



Innovative Process Intensified MBR Design

- Traditional MBR
- Reuse with MBR
- High Rate MBR System
 - Technology Overview
 - Pilot Testing
 - Case Studies

ovivo mbr

MBR is....

A Membrane Biological Reactor, or MBR, is an activated sludge process using membranes in place of sedimentation.



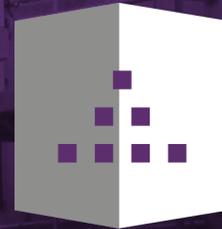
Space Efficient



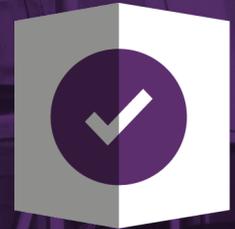
Cost Effective



Best Available
Treatment



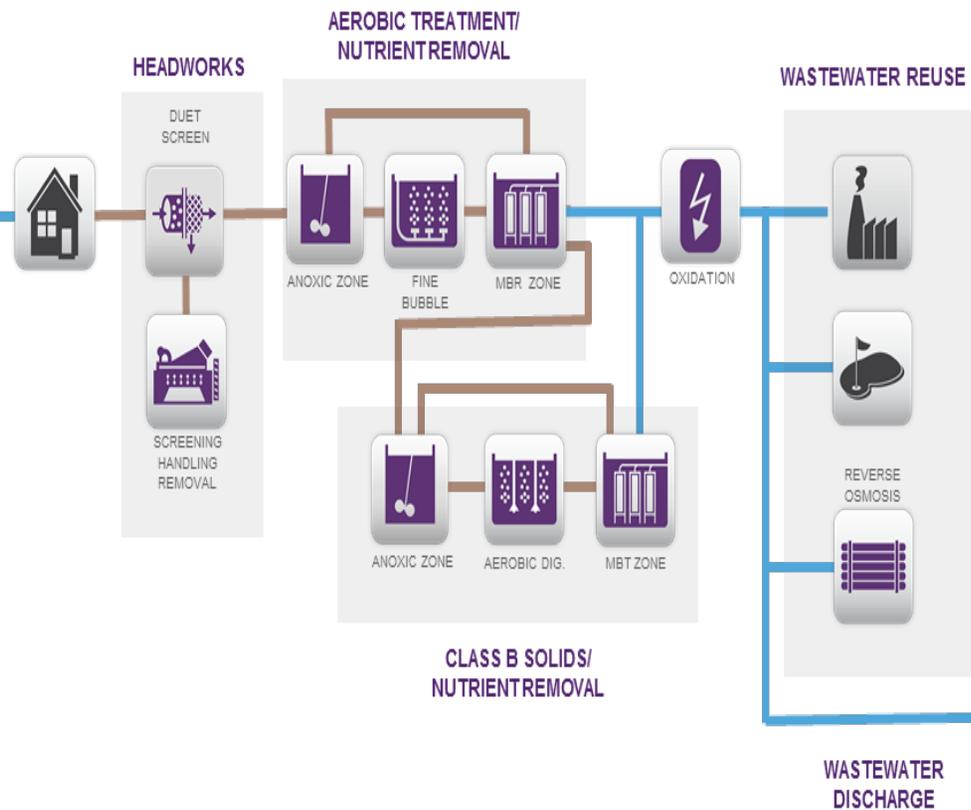
Simple



Reliable

ROCKER
CRANE RENTALS
1-800-258-1323

- 3+ Stages
- MLSS: 8,000 – 12,000 mg/l
- FBD
- 10 mg O/l
- 4Q – 6Q Recycle



- Golf Courses
- Land Scape
- Toilet Flushing
- Agriculture
- Potable Reuse

Permeate Quality

Parameters	Typical Values	Achievable Values
BOD ₅	➡ < 2.0 mg/l	Non-Detect
TSS	➡ < 2.0 mg/l	Non-Detect
Ammonia (NH ₃)	< 1.0 mg/l	Non-Detect
Total Nitrogen (TN)	➡ < 10.0 mg/l	< 3.0 mg/l
Phosphorus (TP)	< 1.0 mg/l	< 0.03 mg/l
Turbidity	➡ < 0.10 NTU	< 0.05 NTU
Fecal Coliform	➡ < 2.2 CFU/100ml	Non-Detect
SDI	< 3	< 2





