April 21, 2025

Nutrient Management, District Project 100078

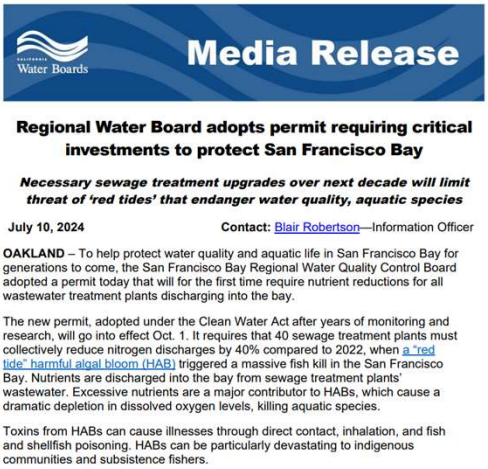
Dublin San Ramon Services District /
Central Contra Costa Sanitary District
Liaison Committee Meeting

Nitin Goel, P.E.
Optimization Division Manager

Driver of Nutrient Management, DP 100078

Third Bay Area Nutrient Watershed Permit:

- On July 10, 2024, the San Francisco Bay Regional Water Quality Control Board adopted an Order requiring all Bay Area wastewater agencies to seasonally reduce their discharge of total inorganic nitrogen (TIN) by 40% relative to 2022
- To be enforced beginning October 2034
- First compliance period May-September 2035



Water Boards

Media Release

Regional Water Board adopts permit requiring critical investments to protect San Francisco Bay

Necessary sewage treatment upgrades over next decade will limit threat of 'red tides' that endanger water quality, aquatic species

July 10, 2024 **Contact:** Blair Robertson—Information Officer

OAKLAND – To help protect water quality and aquatic life in San Francisco Bay for generations to come, the San Francisco Bay Regional Water Quality Control Board adopted a permit today that will for the first time require nutrient reductions for all wastewater treatment plants discharging into the bay.

The new permit, adopted under the Clean Water Act after years of monitoring and research, will go into effect Oct. 1. It requires that 40 sewage treatment plants must collectively reduce nitrogen discharges by 40% compared to 2022, when a "red tide" harmful algal bloom (HAB) triggered a massive fish kill in the San Francisco Bay. Nutrients are discharged into the bay from sewage treatment plants' wastewater. Excessive nutrients are a major contributor to HABs, which cause a dramatic depletion in dissolved oxygen levels, killing aquatic species.

Toxins from HABs can cause illnesses through direct contact, inhalation, and fish and shellfish poisoning. HABs can be particularly devastating to indigenous communities and subsistence fishers.

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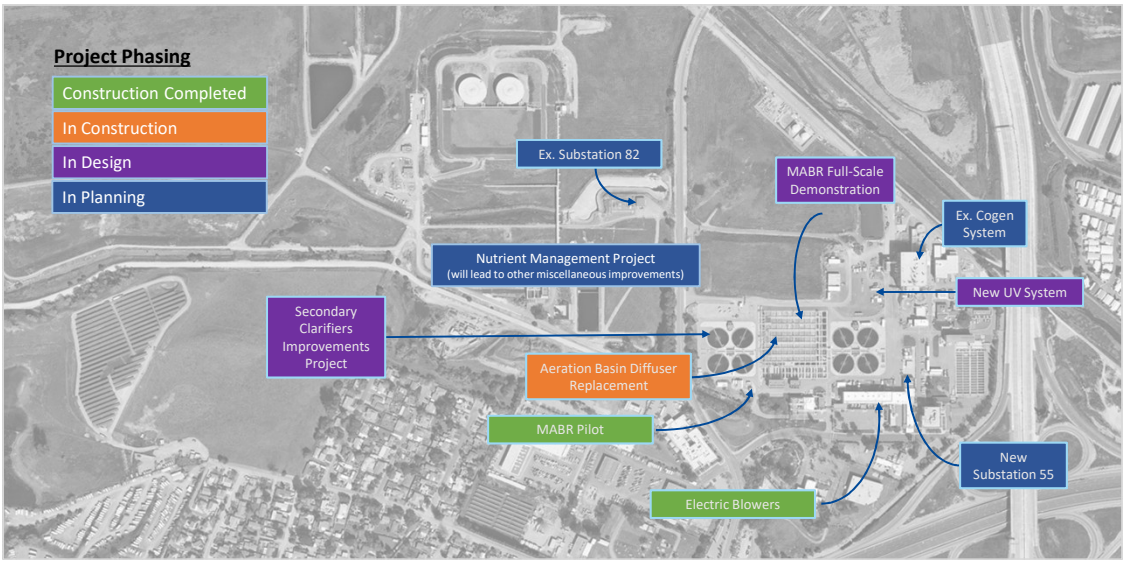
Core Projects Supporting Nutrient Management Objectives



