

Ocean Water Desalination Project

Frequently Asked Questions (FAQs)

1 Why is West Basin considering ocean water desalination?

Southern California is an arid region that averages 14 inches of rain every year. Water supply reliability and confidence in our water resources is critical to this region's economy and quality of life. The need for a locally controlled water supply has grown due to the increased frequency and duration of droughts, periodic restrictions on imported water and uncertainties surrounding climate change.

To ensure water supply reliability for our customers and communities in our service area, the West Basin Municipal Water District has developed a goal to achieve a diverse water supply portfolio, as detailed in the 2015 Urban Water Management Plan. For West Basin, water supply reliability can be achieved by: reducing dependence on imported water; increasing water conservation; expanding recycled water production; and developing a locally-controlled, drought-proof water supply.

Presently, in pursuing the District's mission to provide a safe and reliable supply of high-quality water to the communities it serves, West Basin is examining ocean water desalination as a new potable supply. This source would further diversify the District's water supply portfolio, which already includes recycled water production, water conservation programs, groundwater replenishment and imported water purchases. This new source of drinking water would enhance regional water reliability, especially during periods of drought and water scarcity (e.g., loss of snowpack in the Sierra Nevada Mountains, catastrophic interruptions of water supply and uncertain impacts of climate change).

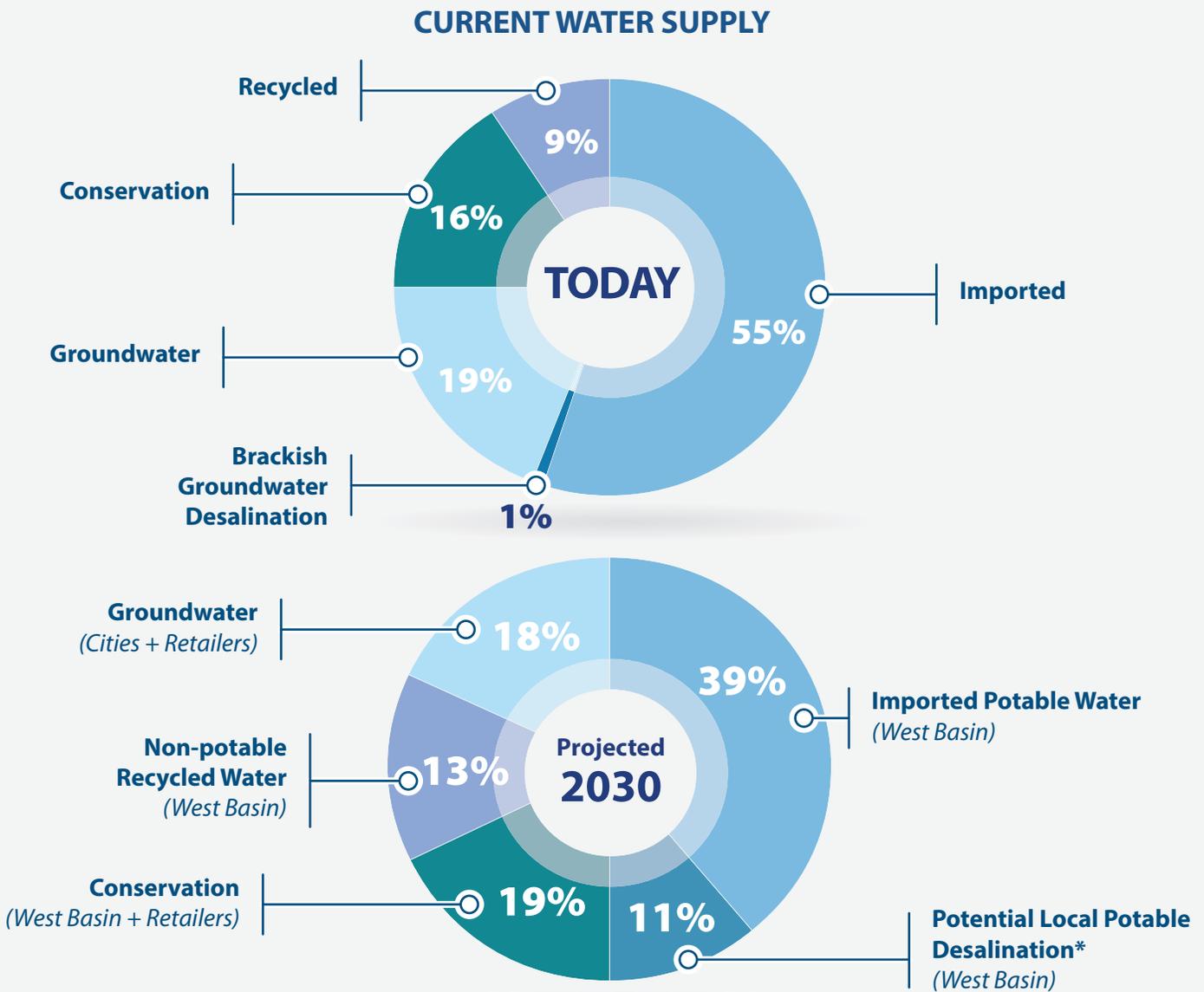
2 What is the West Basin Ocean Water Desalination Project?

