Water360
Resources for Reuse

# Recycled water for drinking: A new source of pure water for San Diego, California

After a successful one-year wastewater purification demonstration, and four years of tours and testing, San Diego is planning to implement a full-scale scheme as a new source of drinking water. The city is currently exploring options of storing the purified water in a reservoir before sending it to an existing drinking water treatment plant, then distributing it to the city's 1.3 million residents. The scheme is expected to be completed in 2035 and will supply one-third of the city's water needs.

## The drivers

More than 85 percent of the San Diego region's water supply is imported, most of it being conveyed by aqueducts from the California Bay-Delta and the Colorado River. The region's reliance on imported water leaves the City of San Diego's water supply vulnerable to drought, competing demands, and rising costs of imported water.

'Pure Water San Diego' is the city's multi-year program to develop a local source of drinking water to reduce its dependence on imported water; keep up with population growth; and combat water supply challenges such as recurring drought.

## The scheme at a glance

- The City's long-term goal, targeted for 2035, is to produce 314 million litres (ML) of purified water per day — one-third of San Diego's future drinking water supply.
- The City has successfully trialled a process that purifies recycled wastewater through membrane filtration, reverse osmosis and UV advanced oxidation.
- While the state of California has yet to approve or develop regulatory frameworks for direct and indirect potable reuse, San Diego is moving forward to develop a full scale program utilising surface water augmentation.
- The current proposal has conveying the purified water 37 kilometres to the San Vicente Reservoir where it would be blended with imported water supplies in the reservoir before going to a standard drinking water treatment plant.
- The City is also testing additional barriers that could potentially be used in lieu of the blending, dilution and detention time currently envisioned for reservoir augmentation. This potable reuse route could provide additional operational flexibility and reduce the need for the costly pipeline needed to convey the purified water to the San Vicente reservoir.
- When fully commissioned, the program will produce 314 ML of purified water per day for the city's 1.3 million residents.
- A separate project is underway to increase the capacity of the San Vicente Reservoir, where the purified water could be stored.

## The path taken

### *Investigation*

The City of San Diego began addressing the need for a new, locally controlled, drought-proof water supply in the 1990s, when it first proposed purifying wastewater into potable water. The initial plans were met with opposition — opponents adopted the phrase "toilet to tap" and raised the public's fear of the drinking water quality.

In 2004-2006, a water reuse study stated that purifying water by adding it to a reservoir was the preferred water reuse strategy for the area. The study recommended a project that would convey purified water to the San Vicente Reservoir.

In 2009, the City partnered with several stakeholder groups, including San Diego Coastkeeper and San Diego Surfrider, to launch the Recycled Water Study. This study helped the City identify opportunities for making more recycled wastewater available for both potable and non-potable uses and the costs of implementing such projects. Groups also included trade unions and ratepayer advocates. It was successful because of its diversity.

### *Pilot*

In 2009, the City launched the Water Purification Demonstration Project to:

- determine whether advanced water purification technology could provide safe drinking water to residents; and
- evaluate the feasibility of a full-scale scheme where the purified water would be added to the San Vicente Reservoir.

The demonstration project produced 3.8 ML of purified water per day at the test Advanced Water Purification Facility. One year of extensive testing determined that the test facility produces water that meets all federal and state drinking water standards.

### *Approval for full-scale implementation*

The two agencies with primary regulatory authority (State Water Quality Control Board, Division of Drinking water, formerly the California Department of Public Health, and the San Diego Regional Water Quality Control Board) evaluated the demonstration project and approved the City's concept and approach to add the purified water to the San Vicente Reservoir.

California's State Water Quality Control Board is evaluating the feasibility of direct potable reuse and has yet to establish the framework for regulating direct potable reuse schemes.

### *Construction*

Pure Water San Diego components include the construction of water purification facilities and the continued operation of the test facility.

A separate project is underway to increase the capacity of the San Vicente Reservoir, where the purified water could be stored.

### *Commissioning*

A 57 ML per day water purification facility is planned to be in operation by 2021.

The long-term goal of producing 314 ML of purified water per day — one-third of San Diego's future drinking water supply — is targeted for 2035.

## Engaging the community

### *Engaging decision makers, regulators and politicians*

From past experience, project leaders of 'Pure Water San Diego' knew that engaging local government officials, including their mayor and city council members, would be critical for the success of the project. Therefore, the City kept decision-makers, regulators and politicians involved in the program by engaging them in presentations and tours and keeping them up to date on project developments.

### *Engaging customers*

To inform and engage the public, the City developed a public outreach program that includes informational materials and events; tours of the test facility; email updates; website content; presentations at city council meetings and community meetings; press releases for newspaper, radio and TV; and blog posts.

Residents are notified of tours through a flier included as a bill insert, websites, other media, community group presentations and recently social media advertising. Public surveys were conducted from 2004 to 2012 and have shown a significant increase in support from the community.

The City also formed the Pure Water Working Group to capture diverse viewpoints and input on the city's efforts to ensure a safe, reliable and cost-effective drinking water supply for San Diego. An invitation to join the working group was sent to community planning groups, businesses, city council district offices, non-profit environmental organisations and community leaders.

## Success factors

### *High levels of trust in water authority*

The role of the Water Purification Demonstration Project was to show the public that the water purification process consistently produces water that meets all state and federal drinking water standards. The test facility allows the community to see firsthand how this is technically possible.

### *Clear roles and responsibilities for developing policy regulation*

By creating a partnership of stakeholder agencies (including San Diego Coastkeeper, Surfrider Foundation, City of San Diego Independent Rates Oversight Committee, San Diego Metro Wastewater Joint Powers Authority and the San Diego Water Authority) the City was able to open up the communication lines and outline responsibilities of groups.

### *Water quality not compromised*

During the pilot program, more than 9000 water quality tests confirmed the absence of contaminants in the water. The water has met all federal and state drinking water standards.

### *Sustained community support*

The test facility is still operating as the City conducts additional research, allowing for continued community engagement. The City feels that "seeing is believing," and says that by the end of a tour of the test facility the concerns of doubters are alleviated.

## Lessons learnt

- Working with the Water Reliability Coalition, an independent group of organisations partnering on water reuse in the region, was helpful as the City began public outreach. This coalition had already been making strides in educating the public on water supply.
- The City continues to study the potential of a direct potable reuse scheme so that it understands the permit requirements and is ready to implement a project when regulations are approved by the California state regulators.
- Information about recycled water projects is technical and complex, and distilling it down to a brief message is difficult but important. Having a 15 to 20 minute presentation with clear points is a useful tool when briefing elected officials and media.
- Having a well thought out and extensive public outreach plan is vital. It needs to be maintained continually through the long cycles of environmental review, technical feasibility evaluations, and local government approval. Audiences may vary through time, so gaining the public's understanding and acceptance requires a continual and often costly effort.
- Having a demonstration facility where elected officials, regulators and the public can see the technical processes in action has proven, by far, to be the most important component of the public outreach process in gaining public support.