



Bay area water/wastewater workforce reliability

WATER INDUSTRY SUMMIT

SESSION 2

CLIMATE CHANGE: FROM REACTING TO RESILIENCE



BAYWORK Water Industry Summit

Session Two: Climate Change

Catherine Curtis, San Francisco Public Utilities Commission, Moderator

Panelists:

- Eric Dunlavey, Pedro Hernandez (City of San Jose)
- David Glukowski, Sarah Plummer (East Bay Municipal Utility District)
- Anna Roche (San Francisco Public Utilities Commission)
- Sasha Ponomareva, Dale Roberts (Sonoma County Water Agency)
- Sunshine Julian, Kirsten Struve (Valley Water)



Climate Change

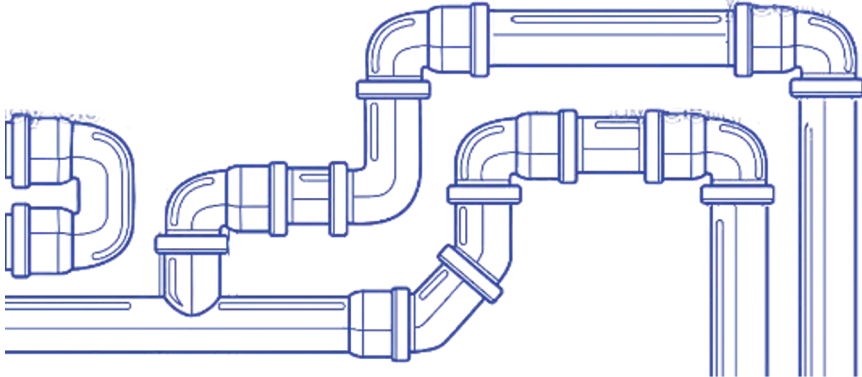
Climate Change significantly impacts water and wastewater and is a serious threat. Today we will examine the risks, impacts, and possible mitigations.

Water and Climate Change are inextricably linked.

Climate Change Adaptation planning is needed.

Climate Change Risk

- ❑ Changing precipitation patterns,
- ❑ Sea level rise and saltwater intrusion,
- ❑ Impact on Water Quality,
- ❑ Infrastructure Damage,
- ❑ Operational Disruptions,
- ❑ And there are many others...
- ❑ Climate Change Adaptation Planning is needed!





Sonoma Water

SERVING THE COMMUNITY SINCE 1949

Climate Action at Sonoma Water

Sasha Ponomareva, Climate Resilience Program Manager

Dale Roberts, Principal Engineer

27 February 2025

BAYWORK Water Industry Summit



sonomawater.org



Who is Sonoma Water?

Core Functions:

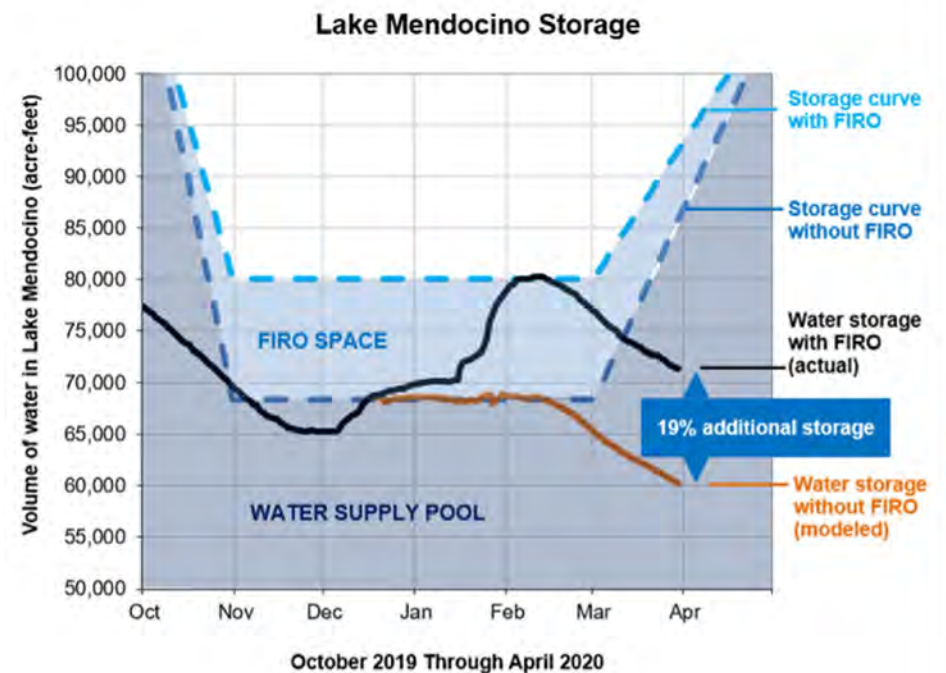
- Wholesale water supplier
- Flood protection services
- Wastewater sanitation