The potential Ocean Water Desalination Project (Project) would produce approximately 20 million gallons per day (MGD) of drinking water from the ocean. The 20 MGD capacity facility (Local Project) would generate approximately 21,500 acre-feet per year of high-quality drinking water to meet local demands.

A 20 MGD ocean water desalination facility could add approximately 10% of new reliable water to the service area, further diversifying the District's water supply portfolio and enhancing water security for those the District serves.

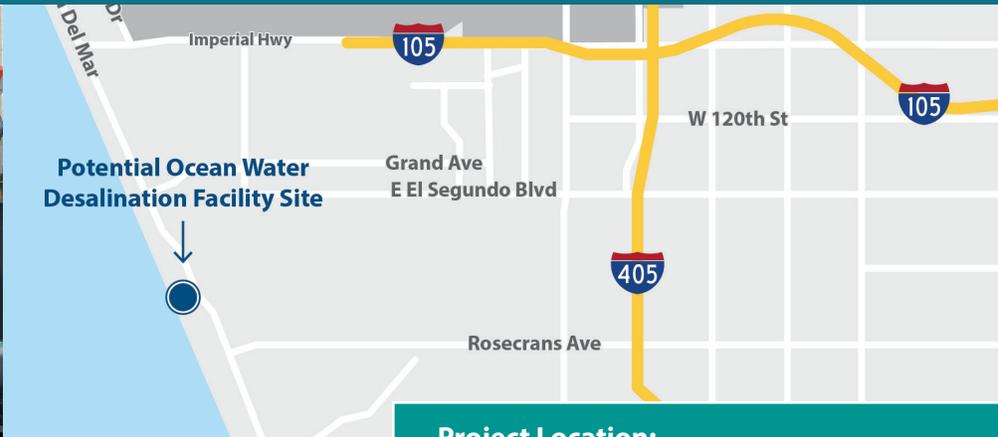
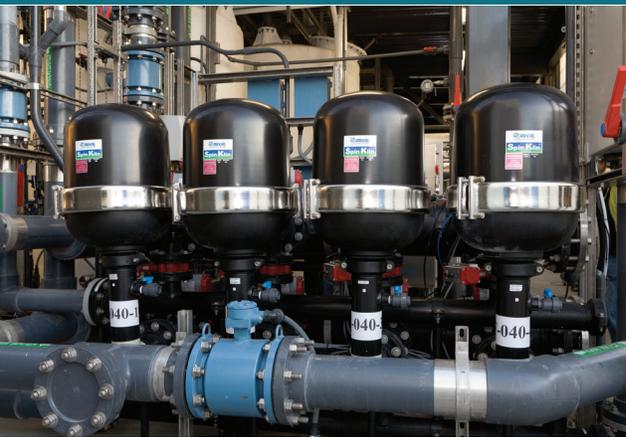
The potential Project would include a low velocity, screened intake system to deliver ocean water to the facility, reverse osmosis membrane technology, a brine discharge diffuser system to return concentrated seawater back to the ocean, and a drinking water delivery system to distribute drinking water to the local and regional water supply systems.