Fay School, MA - Gold



OHSU, OR - Platinum

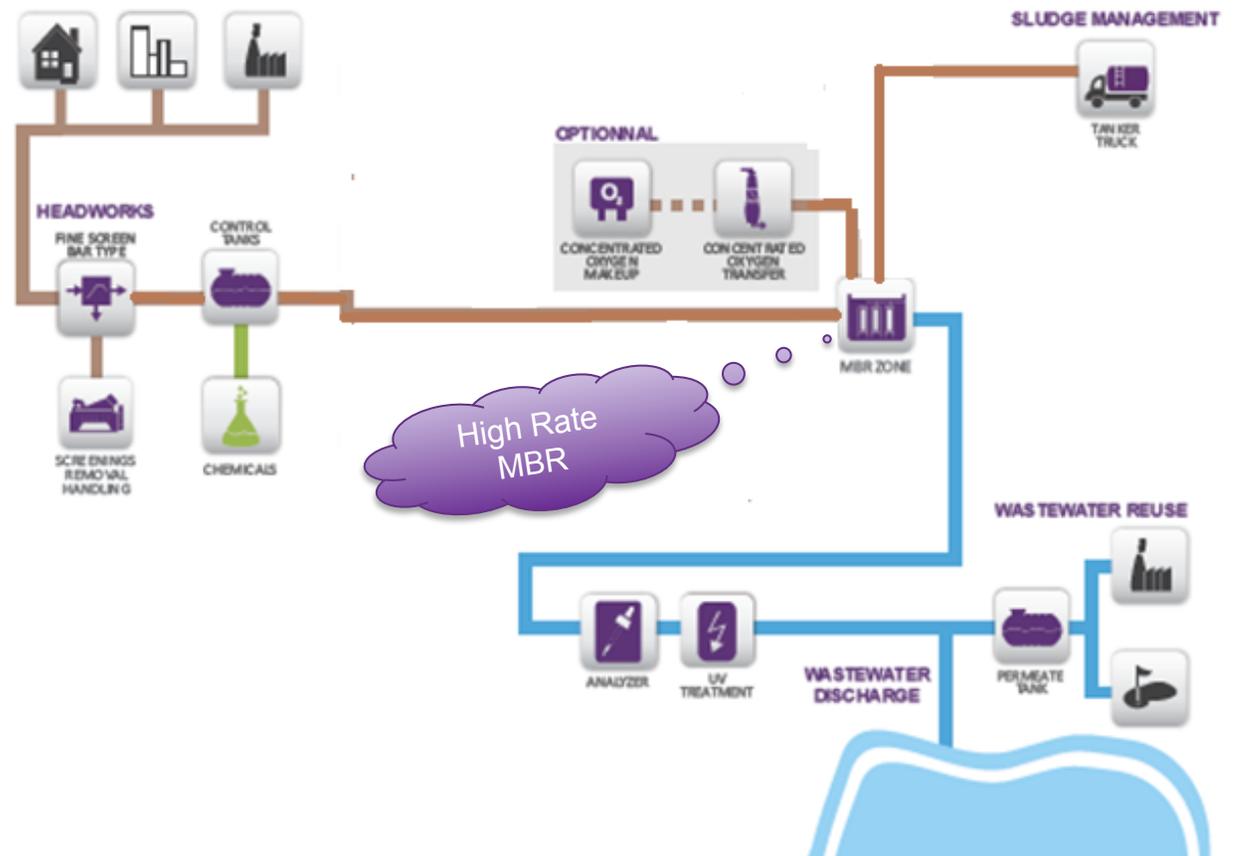


Earth Rangers, Canada - Gold

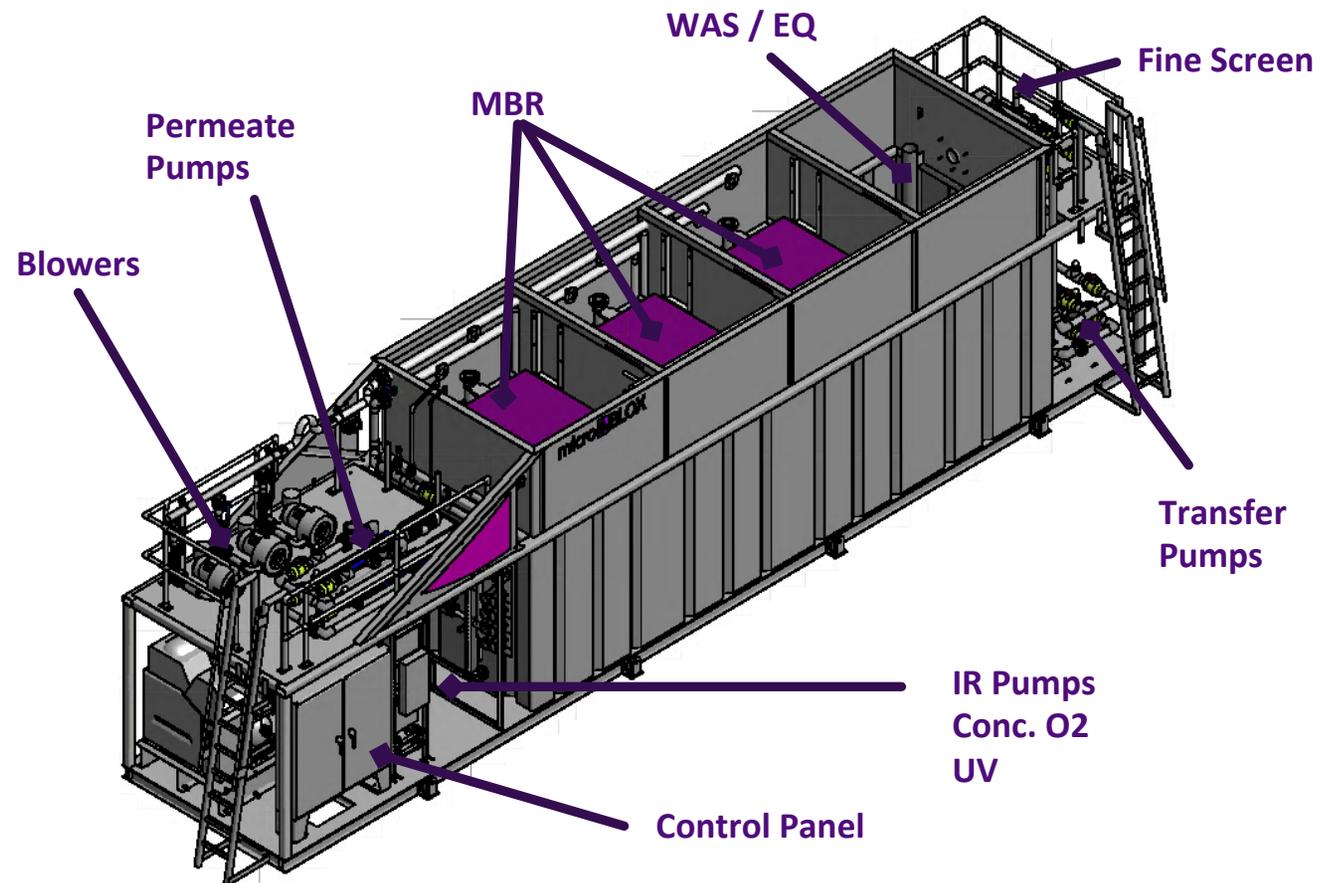


Coeur d'Alene, ID - Silver

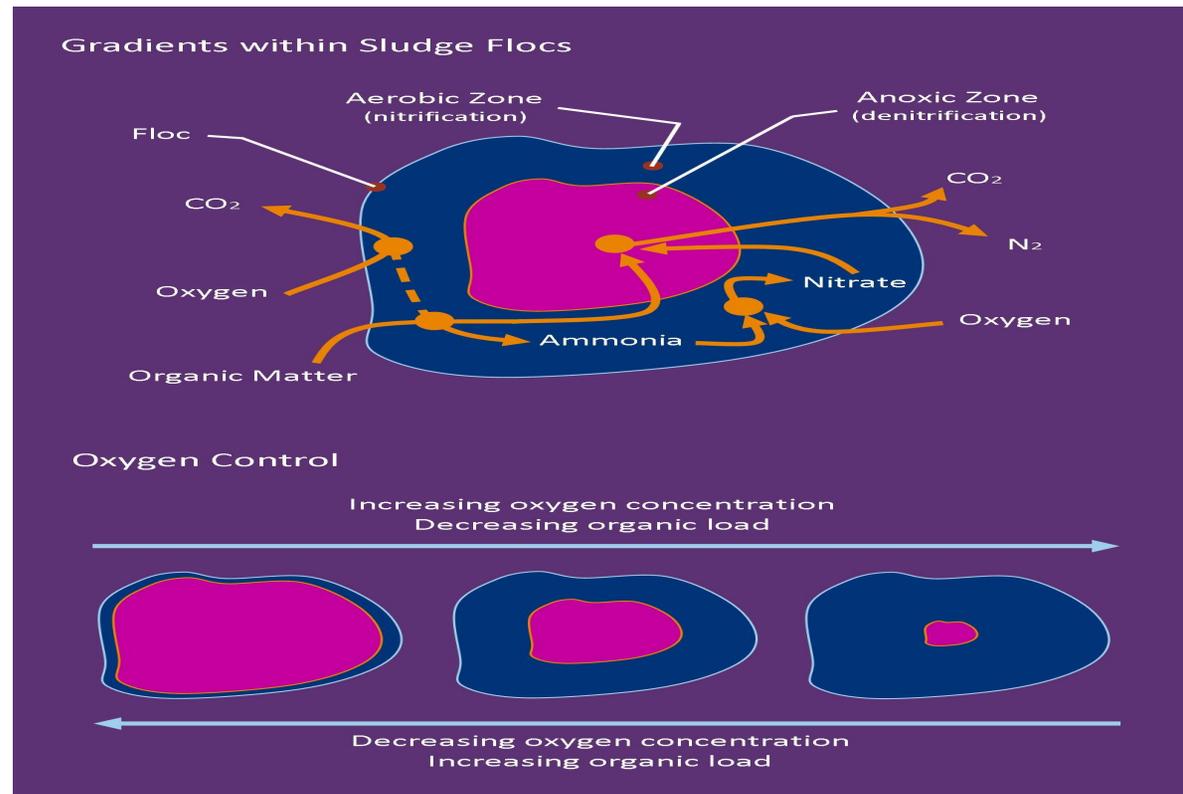
- Single Stage
- MLSS: 20,000 – 30,000 mg/l
- No FBD
- 200+ mg O/l
- Similar Effluent

