATIVE CAUSE OTHER POTENTIAL ENVIRONMENTAL IMPACTS?	AMOUNT OF SUPPLEMENTAL WATER SUPPLIED BY ALTERNATIVE				APPROXIMATE COSTS[1]	
	City			District					City		District		Capital Costs (million $)	Annualized Unit Cost ($ per AF)[2]
	No	Yes	Partial	No	Yes	Partial			MGY	AFY	MGY	AFY		
City Package Alternative[8]	✓			✓			SOMEWHAT Alternative would avoid any marine-related impacts, as no construction or operational activities would occur in the marine environment. Other impacts would be somewhat reduced in certain categories as only the City-District intertie system would need to be constructed.	YES Given that the Alternative would not provide adequate water, it would hinder the City's ability to commit to or implement stream flows associated with a HCP and, therefore, could result in continued unavoidable impacts on listed anadromous fish and fisheries habitat. The alternative would also result in adverse impacts related to the City's water supply, including availability, distribution, and treatment.	200	610	NA	NA	$48 (Water Transfer)	$4,200 (Water Transfer)
District Package Alternative[9,10]	✓					✓	SOMEWHAT Alternative would avoid any marine-related impacts, as no construction or operational activities would occur in the marine environment. Other impacts would be somewhat reduced in certain categories as only the City-District intertie system would need to be constructed.	POTENTIALLY Given that the Alternative would not provide a guarantee that enough water could be provided for the District, it could result in continued unavoidable impacts related to groundwater overdraft. However, overall, the effect of the Alternative on groundwater conditions is unknown.	NA	NA	Water Rationing		Water Rationing	
											590	1,800	$50 – 127 (Total Program Costs to District)	$1,700 - $5,500
											Water Transfer		Water Transfer	
											0-110	0-340	$48	$4,200

Notes:

1. Costs are provided in Appendix Z, Kennedy/Jenks Consultants, *Technical Memorandum, Conceptual-Level Cost Comparison of Water Supply Alternatives,* prepared for City of Santa Cruz and Soquel Creek Water District, scwd² Desalination Program, April 17, 2013. Costs would be split between the City and District for some of the alternatives, as defined below.
2. Annualized water cost includes capital and operations and maintenance costs for the life of the project (assumed to be 30 years).
3. Depending on operational agreements, the City or District could receive up to 910 mgy (2,800 afy) of potable water supplies from the proposed project. The figures for the District presented in the table provide a range from average to maximum. Volumes presented in mgy are rounded to the nearest 10. Additionally, for these alternatives, costs would be split between the City and District according to cost-sharing agreements.
4. Impacts related to the District's ongoing groundwater pumping not considered as it is unknown what course of action the District would take should the City independently implement this alternative.
5. Impacts related to the City's ongoing operations (i.e. special-status fish species and the proposed HCP) not considered as it is unknown what course of action the City would take should the District independently implement this alternative.
6. The DPR pilot portion of this alternative would result in an approximate increase of 1 to 2 percent over the cost of the proposed project for the construction and operation of the pilot program.
7. Because the City would significantly restrict irrigation in a drought, the 950 afy for irrigation from a regional recycled water project would not "free up" and provide new potable supplies for the City during a drought. Therefore, the new potable water supply to meet City and District objectives is approximately 250 AFY of supply for the District (Appendix FF). Costs would be split between the City and District for this alternative.
8. The amount of water presented for this alternative is based only on an interim estimate of ongoing and new water conservation programs (see Appendix B). In terms of water available from a potential water transfer, approximately 740 afy of City winter water could be available for transfer to neighboring water agencies: 400 afy could go to Scotts Valley; 340 afy to District would require change in water supply permit. The unconfirmed estimate of time needed by other agencies to obtain water rights is 10 to 20 years, if approved at all, but there may be some mechanisms to more rapidly allow conjunctive use water transfers on an emergency basis. After water rights are obtained, it is possible, though not certain, that the District may be able to transfer some amount of water back to the City during drought conditions after the basin recovers (expected to take 20 years). Given that the feasibility of the transfer from the District to the City is very unlikely within the time frame of the proposed project (through 2030) and the quantity of water the District would be able to transfer back to the City is currently unknown, the table above does not assume that the City would receive water back in exchange from the District during this period.
9. As indicated in note #8 above, up to approximately 340 afy could potentially be available to transfer to the District, but would require change in the water supply permit. This estimate does not incorporate any reductions in diversions needed for a HCP for special-status anadromous fish. Implementation of any HCP could significantly reduce water available for transfer. The unconfirmed estimate of time needed by other agencies to obtain water rights is 10 to 20 years, if approved at all, but there may be some mechanisms to more rapidly allow conjunctive use water transfers on an emergency basis. Given that the feasibility of the transfer within the time frame of the proposed project (through 2030) cannot be demonstrated, the table above gives a range of water available for transfer to the District from zero in the short term to a maximum of 340 afy in the long term. The per unit cost for the transfer provided in the table assumes that 340 afy would be provided to the District.
10. Estimated costs for mandatory rationing are provided in materials from the District Board of Directors workshop held on June 5, 2012 (District, 2012c) and included in Table 6-2 of the District's 2012 IRP Update (District, 2012a). Program costs for mandatory rationing are approximately $50-$127M, which includes $10 million for additional water supply studies. Annualized unit cost assumes: program could reach needed water savings in 2022/23 to meet groundwater target pre-recovery yield of 2,900 afy; reduction of groundwater pumping could be approximately 1430 afy; and pay-as-you go and debt financing would be split 55%/45% for $116M of the program costs for the full toolbox method.

Acronyms:
MGY = million gallons per year AF = acre foot AFY = acre-feet per year