Targeted 2030 Water Supply Portfolio



Note: Parenthesis indicates the entity/entities that control the specified water supply. (Reference: 2015 Urban Water Management Plan)

*10% of potential Project and ~1% of brackish groundwater



Project Location:
301 Vista del Mar, El Segundo, California

3 Where will the Project be located?

The potential Project site would be at an existing 33-acre industrially zoned location within the El Segundo Generating Station at 301 Vista del Mar in the City of El Segundo, California. Today, the site houses a heavy industrial power generation facility. The potential desalination plant is considered a light industrial facility.

4 Why is desalination important for the region?

West Basin is looking into solutions to address conditions that may impact water supply reliability such as drought, regulatory uncertainty, climate change and natural disasters. Drought and climate change continue to have a profound impact on California's water resources, as seen in dramatic fluctuations in snowpack size, river flows and groundwater levels.

The California Department of Water Resources predicts that by the end of the century, Sierra Nevada Mountains will experience a 48-65% loss in snowpack. This is significant, as mountain snowpack from Central and Northern California provides as much as a third of California's water supply by accumulating snow during winter and releasing it slowly during the spring and summer. As temperatures continue to rise, snow will melt faster and earlier, which will make the water from it difficult to store and use as a reliable water supply in Southern California.

In addition, several factors are affecting the Sacramento-San Joaquin Bay Delta, which is a key source of water for the State Water Project. Sea level rise, early snow melt flooding, and prolonged drought each present challenges to managing the delicate ecosystem in the Delta. These factors along with regulations needed to protect the ecosystem have led to reduced water deliveries to Central and Southern California (including West Basin) in three of the past eight years.

Our current water supply is vulnerable to climate change and to potential infrastructure failures caused by natural disasters such as earthquakes. These challenges have reinforced the importance of reducing the need for imported water and increasing locally-controlled, drought-proof, potable water supplies in the West Basin service area.

5 What are the objectives of the Project?

The Project is being explored as one component of the District's mission to provide a safe and reliable water to the communities it serves through the following objectives:

- Diversify the District's water supply portfolio to increase reliability in the near and intermediate term (5-15 years) and long term (15-30 years), while reducing reliance on imported water
- Improve ability to adapt by developing a water supply that is less vulnerable to climate variations
- Increase local control of water supplies and infrastructure
- Improve the District's ability to control water costs and provide long term price stability
- Develop a potable water supply that is cost effective and environmentally responsible