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Project Objectives

- Identify viable nutrient mitigation alternatives to assist Central San in selecting an optimal solution
- Consider various potential recycled water opportunities
- Maximize the value of existing assets
- Develop an optimal project phasing, schedule, and delivery plan that has the least impact on Central San's operations and ratepayers
- Update the Board's Recycled Water Policy
- Develop a pre-design report including site layouts of the selected alternative

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Pilot and Full-Scale Demonstration Testing

- Results will be crucial in determining the optimal nutrient alternative

Successful Completion of Membrane Aerated Biofilm Reactor (MABR) Pilot

Full-Scale Demonstration of MABR in Existing Aeration Tanks (as Part of the Nutrient Management, DP 100078)

MABR & Process Intensification

Conventional Biological Nutrient Removal

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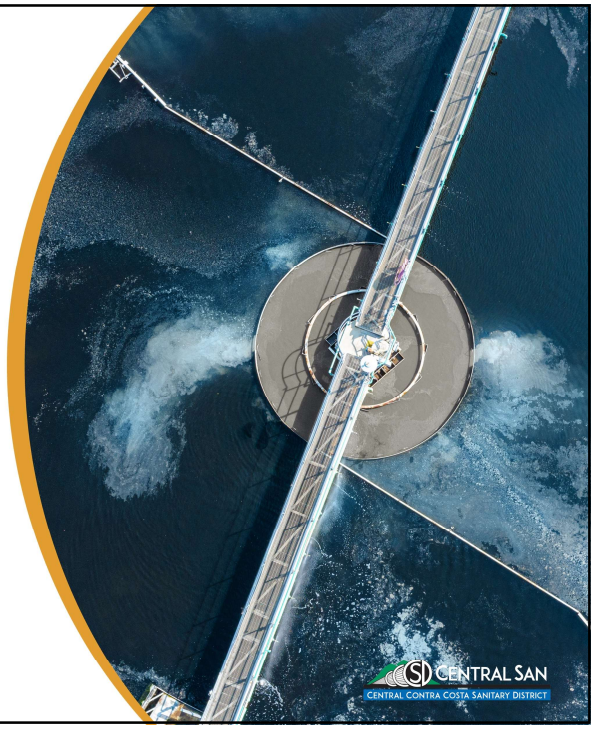
MABR Pilot Overview



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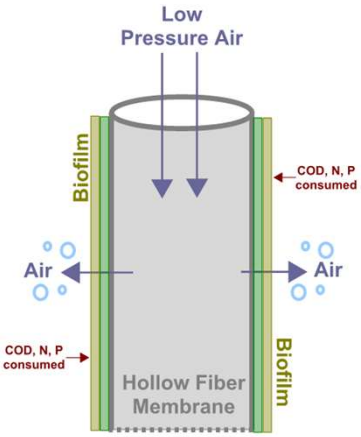
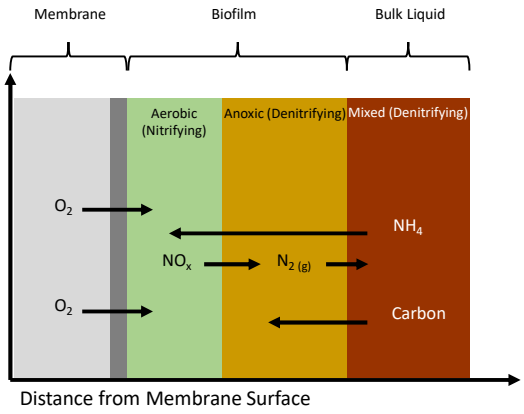
MABR Process Intensification Technology Overview





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Pilot Installation February/March 2024