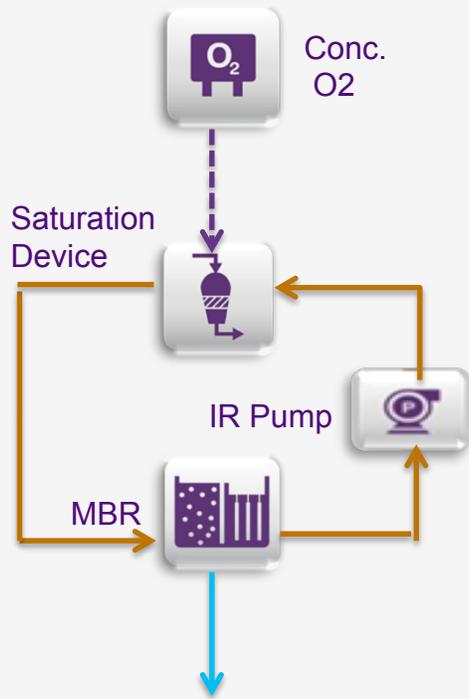


- RTO
- 5,000 - 125,000 GPD
- SNDN
- Supplemental O2 System
- OV400 Unit
- Adaptable



- Simultaneous Nitrification and Denitrification
- Ideal DO Range 0.8 – 1 mg/l



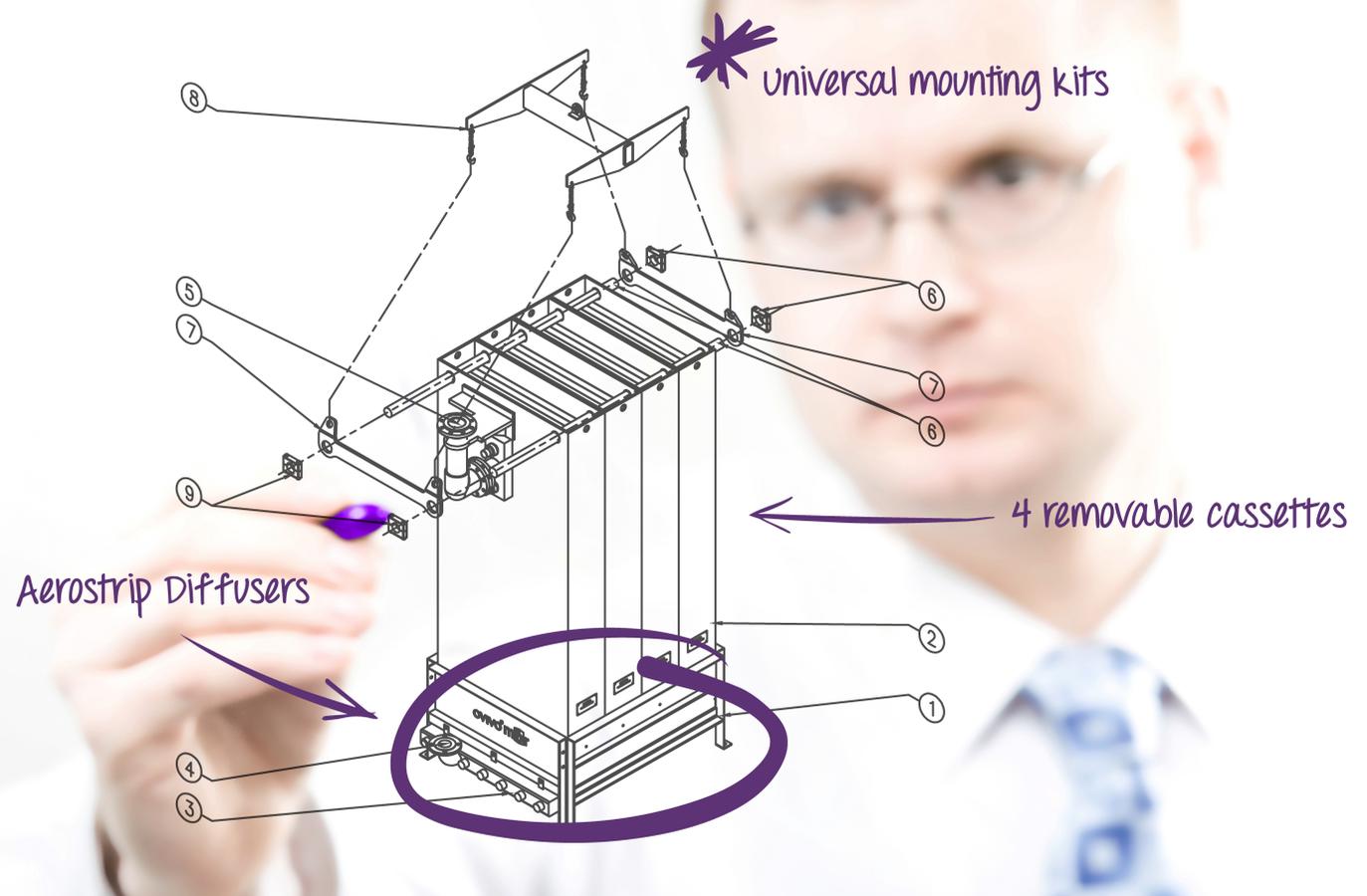


PCI DOCS80

Speece Cone

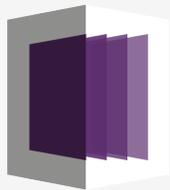
IR Pumps

- Latest
- Ultrafiltration
- Flat Sheet
- BulletProof™
- Title 22

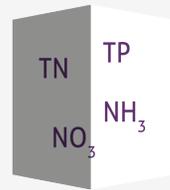


- Wilbarger, TX
- Testing in 2012
- Flow < 20,000 GPD
- Scalping Facility
- Old Membrane Type





