



scwd² Seawater Reverse Osmosis Desalination Pilot Test Program

Frequently Asked Questions (FAQs)

What is reverse osmosis desalination?

Desalination is any process that separates saline water (water containing salts) into two parts - one that has a low concentration of salt (treated water or product water), and the other with a much higher concentration than the original source water, usually referred to as brine concentrate or simply as 'concentrate.'



The reverse osmosis process is one type of desalination technology that occurs by forcing a solvent (liquid salt solution) from a region of high solute concentration through a semi-permeable membrane to a region of low solute concentration by applying a pressure to the water.

Desalination processes may be used in municipal, industrial, or commercial applications. Available technologies can desalinate water from a variety of sources including: seawater, brackish, river, waste water, pure, and brine.

Why is the City of Santa Cruz and Soquel Creek Water District (SqCWD) pursuing a new water source through desalination?

Both the City of Santa Cruz and SqCWD evaluated their water needs and available sources and determined that a new water source through desalination is a necessary component of an overall water plan to meet the demand for water in the community.

Currently, the City of Santa Cruz demand for water exceeds the estimated available yield from its existing sources during drought conditions, even with mandatory curtailment requirements. The Santa Cruz City Council conducted an exhaustive process beginning in 1997 to evaluate several new water source options to protect customers in drought years. From these background evaluations on water demand, conservation, curtailment, and alternative water supplies, the City of Santa Cruz Integrated Water Plan (IWP) was developed and adopted in 2005. The purpose of the IWP is to provide a reliable water supply to meet long-term needs while ensuring protection of public health and safety.

The proposed Integrated Water Plan Program Environmental Impact Report (EIR), carried forward from the IWP, consists of three primary components: conservation, curtailment, and additional water supply. The IWP Program EIR

identified desalination as the best option for delivering a flexible and reliable water source to meet the needs of the community during drought periods. The City will continue to use conservation and curtailment requirements to maximize efficient use of water resources as outlined in the IWP.

Similarly, SqCWD is experiencing shortfalls in water supplies. The current annual water use for the SqCWD exceeds the available water supply by 15% even during non-drought conditions. The SqCWD is entirely dependent on local groundwater, and does not take water from surface water or regional water supplies. The current situation is not sustainable and future deficits will lead to saltwater intrusion.

Beginning in the late 1990s, SqCWD began evaluating depressed groundwater levels and saltwater intrusion, long-term water demand, conservation opportunities, the adequacy of water supplies and the preferred options for supplemental water supplies. In early 2006, SqCWD adopted the Integrated Resources Plan (IRP) which recommends a flexible plan to address changing demand and water supply conditions. The IRP-preferred alternative focuses on regional seawater desalination with the City of Santa Cruz as the preferred conjunctive use project. The IRP also includes implementation of demand and groundwater management to incorporate conservation and recharge protection policies.

How are SCWD and SqCWD partnering in the Pilot Program and Full-Scale Plant?

The SCWD and SqCWD have developed an agreement for jointly undertaking the multi-layered investigative stage of the project and developing an operating plan. The Full-Scale Regional Seawater Desalination Project will feature a plant in Santa Cruz, where SqCWD uses the plant to augment groundwater supplies during normal years. Santa Cruz will use the plant during drought periods when surface water sources are limited.

The Full-Scale Plant operational strategy would provide water supply during a drought to the City of Santa Cruz service area. During non-drought periods, the plant would provide water supply for Soquel Creek Water District (SqCWD). Key issues include:

- SqCWD would use desalination facility to supply customers while resting existing wells to recharge the aquifer and protect ground water resources
- SCWD would coordinate with SqCWD for Santa Cruz use of the plant in drought periods
- Each agency would finance the operational costs of the plant associated with their use

What is the scwd² Task Force?

The scwd² Task Force is a Joint Task Force formed by the SCWD and SqCWD to provide direction on the investigative stage of project, public outreach activities, and development of an operating plan. scwd² is comprised of two City Council Members and two District Board Members. A majority vote is required for any action.

What is the purpose of building a Pilot Plant?