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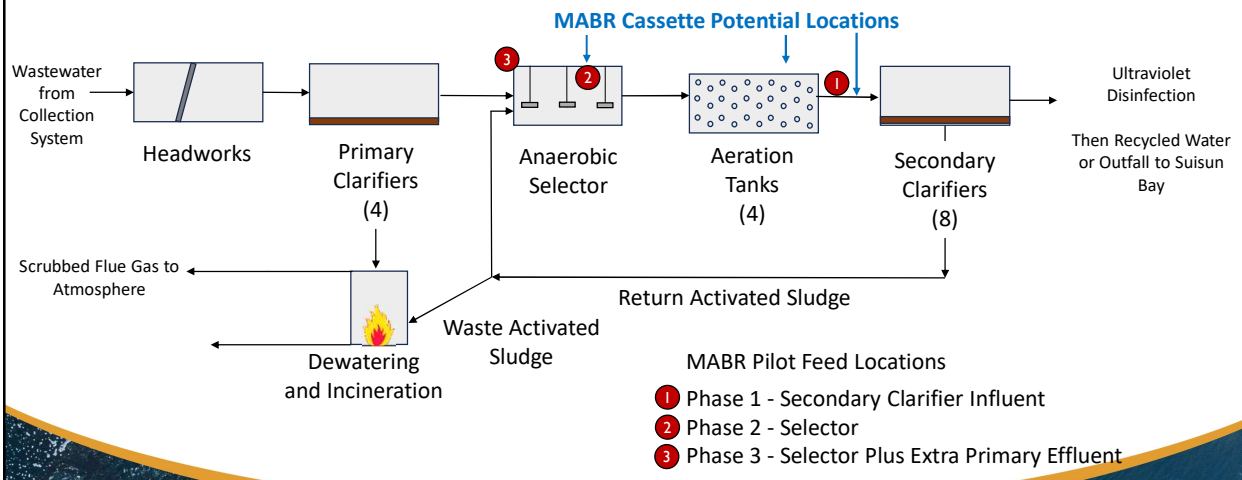
MABR Pilot Influent Water Locations



Biofilm Visual Inspection

April 2024
Day Zero

May 15th
Least Challenging Condition

Oct 10th
Challenging Condition

Nov 8th
Most Challenging Condition

MABR Pilot Results are Promising for Central San

Pilot Answered Many Questions:

- ✓ **Nitrogen Removing Bacteria Growth** - Can nitrogen removing bacteria live on MABR when fed with Central San bacteria that do not remove nitrogen?
- ✓ **Cyanide Impacts** - Can nitrogen removing bacteria grow in presence of cyanide from incinerator air pollution control equipment?
- ✓ **Biofilm Management** - Can biofilm thickness control equipment mitigate high-carbon demand?
- ✓ **Typical Nitrogen Removal Rate** - Will nitrogen removal rate be similar at Central San to treatment plants that already remove nitrogen?

Addressing Key Questions via Full-Scale Demonstration:

- ? Will the pilot results translate at full-scale? This is a cutting-edge, unproven application of this technology.
- ? What is the full-scale installation cost?
- ? What are other considerations?

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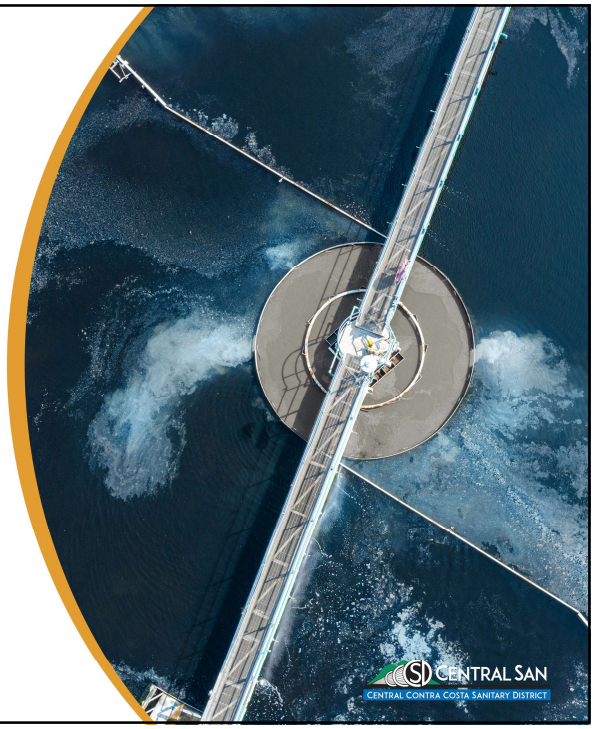
Full-Scale Demonstration Overview



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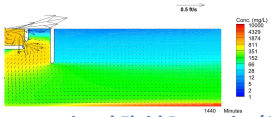
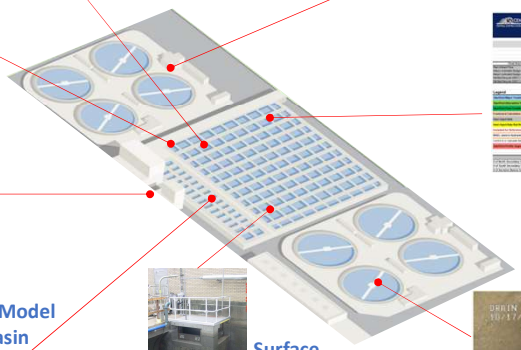
Key Components for Full-Scale Demonstration Testing