Membranes



Biological
Nutrient Removal



Aeration



Integration
& Controls

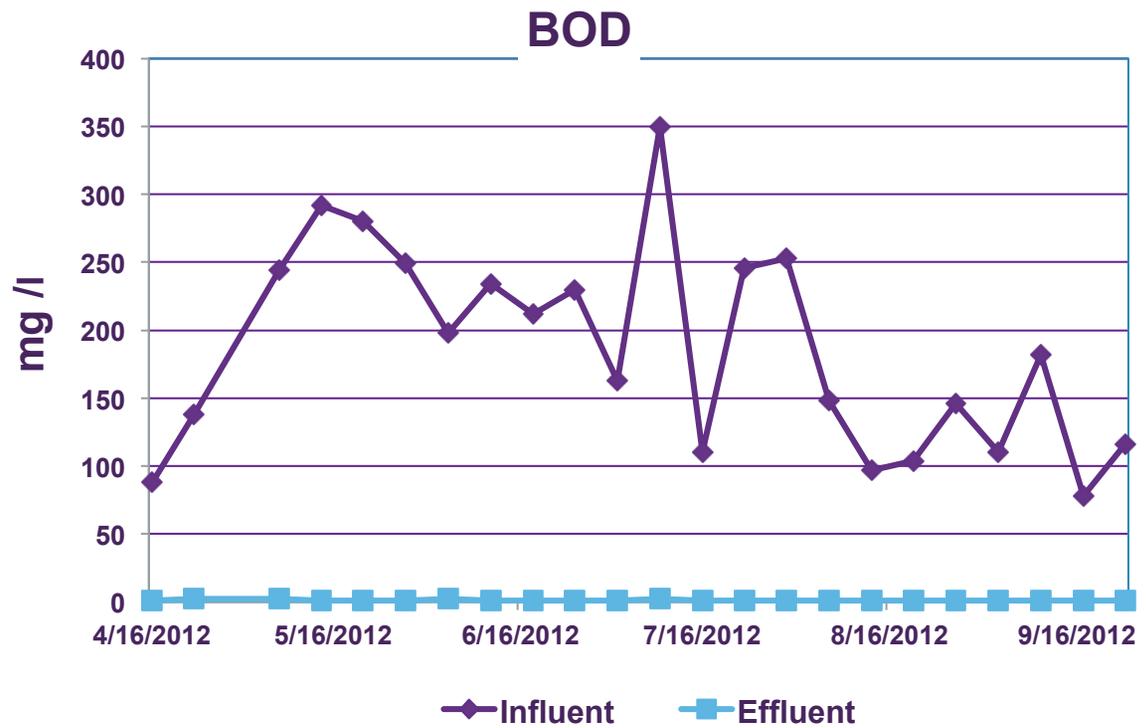
Testing Objectives

- Proof of Overall Concept
- Verify Membrane Performance
- Verify DO Control
- Validate nutrient limits