6 What ocean water desalination experience does West Basin have?

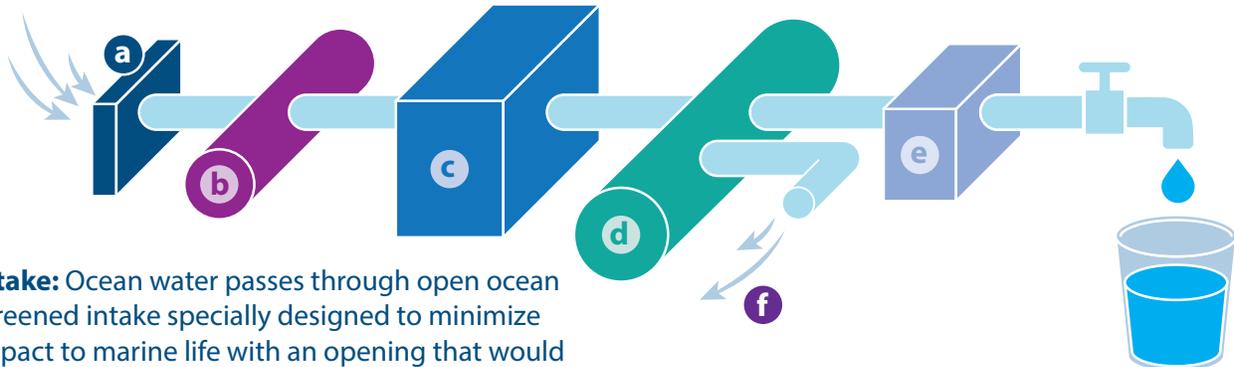
For more than 15 years, West Basin has researched ocean water desalination issues related to the operation and incorporation of desalinated ocean water into its existing water supply. In 2002, West Basin initiated a Desalination Pilot Project (Pilot Project) at the El Segundo Generating Station. The data collected during the Pilot Project led to the development of the Ocean Water Desalination Demonstration Facility (OWDDF) at the Science, Education, and Adventure Lab (SEA Lab) in Redondo Beach. The OWDDF conducted larger-scale testing and operated continuously from October 2011 to December 2014. These efforts led to the development of a comprehensive 2013 Ocean Water Desalination Program Master Plan (PMP), which offered a full-scale design, permitting and operations

approach for incorporating ocean water desalination into the West Basin water supply portfolio. The PMP contains a detailed analysis of over 2000 pages of desalination technical studies and can be viewed under "Project Materials" at: www.westbasinidesal.com



7 How does desalination work?

The ocean water desalination process involves removal of dissolved salts and impurities to produce clean water for human use and consumption. The potential ocean water desalination Project would involve the following steps:



a Intake: Ocean water passes through open ocean screened intake specially designed to minimize impact to marine life with an opening that would not exceed 1 mm. Water is taken into the system at a velocity less than 0.5 feet per second (fps) ensuring minimal marine life impingement. The screens will be designed in accordance with the 2015 California Ocean Plan Amendment for desalination.

b Media Filtration: Filters remove coarse materials from the water, such as sand and sea shell pieces.

c Membrane Filtration: Fine membranes remove the microscopic material in the ocean water, such as bacteria.

d Reverse Osmosis: The filtered water is pumped under high pressure through reverse osmosis (RO) membranes to purify it, removing salt, minerals and any remaining viruses. This results in water that meets or surpasses state and federal drinking water requirements. The discarded salt water is referred to as brine.

e Post-Treatment: Due to the pure water quality that results from the RO process, minerals are added back to the water to stabilize it and prevent water pipes from corroding. The water is then disinfected so it is safe for drinking.

f Brine Disposal: The brine from the RO process is returned to the ocean where it reaches ambient salinity levels between 45 to 63 feet from the discharge point (depending on final design and operations) to minimize impacts on marine life. This avoids the creation of salt plumes or oxygen-starved areas on the seafloor. The 2015 Ocean Plan prescribes 328 feet to reach ambient salinity levels, but the Project discharge would be well below that threshold (45 to 63 feet).

8 Where is ocean water desalination used?

Ocean water desalination has been used around the world successfully for decades, with over 18,000 facilities currently operating in 150 countries including Saudi Arabia, Israel, Australia, Japan, Italy, Spain, Portugal, India, and South Africa. The largest facility is in Saudi Arabia, which produces over 270 million gallons of fresh water per day. The United States has hundreds of desalination

plants and groundwater desalters, some of which have been operating for decades. Two desalination plants are in operation in Carlsbad and Santa Barbara. Another plant located on Catalina Island uses desalination to provide water during severe drought conditions. Across the world, it is estimated that desalination produces over 21 billion gallons of drinking water a day to more than 300 million people.

