



Central Marin Sanitation Agency

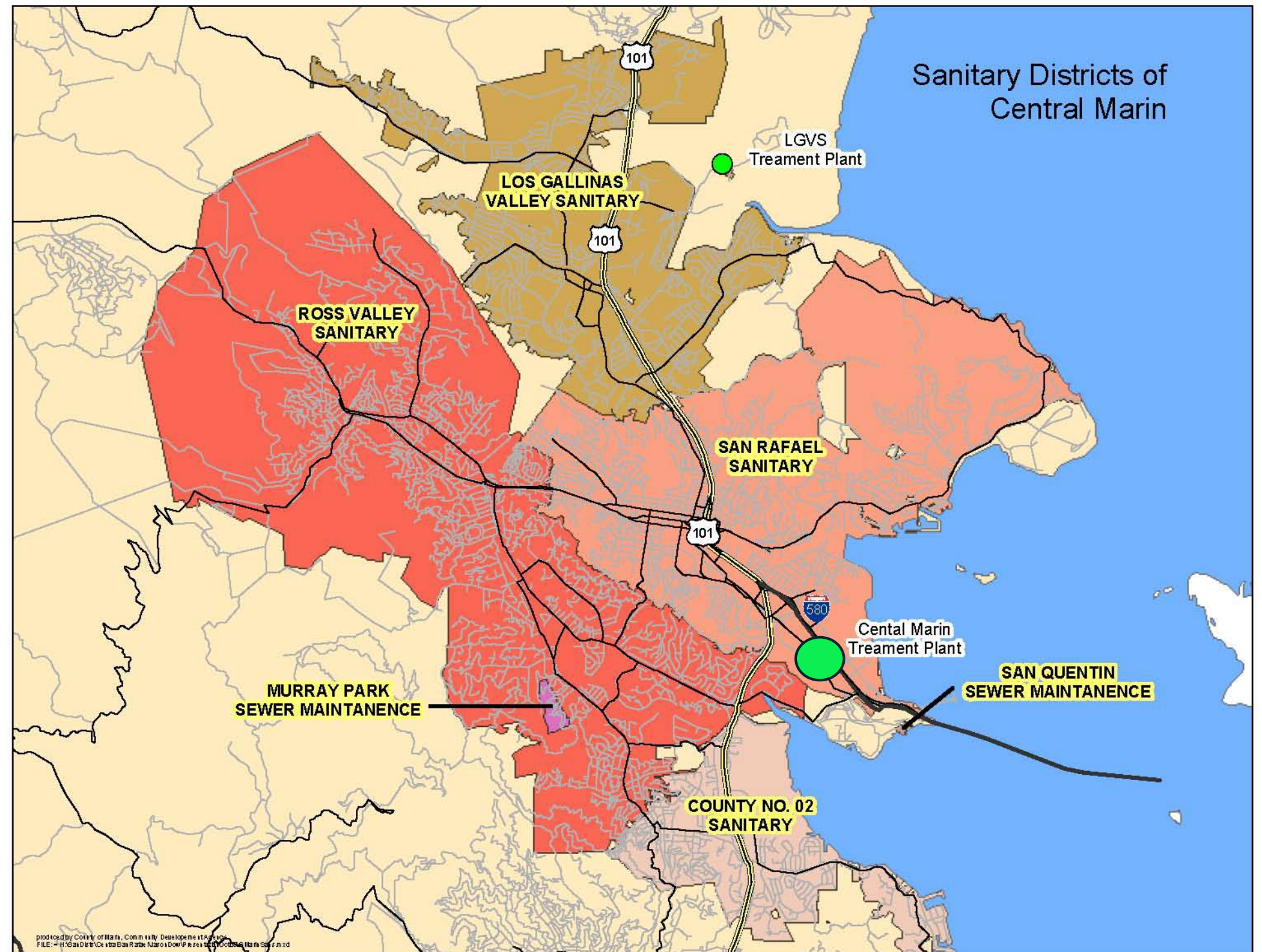
Nutrient Removal Planning Constraints & Drivers