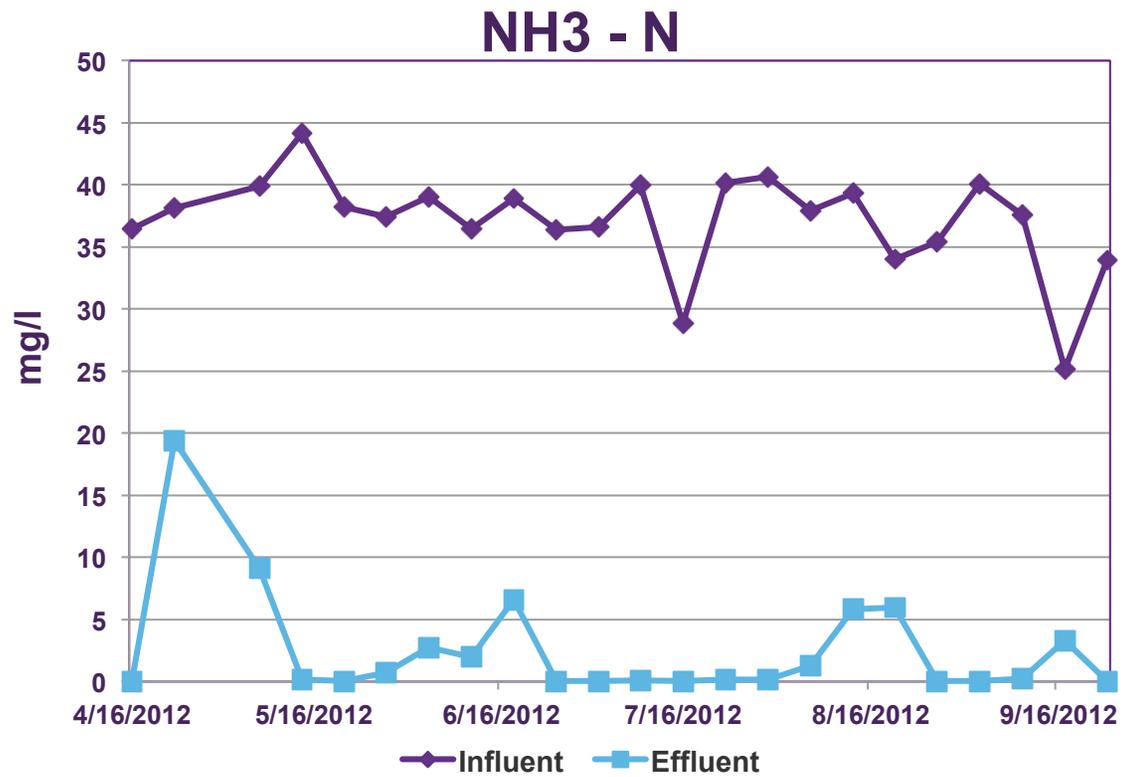
Testing Results



Testing Results



Testing Results



Lowes, MA

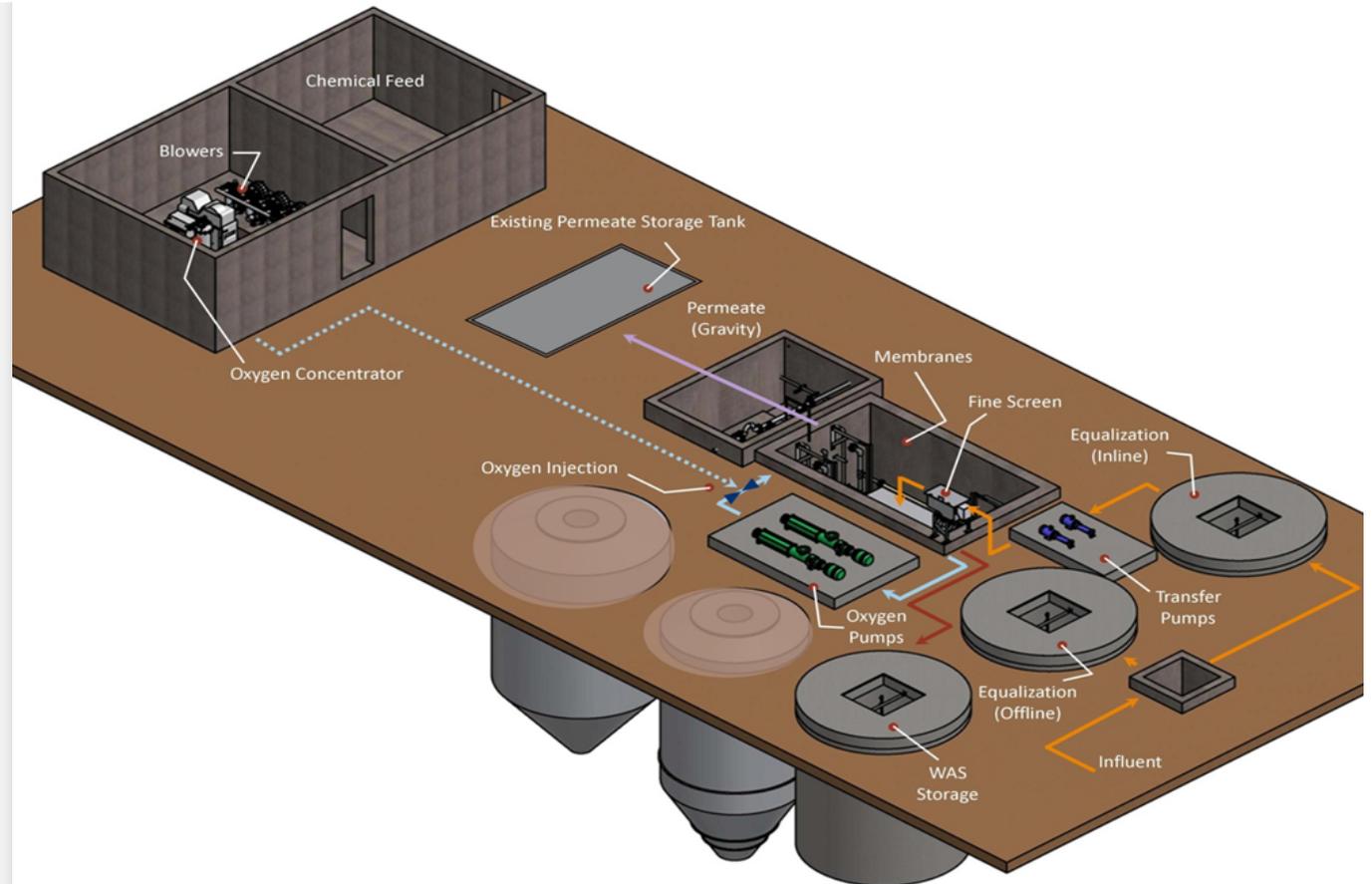


- Retrofit – Trickling Filtration
- Permit 30/30/10 (BOD/TSS/TN)
- Commissioned – March 2013
- Single Stage Process Design
- 40,000 GPD MMF
- Total Installed Cost - < \$ 1 mil