Calibrated Process Model Leads to Optimized Process Design

MABR Demonstration

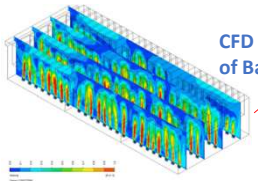


Clarifier Computational Fluid Dynamics (CFD) Model



Hydraulic Model Optimizes Flow Splitting, Flow Control, and Increased Capacity

Training Operational Staff

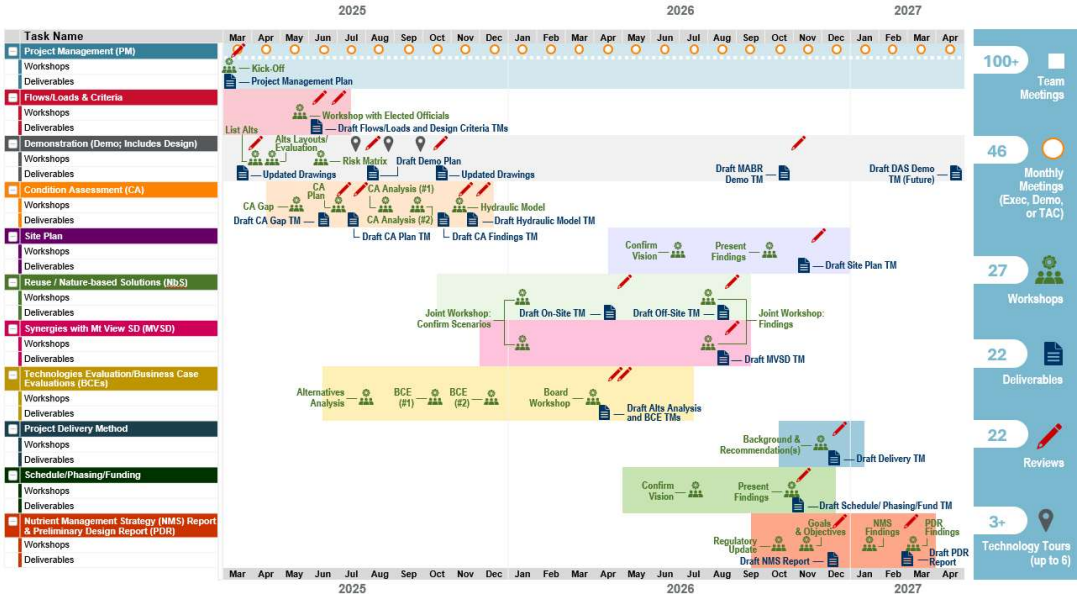


CFD Model of Basin

Surface Wasting

Condition Assessment of Various Unit Processes

Nutrient Management Project Schedule and Task List



Consultant Selection and Financial Impacts

- On October 4, 2024, a request for proposal was publicly advertised, resulting in submissions from two consulting firm teams: Carollo Engineers with subconsultant Brown and Caldwell and HDR, Inc. with subconsultant Hazen and Sawyer.
- Both teams interviewed on January 14, 2025; following interviews, the HDR team was selected as top proposer and is, therefore, recommended for the project.
- Consultant agreement cost not to exceed $3,800,000.

Thank You!

Nitin Goel, P.E.
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Dan Gill, Operations Director