9 What is the quality of desalinated water?



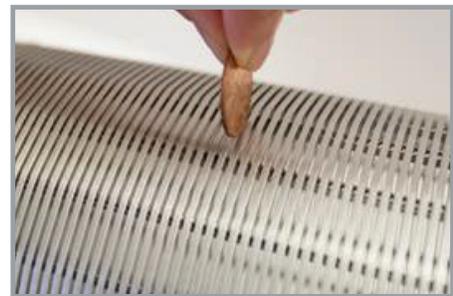
The desalination process produces high-quality drinking water. The quality of desalinated water surpasses all state and federal drinking water standards, based on the data reported by similar facilities across the world as well as thousands of water quality tests conducted during the District-led pilot and full-scale equipment demonstration studies (2002-2014).

10 How will the Project affect marine life?

Since 2002, West Basin has taken a responsible, science-based approach to its Ocean Water Desalination Program to protect marine life, maximize energy efficiency and minimize cost by engaging experts in this field.

The West Basin proposed wedge-wire, ocean screened intake will protect marine life through a screen barrier with slots less than 1mm wide. This width is less than the thickness of a single penny. Water will also be drawn into the intake system at a very slow velocity of less than 0.5 fps. Marine life will also be protected by designing an effective brine discharge and dilution system that will prevent concentrated areas of salt – or salt plumes. This site-specific design, as well as the local currents action will accelerate the

brine dilution process. The analysis of potential impacts to marine life are included in the Draft EIR and possible mitigation measures will be detailed in the Final EIR.



11 How much energy does desalination require?

Producing one acre-foot of desalinated ocean water currently requires more energy than importing a similar amount of water due to the high water pressure required for the advanced purification process. However, advancements in membrane technology, high-efficiency pumps and energy recovery systems are making ocean water desalination more energy efficient. For instance, ocean water desalination plants in Santa Barbara and Carlsbad have been successful in reducing their energy consumption by using such devices. Many similar facilities are also taking advantage of available renewable energy as more environmentally sustainable power sources, such as solar and wind power, become more readily available as part of the energy grid.

West Basin is committed to evaluating all energy sources, including renewable energy, to power the Project and achieve a net carbon neutral portfolio. Additional details and opportunities for energy efficiency will be provided in more detail if the Project moves into the design phase.

12 How will the Project affect greenhouse gas emissions?

The Project will be consistent with Assembly Bill 32 (AB32) greenhouse gas (GHG) reduction goals on both a Project level and a District-wide water supply portfolio level. The Project's potential effects on global climate change, including construction-related and operational GHG emissions, have been evaluated in the Draft EIR. West Basin has committed to reducing the additional

GHG emissions through methods that include carbon offsets. The Project will also strive to meet the State's continued efforts to reduce GHG emissions, which the State has currently set to 80 percent below 1990 levels by 2050 (Senate Bill 350).

13 How much will the facility cost, and how will it affect water rates?

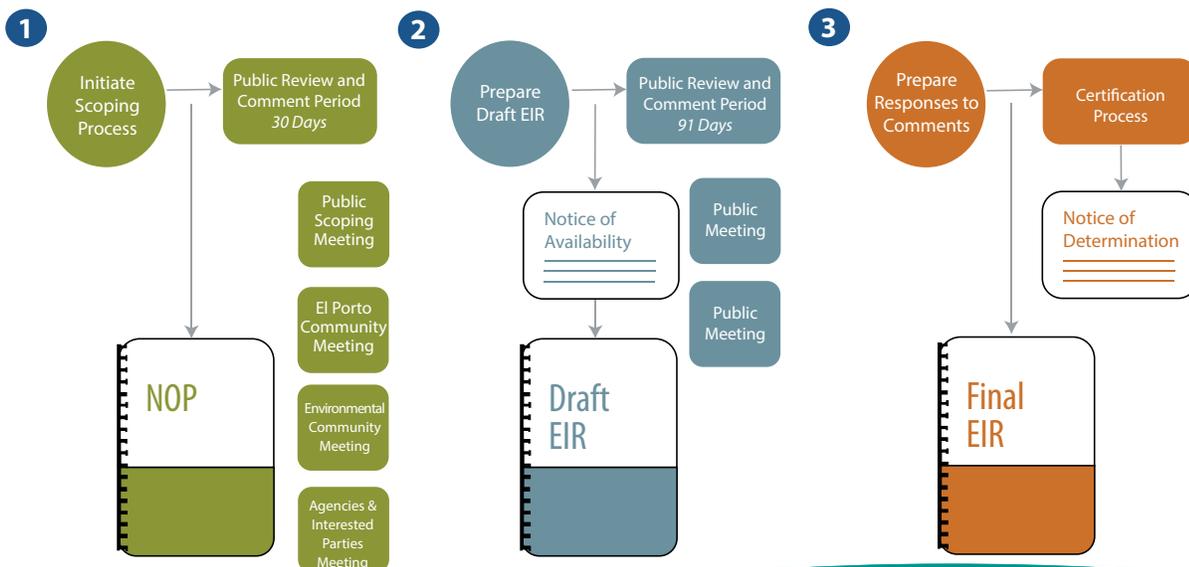
West Basin is sensitive to delivering a cost-effective project that will enhance water security and price stability into the future. Currently, the District is conducting a cost benefit analysis and rate study for the potential Project that is expected to be completed