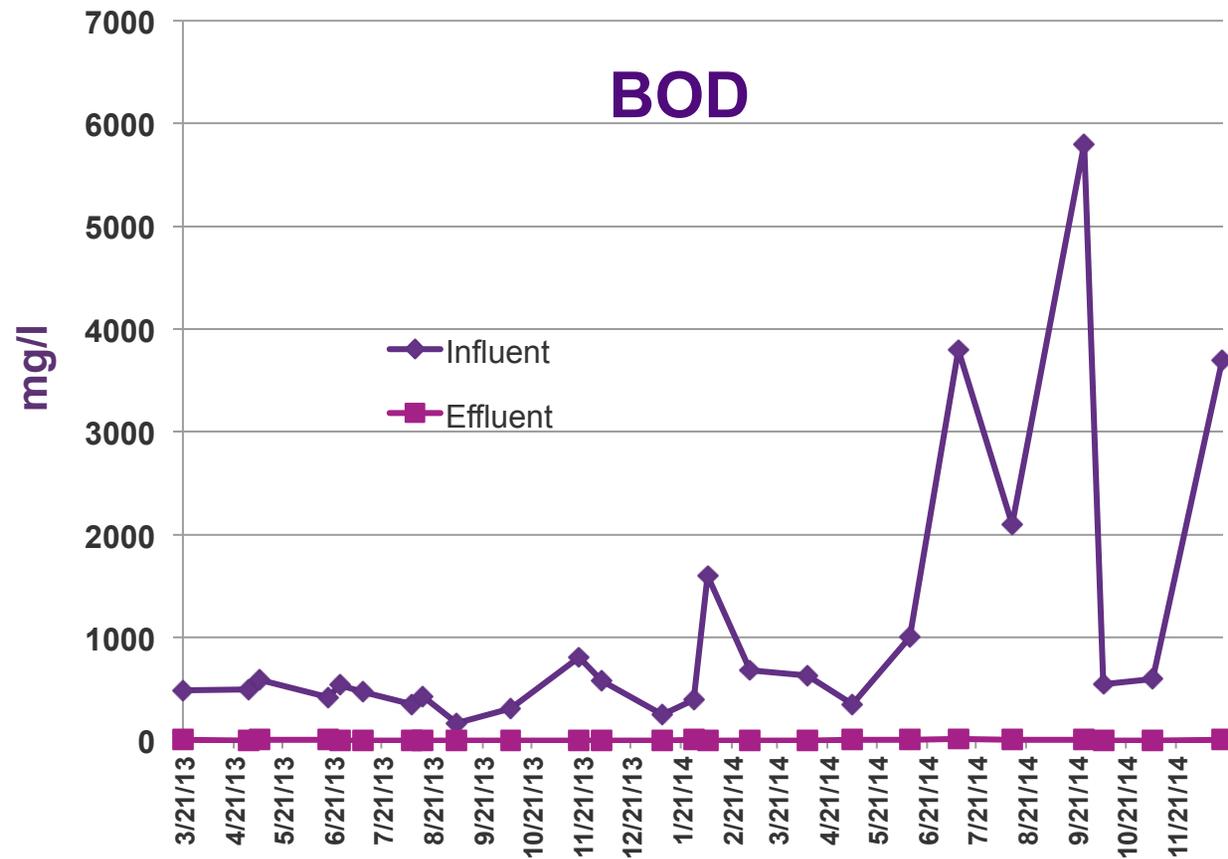
Lowes, MA



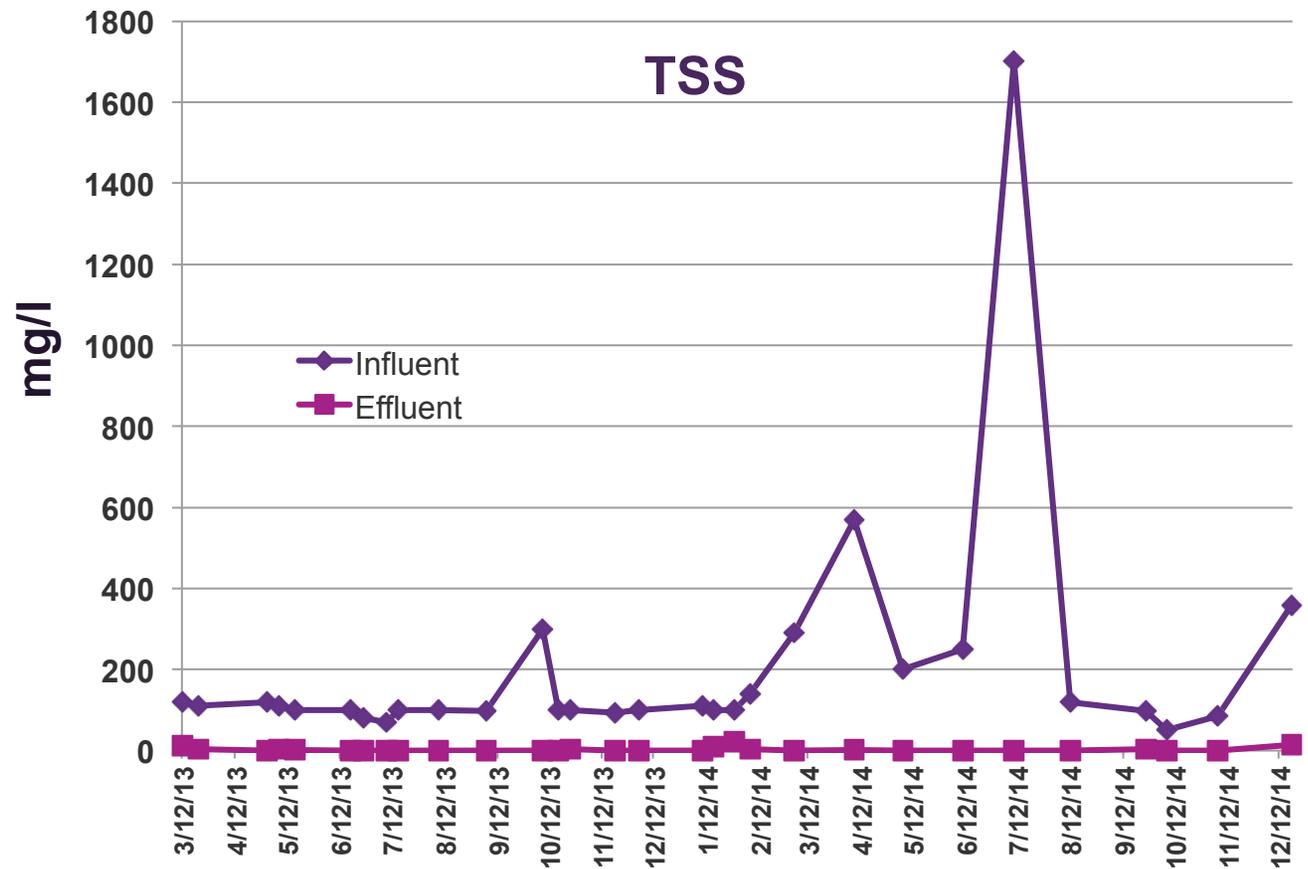
Lowes, MA



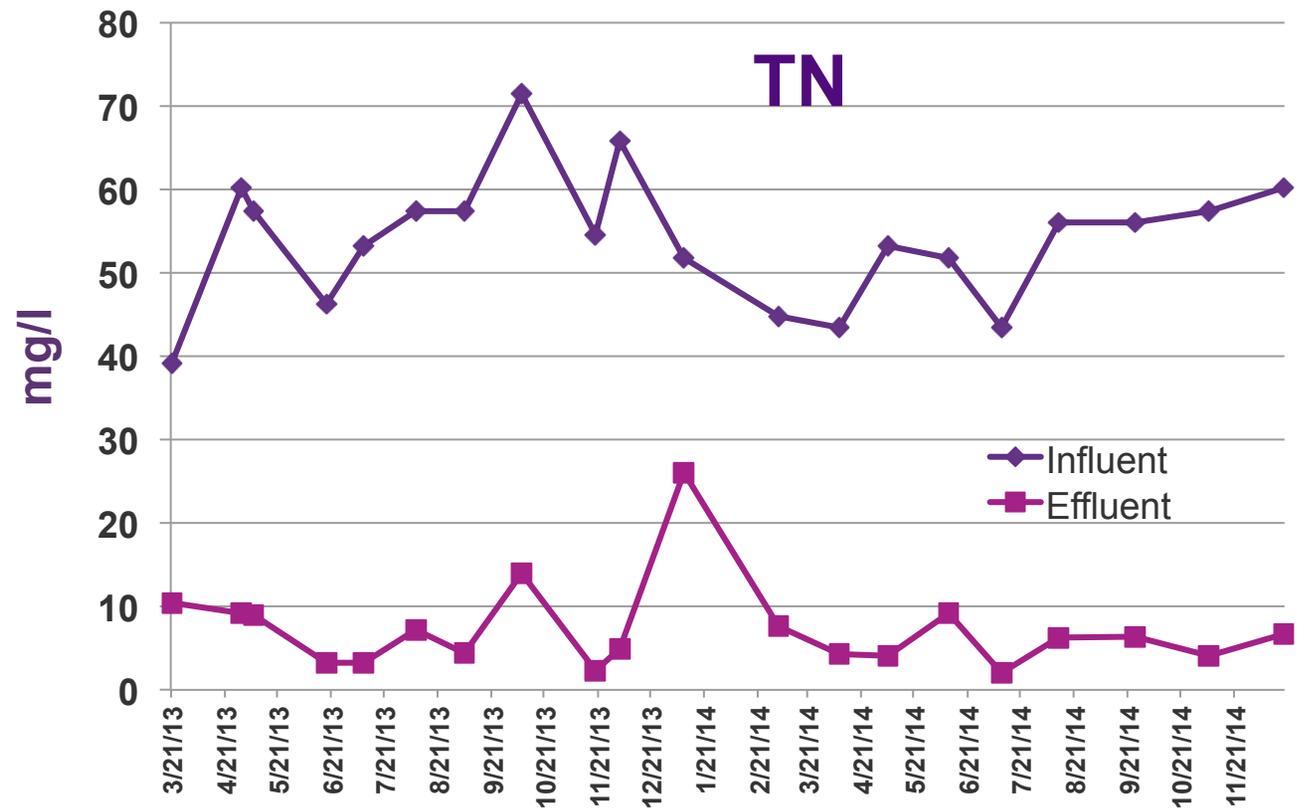
Lowes, MA



Lowes, MA