2025 BACWA Annual Meeting

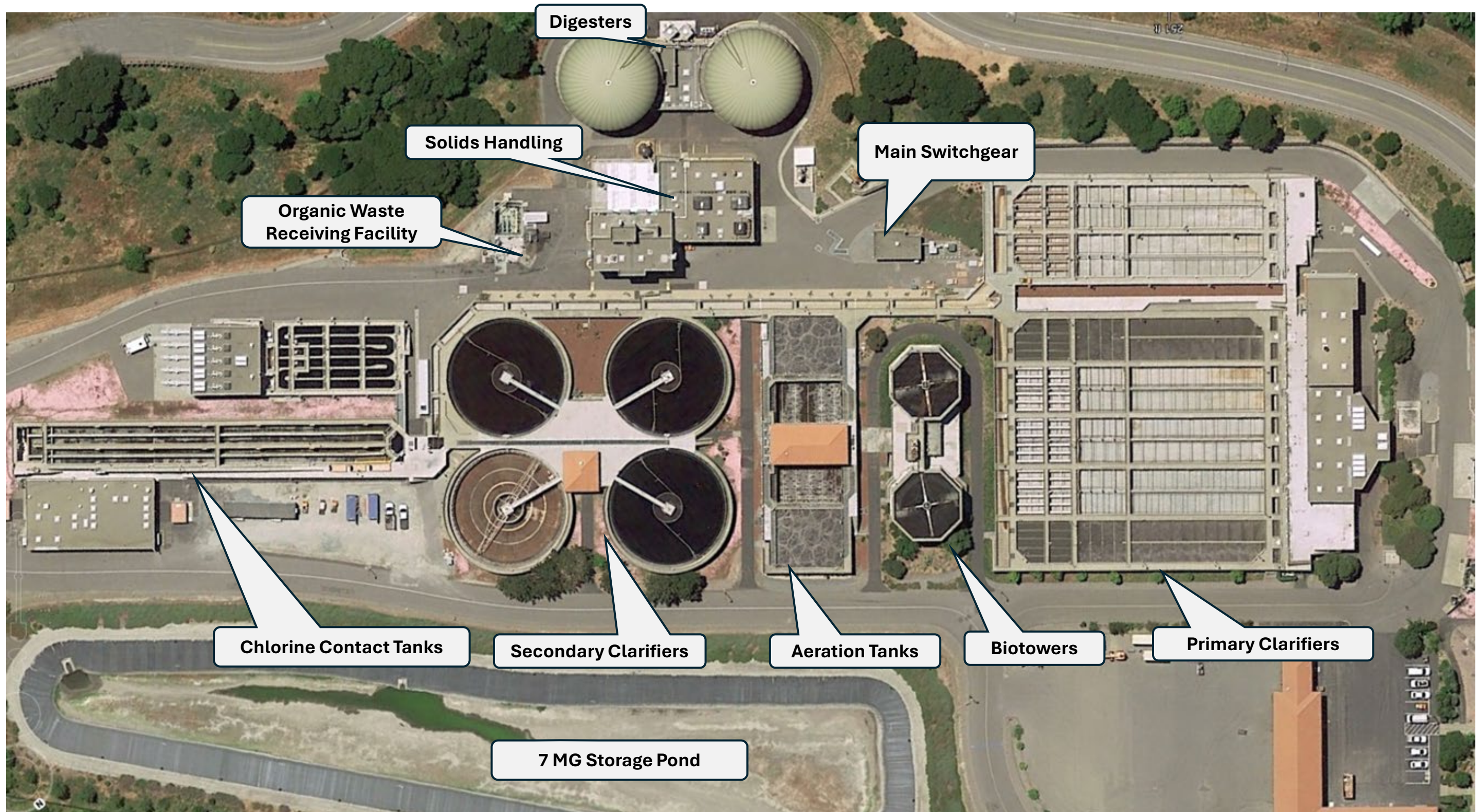




- Regional Wastewater Agency
- Serves 105,000 people and San Quentin State Prison
- Influent flow range: 7 MGD-129 MGD