Forecast-Informed Reservoir Operations (FIRO)

- (WATER) Increase Operational Flexibility of Water Management Facilities
- (FLOOD) Improve Operations of Flood and Water Management Facilities

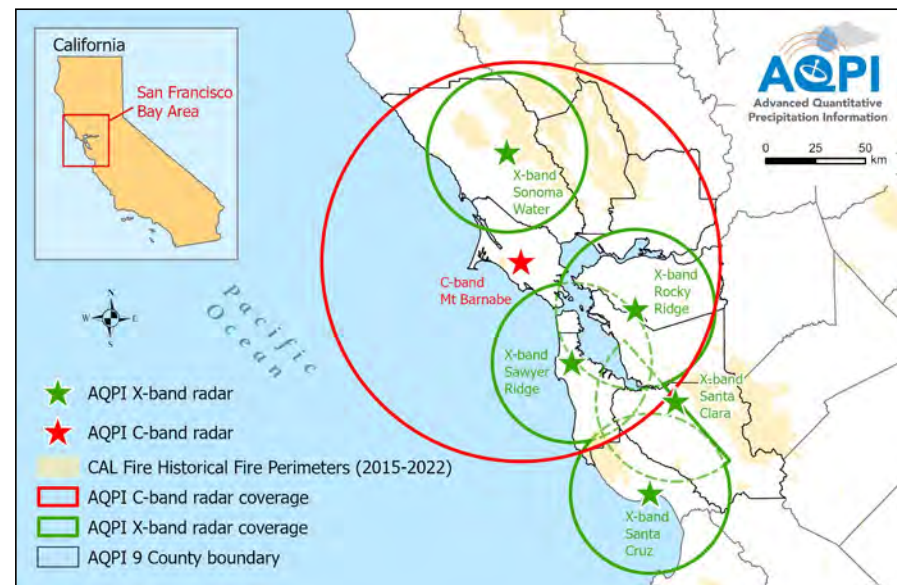
A flexible water management approach that uses data from watershed monitoring and improved weather forecasting to selectively retain or release water from reservoirs



Advanced Quantitative Precipitation Information (AQPI)

- (WATER, FLOOD) Advance Science and Technology

A regional weather prediction system that uses enhanced weather radar to track precipitation associated with atmospheric rivers.



SFPUC Core Services

Water



HETCH HETCHY
RESERVOIR
Delivering high quality water every day

Power



SOLAR PANELS AT SAN FRANCISCO
AIRPORT
Generating clean energy for vital
City services