in 2020. This analysis will be publicly presented as a part of the design approvals and will be consistent with the Project objective of increasing West Basin's ability to control future drinking water costs.

14 What phase is the Project in?

The Draft Environmental Impact Report (EIR) published in the spring of 2018 evaluated the possible impacts of constructing and operating the potential Project and identified mitigation strategies to avoid, minimize, or compensate for impacts. The District received 213 comments and letters from agencies, municipalities, interested groups, and the general public. A Final EIR has been prepared that provides detailed responses to each comment received in accordance

with the California Environmental Quality Act (CEQA). If the Final EIR is certified by the West Basin Board of Directors, and the potential Project is approved, it will then advance to the permit approval phase in which the District will be required to meet the regulations and compliance requirements of local, regional, state and federal agencies. The West Basin Municipal Water District will be conducting a Special Board of Directors Meeting for EIR certification consideration on Monday, November 18, 2019 at 3:00 pm at the Carson Event Center, Community Hall A, 801 E. Carson St., Carson, CA 90745.



15 What will be included in the Final EIR?

The Final EIR will include:

a. The Draft EIR

Topics evaluated in Draft EIR include:

Aesthetics, Light and Glare

Air Quality

Biological Resources – Terrestrial

Cultural Resources

Energy

Geology and Soils

Greenhouse Gas Emissions

Hazards and Hazardous Materials

Hydrology and Water Quality

Land Use and Planning

Marine Biological Resources

Noise

Public Services

Recreation

Transportation and Traffic

Utilities and Service Systems

b. Comments and recommendations received on the Draft EIR

c. A list of persons, organizations, and public agencies commenting on the Draft EIR

d. Prepared responses to the submitted questions and comments

e. Any other information added by the Lead Agency (the District)

16 What agencies would be required to permit the Project?

Ocean water desalination projects in California require detailed coordination and permitting from numerous local, regional, state and federal agencies. The California Ocean Plan, a set of standards created by the State Water Resources Control Board to protect the quality of the ocean waters, specifically addresses design requirements for ocean water desalination facilities. West Basin is actively working with agencies to explore a facility that meets and surpasses the State's strict environmental protection goals, while enhancing water supply reliability and by reducing the region's dependence on imported water supplies.

West Basin has been engaged with the following Federal and State Agencies on the Project: California Coastal Commission; California Energy Commission; California Department of Fish and Wildlife; California State Lands Commission; California State Parks; Division of Boating and Waterways; Los Angeles Regional Water Quality Control Board; National Oceanic and Atmospheric Administration; National Marine Fisheries Service; State Water Resources Control Board – Division of Drinking Water; United States Army Corps of Engineers; and United States Fish and Wildlife Service as well as local community leaders.





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