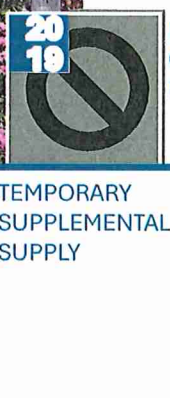
Background

Dublin San Ramon Services District · EBMUD · DERWA

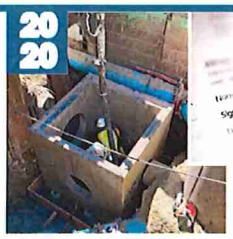
1995 DERWA FORMATION

2006 FIRST DELIVERY OF RECYCLED WATER

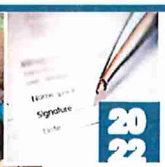
2018 NEW CONNECTION MORATORIUM



2020 TEMPORARY SUPPLEMENTAL SUPPLY



2022 INTERIM AGREEMENT FOR SUPPLY AND SALE OF RECYCLED WATER

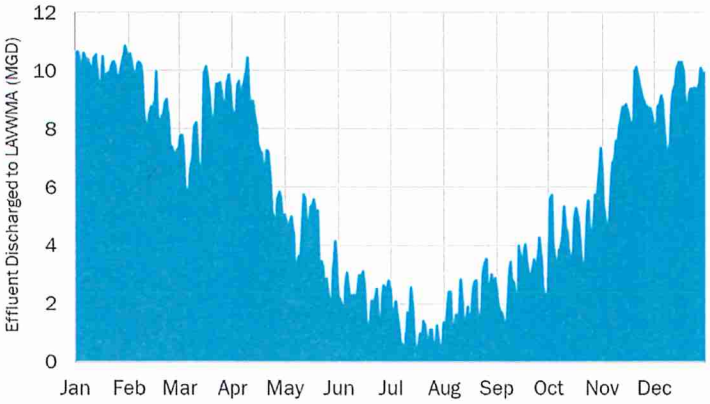


2024 DERWA SUPPLY MANAGEMENT PLAN

2024 NUTRIENT WATERSHED PERMIT

Reducing Nutrient Impacts to the Bay

Recycled water program supports a healthy San Francisco Bay



$240 MILLION

in recycled water investment
(more recycled water means less nutrients to the Bay)

3,300 TONS

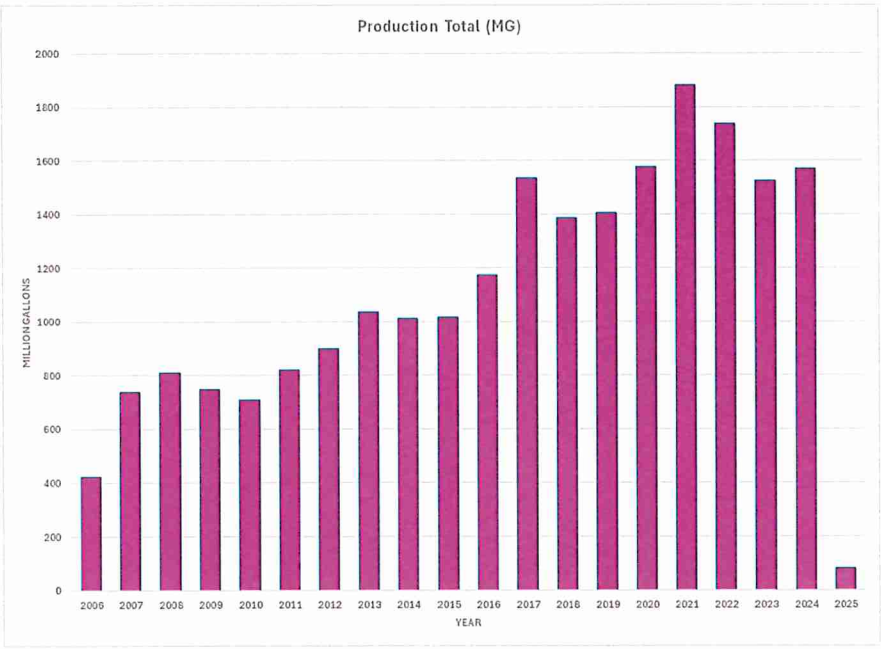
of total inorganic nitrogen has been diverted from the Bay since 2006. That's the same weight as 2,500 cars!