Existing Treatment Plant





Nitrogen Removal Planning Targets

Parameter	Units	Interim Limit (2025)	Final Limit (2054)
Influent Flow (Nutrient Permitting Season)	mgd	6.6	7.3
TIN Limit	kg/d	1,300	480
Equivalent TIN Concentration	mg/L	52	17

2024 dry season effluent TIN Load for CMSA = 1,118 kg/d

Percent reduction from interim limit = 63%

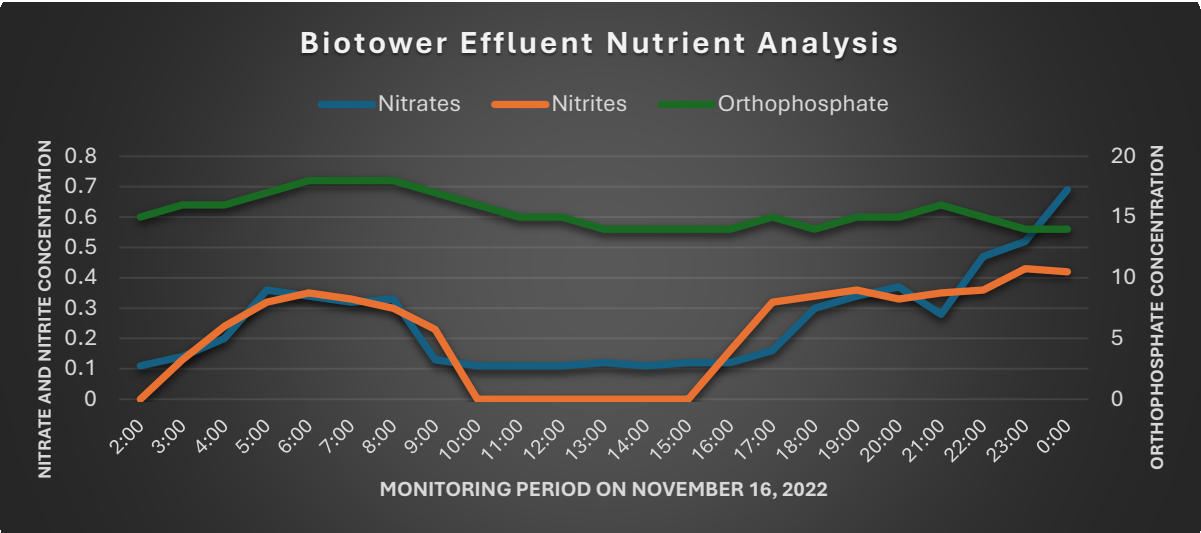
Percent reduction from 2024 TIN Load = 57%

Timeline of Nutrient Removal Planning

Completed

In Progress

Planned



Planning Criteria

Project Delivery

Economic

- Capital Cost
- Lifecycle Cost

Permitting

- Impacts to air permitting
- CEQA requirements
- Discharge and biosolids management

Constructability

- Maintenance of Plant Operation during Construction
- Land Acquisition
- Bypass Pumping

Daily Experience

O&M

- Process familiarity
- Accessibility and ease of maintenance
- Process Complexity
- Safety

Non-Economic

- Neighborhood impacts (e.g., truck traffic, odor)
- Ease of operations and maintenance
- Process compatibility

Technology Resilience

- Compatibility with peak flow conditions
- Resistance to shock load

Future Proofing

Sustainability

- Energy usage
- Energy recovery
- Chemical usage

Preparedness for Future

- Flexibility for additional nutrient removal
- Flexibility for future regulatory requirements
- Compatibility with potable reuse