Lowes, MA



Pilot Travel Center, MA

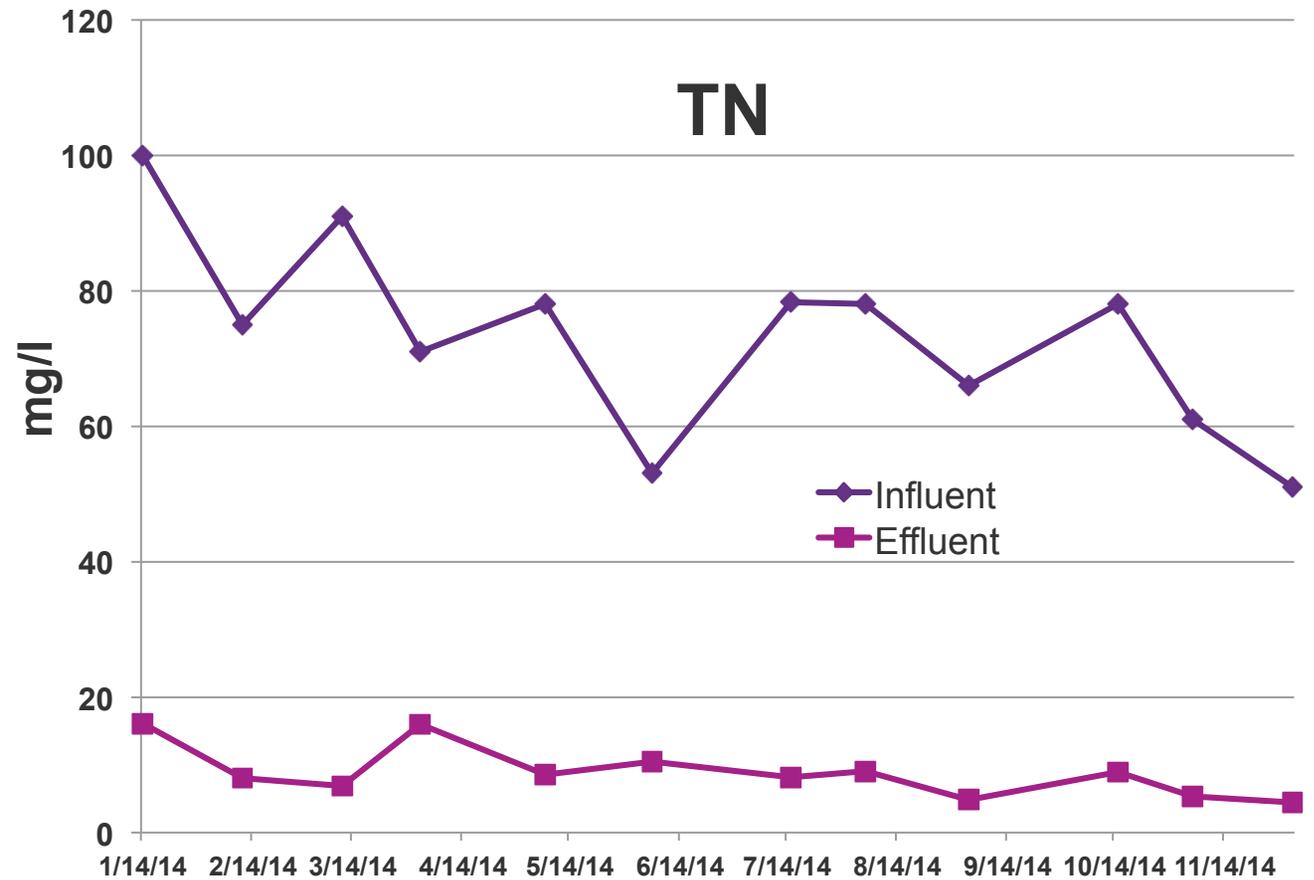


- Commissioned Oct, 2013
- Non compliant RBC Retrofit
- 25,000 GPD MDF
- PCI DOCS System for conc. O₂