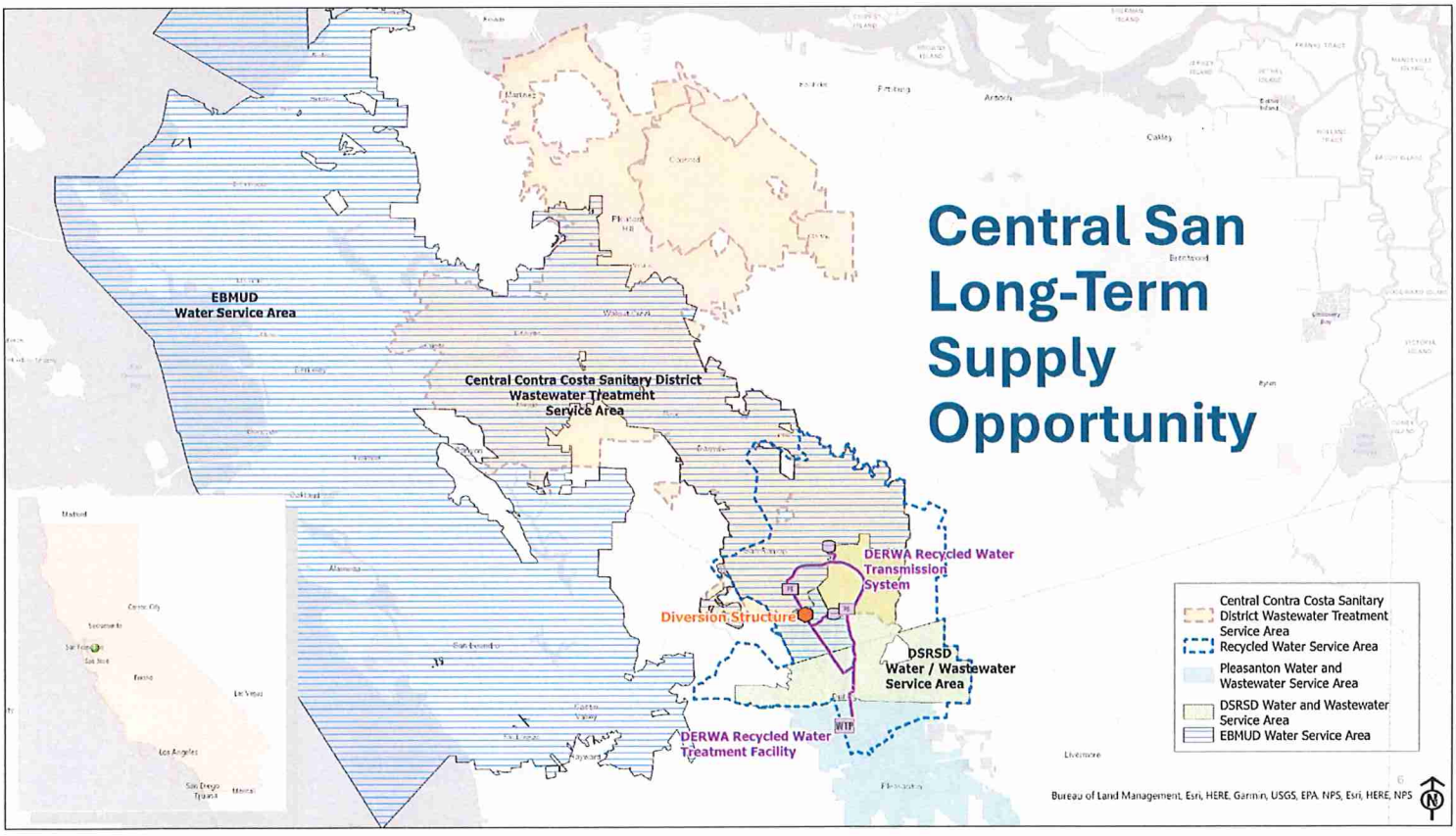
UP TO 80%

nitrogen removal in the dry season from recycled water production

Over 20 Billion Gallons Recycled

Growth in Recycled Water Program





DERWA-Central San Diversion Project

- Executed agreement in 2019
- 5-year term, expires December 31, 2025
- 0.7 MGD of wastewater diverted to DSRSD collection system during peak irrigation season

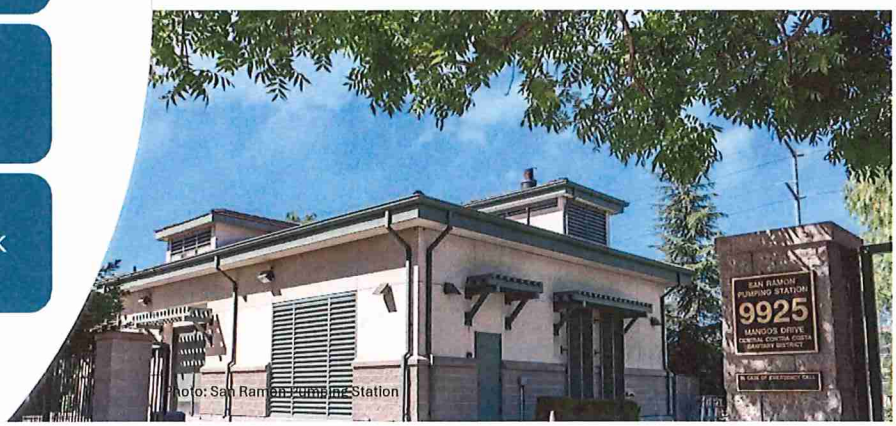
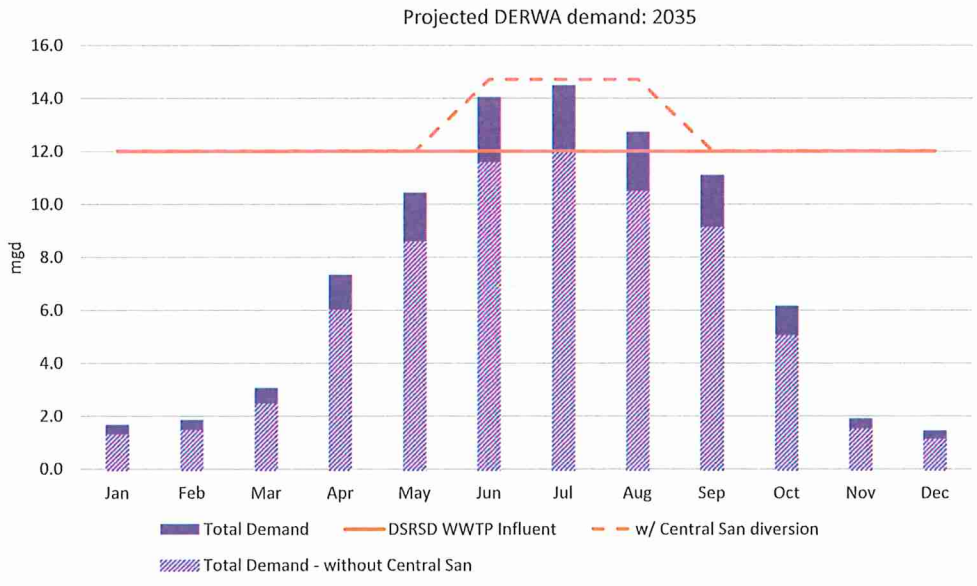