Preliminary Criteria Ranking

High Priority

Medium Priority

Low Priority



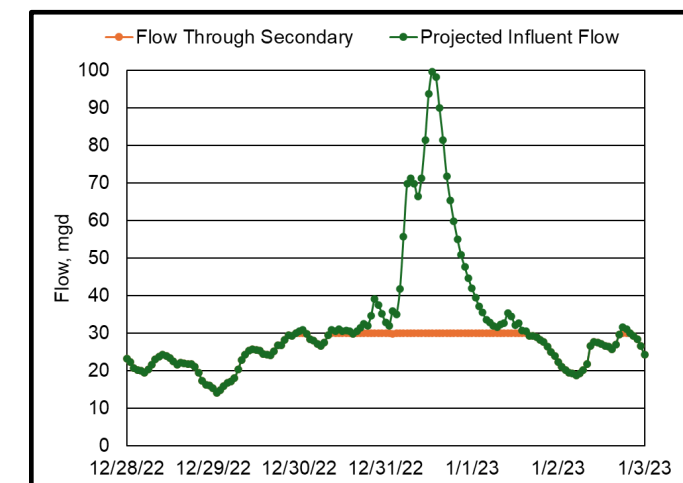
Additional CMSA Drivers:

Wet weather flow management

Organic waste

Keep existing assets?
(Biotowers/Electrical)

Limited space



2024 Total

Energy Neutrality

103%

2025 YTD

Energy Neutrality

112%

2026 Goal

Energy Neutrality

150%

Evaluating Nutrient-Energy Nexus



An aerial photograph of a wastewater treatment plant (WWTP) facility. The plant features several large circular clarifiers, rectangular aeration tanks, and a long rectangular settling tank. It is surrounded by greenery and a highway. In the background, there are mountains and a body of water. A semi-transparent blue text box is overlaid on the upper portion of the image, containing the title and a list of options for limited space.

Exploring Options for Limited Space

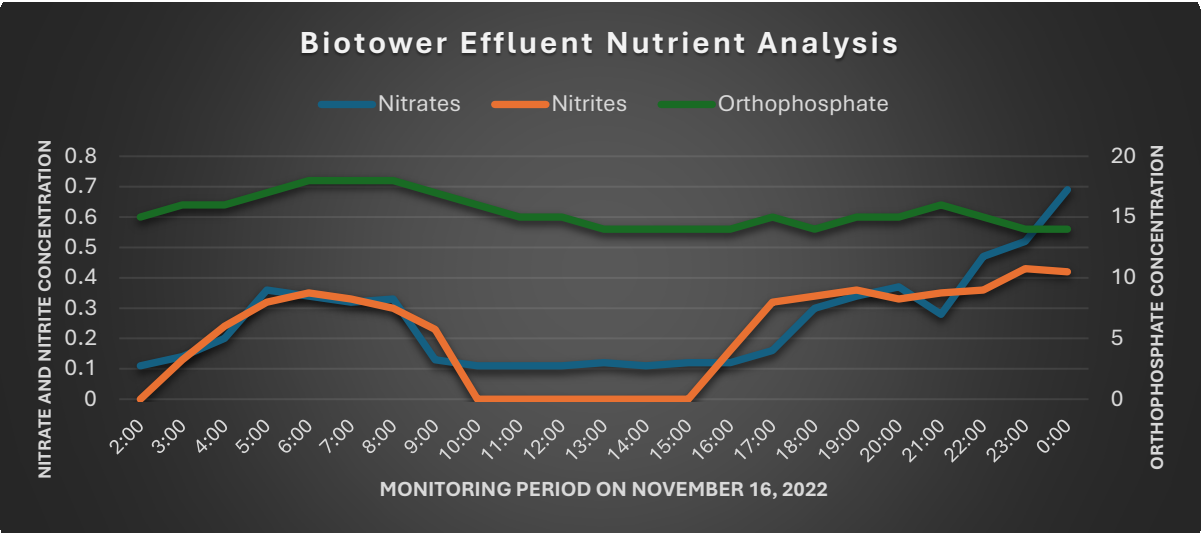
1. **Maximize** nutrient removal in existing tanks
2. **Minimize** new tanks required
3. Explore **Intensification** for more space savings
 1. MABRs
 2. Cyclones
 3. Clarifier baffles
 4. Clarifier sludge removal system

Next Steps

Completed

In Progress

Planned



Questions?