Pilot Travel Center, MA



Pilot Travel Center, MA



**Napa
Berryessa, CA**

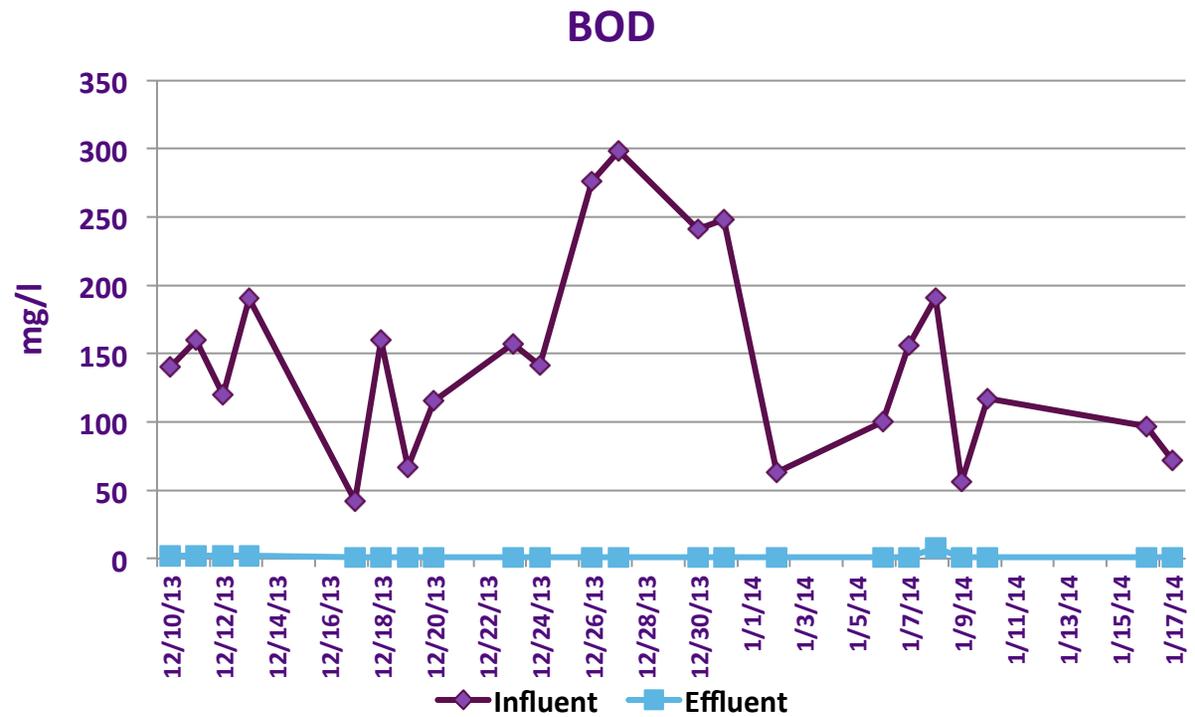


- Commissioned November, 2013
- microBLOX™ + stormBLOX™
- microBLOX™: 60,000 GPD
- stormBLOX™: 70,000 GPD
- Reuse Permit

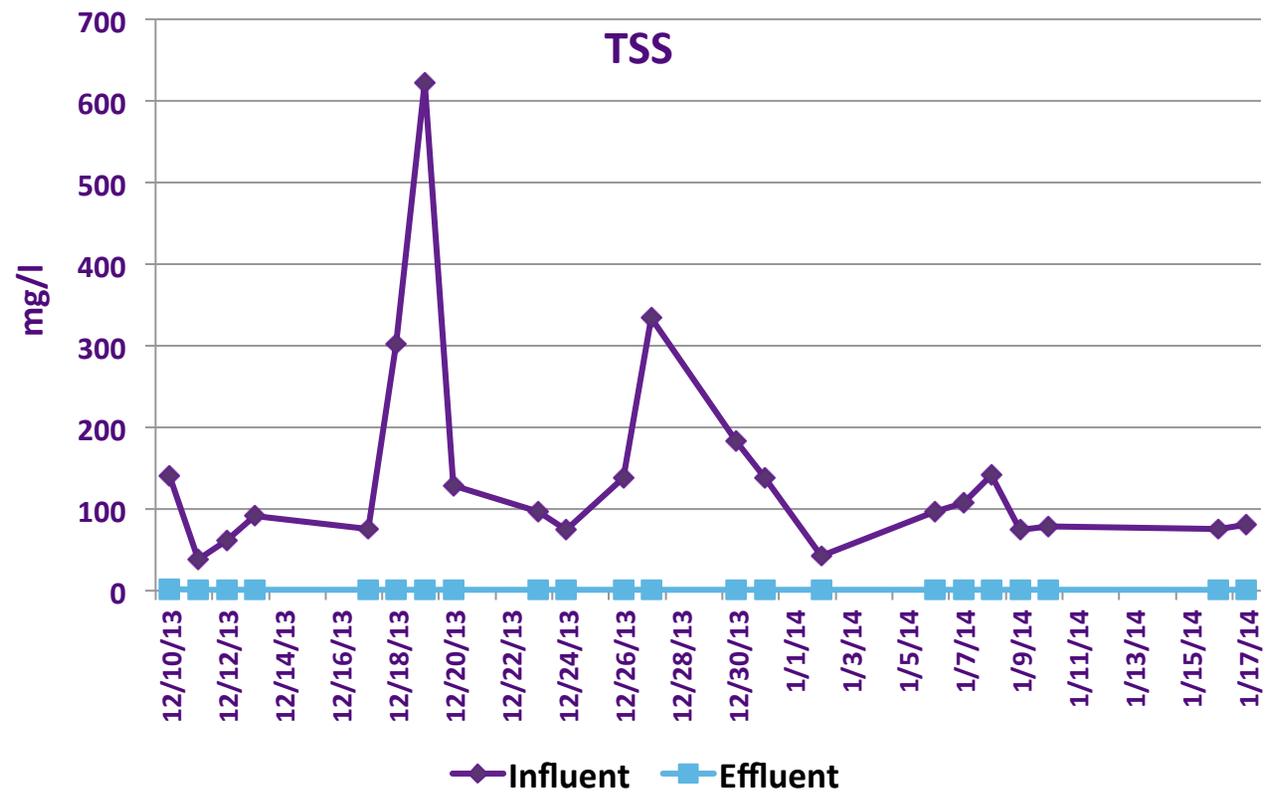
Napa Berryessa, CA



Napa Berryessa, CA



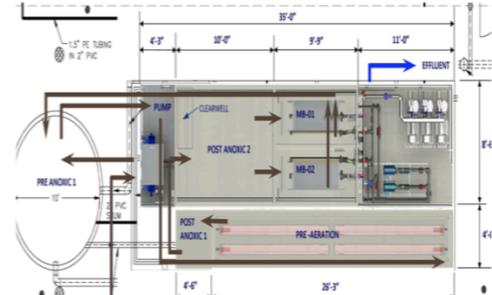
Napa Berryessa, CA



Recent Startups



Tech Central, MA



- Retrofit
- 24,000 GPD
- 4 Stage

Storm King School, NY

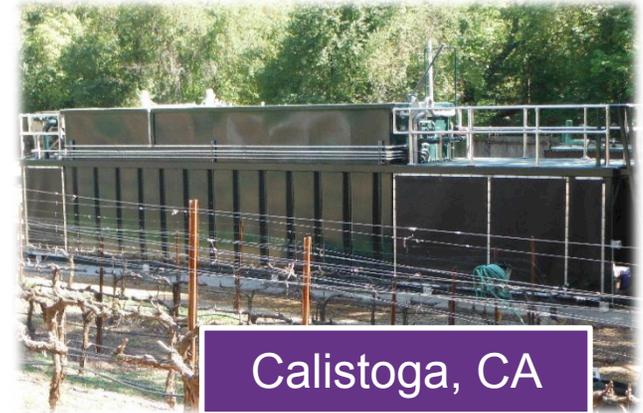


- 60'x20' Building
- 40,000 GPD
- Single Stage

Additional Installations



Turks & Caicos Resort



Calistoga, CA



Tule River, CA



Jackson Hole, WY



- Established
- Flexible
- Integrated WAS
- BulletProof™
- Lowest Constructed Cost

THANK YOU