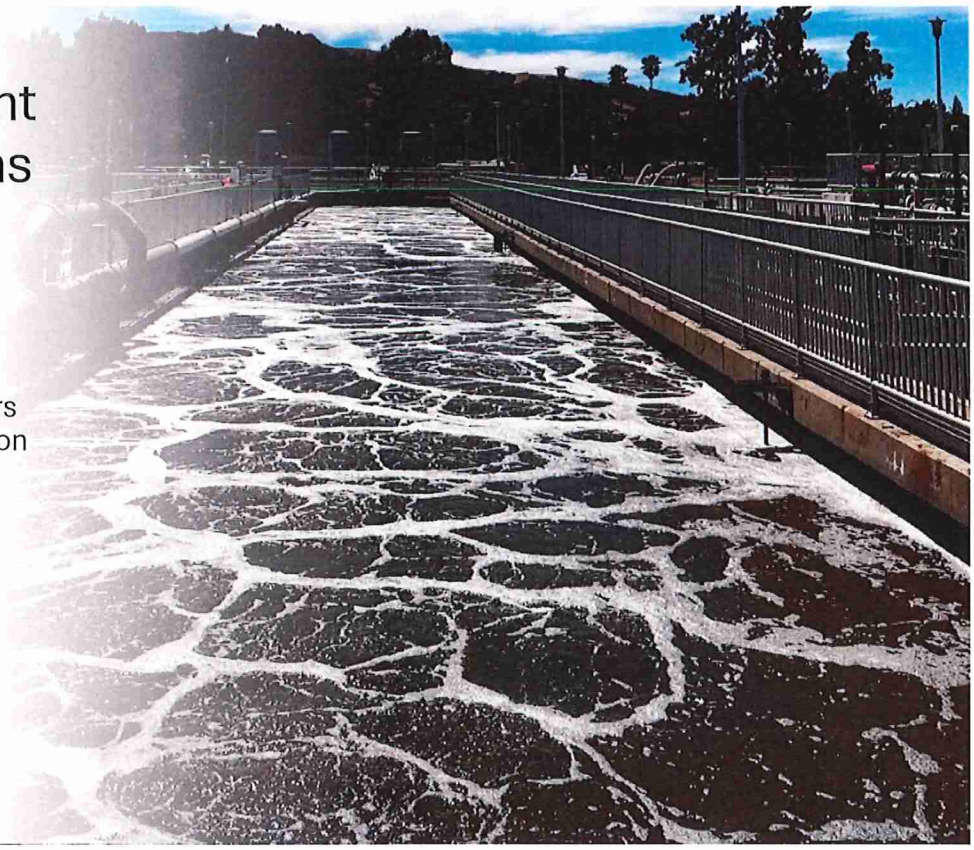
Photo: San Ramon Pumping Station

Diverting wastewater from Central San (2.7 mgd, June-Aug) would enable DERWA to expand its customer base and meet demands for next ten years