A pilot test program is required by the California Department of Public Health (CDPH) for the potential full-scale project to evaluate issues related to public safety, environmental protection and plant operations. The composition of desalination source waters is unique to each site, and therefore each plant requires its own pilot testing to determine site-specific treatment guidelines to ensure public safety. All source waters are under CDPH jurisdiction in order to promote and maintain a physical, chemical, and biological environment that contributes positively to health, prevents illness, and assures protection of the public. CDPH is responsible for permitting desalination facilities and conducts ongoing monitoring as appropriate.

What is being tested at the pilot plant?

The pilot test program will carefully evaluate operational and environmental issues including:

- Source Water Monitoring (Input)
- Product Water Quality (Output)
- Membrane Performance

What environmental impacts will be evaluated for the full-scale plant?

Project level environmental review will begin once the pilot test program is finished and a full-scale plant design is complete. Impacts evaluated in the Environmental Impact Report (EIR) will include, but are not limited to:

- Energy Requirements
- Emissions
- Brine Outfall Monitoring
 - Impacts to marine species
 - Water quality
- Impingement and Entrainment
- Public Access to the Coast

When will the Pilot Plant Testing begin?

Twelve months of pilot testing is scheduled to begin in January 2008. The timeline for testing is subject to change based on completion of pilot plant construction.

What is the size and capacity of the Pilot Plant?

The Pilot Plant is a custom-fabricated, pilot-scale treatment facility which will utilize source seawater from Long Marine Laboratory's existing seawater intake. The Pilot Plant, housed in a 2,400 square-foot temporary building, will pump and treat seawater up to 50 gallons per minute.

How much will the Pilot Plant Project cost?

The Pilot Plant Project estimated cost is \$4 million. Capital costs to build a full-scale desalination facility are comparable with other water supply options and are estimated to be approximately \$30 - \$40 million. Operation costs have not yet been determined as a detailed design is necessary to estimate these costs. However, based on broad assumptions, these costs could be on the order of \$500,000 per year.

Who is funding the Pilot Plant Program?

The City of Santa Cruz and the Soquel Creek Water District have agreed to share the costs as they are partners in the Pilot Plant Program and full-scale plant if granted regulatory approval.

Two grants have been awarded for the project, which include a \$2 million grant by the Department of Water Resources (Pilot Plant and Testing) and a \$600,000 grant by the State Water Resources Control Board (Intake Study).

Where can I get more information on the Pilot Plant testing?

To learn more about the pilot plant testing, the public may:

- Visit the Seymour Marine Discovery Center for informational handouts, an interpretive display, and docent guided plant tours
- Visit the scwd² Website (www.scwd2desal.org) for project updates
- Attend a Speakers' Bureau or the community Open House event when the plant is operational.

When will a full-scale plant be built?

Construction of a full-scale plant is dependent on the completion of the pilot program, technical review of the data collected, completion of the parallel studies

mentioned earlier, and environmental approval and permitting of a full-scale plant design. The preliminary project schedule is:

- Pilot Plant Testing — January 2008-January 2009
- Final Technical Review and Reporting — Jan 2009 - May 2009
- Full-Scale Plant Design — Fall 2008 - Fall 2011
- Full-Scale Plant Environmental Review — Fall 2008– Spring 2011
- Full-Scale Plant Construction — 2012 - 2014

Where would a full-scale plant be built?

Pilot plant evaluations will include a review of potential locations for the full-scale plant allowing use of existing infrastructure and identifying any potential impacts to surrounding properties. Based on the City of Santa Cruz Integrated Water Plan Program EIR, the environmentally superior plant location is within the industrial area of Santa Cruz’s west side. The area is bounded by Mission Street and the Southern Pacific Railroad to the north, Natural Bridges Drive to the west, Swift Street to the east, and Delaware Avenue to the south. The recommendation is not parcel-specific.

What would be the size and capacity of the Full-Scale Plant?

Specific operations of a full-scale plant will be determined following results from the pilot test program and comprehensive environmental review to determine impacts of the proposed project. The recommended plan features a 2.5 million-gallons-per-day (mgd) desalination facility with two potential future capacity increments of 1.0 mgd each, eventually totaling 4.5 mgd. To meet 100% of demand in all years would require initially building a 5.0 mgd facility and expanding it to 8.0 mgd by the end of the planning period, but the IWP concluded it would not pursue any option that delivered average annual demand in droughts.

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