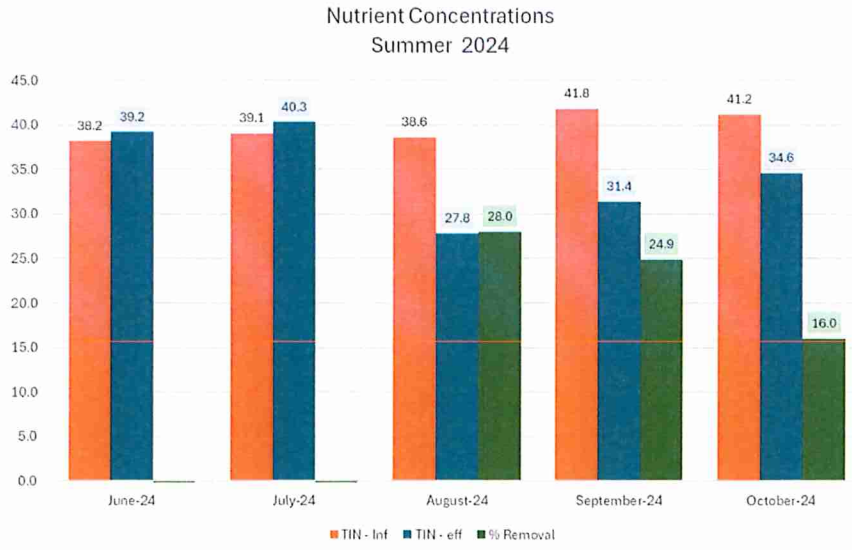
Additional Nutrient Reduction Options Being Explored

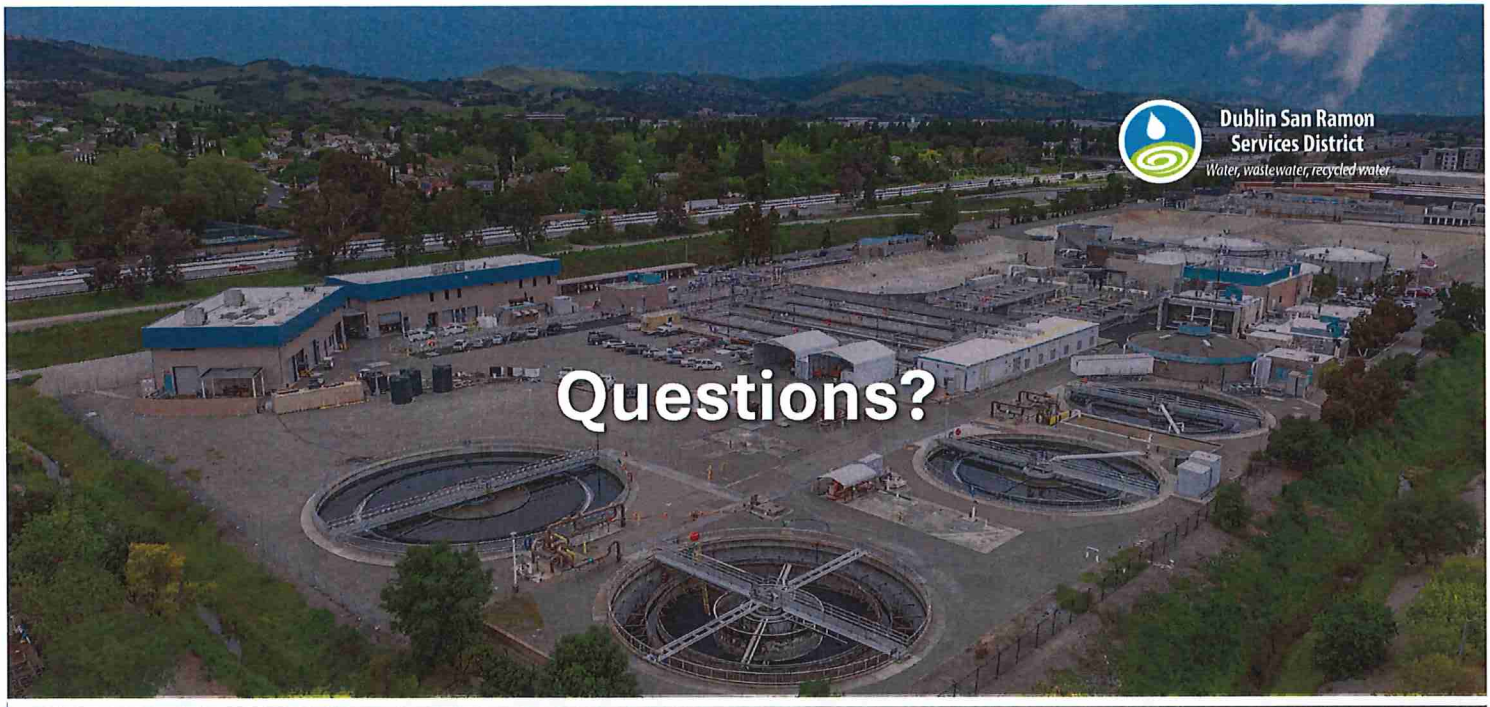
- Wastewater Master Plan Update
- Estimated $89 million dollars for aeration system expansion
- Plant Optimization



We achieved up to 28 percent nutrient reductions in 2024.

Regional Wastewater Treatment Plant Optimization





Dan Gill, Operations Director

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