Sewer



OCEANSIDE TREATMENT PLANT
Protecting public health and
the environment

SFPUC Wastewater System

3 Treatment Facilities
27 Pump Stations
1,000+ Miles of Pipes
40 Billion Gallons Treated/Year
100-Year-Old System

OCEANSIDE
TREATMENT PLANT



NORTH POINT
WET-WEATHER
FACILITY



SOUTHEAST
TREATMENT PLANT

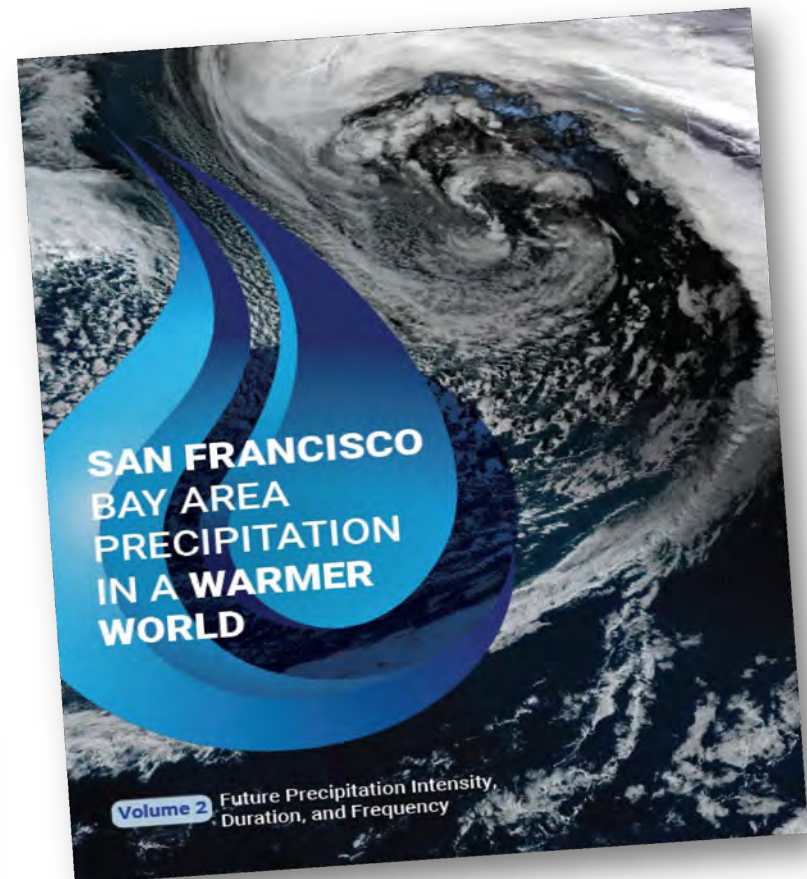


**Some of the greatest challenges
facing our systems are climate
related**

Flooding



Extreme Precipitation Modeling Study – data needed to develop adaptation strategies



Even bigger increase for smaller storms

	Changes in 5-year Return Period	100-year Return Period
2050	+ 17% for 24-hour duration + 21% for 3-hour duration (+ 17% for Extreme Storms)	+ 22% for 24-hour + 26% for 3-hour duration (+ 17% for Extreme Storms)
2100	+ 41% for 24-hour duration + 57% for 3-hour duration (+37% for Extreme Storms)	+ 51% for 24-hour duration + 67% for 3-hour duration (+37% for Extreme Storms)

Key Takeaways

Extreme storms will drop more rain in a shorter period

Smaller storms will increase even more than extreme storms

SFPUC wastewater system cannot manage these changes alone

Sea Level Rise



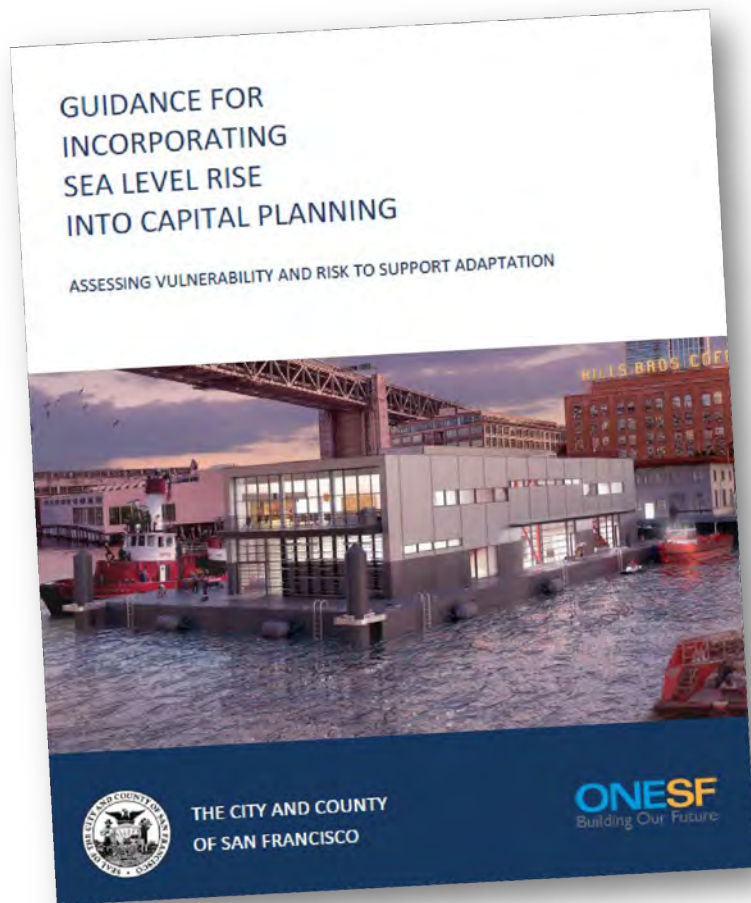


San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

Up to 6 Feet of Water from Sea Level Rise by 2100



Sea Level Rise Guidance & Checklists




ONESF
 Building Our Future

CAPITAL PLANNING PROGRAM

Guidance for Incorporating Sea Level Rise into Capital Planning in San Francisco
 Sea Level Rise Checklist (Version 3.0 Nov 2020)

This checklist should be used in conjunction with the Sea Level Rise (SLR) Guidance document ("Guidance") for use by City departments to guide the evaluation of capital planning projects with respect to sea level rise.

Pre-Checklist Conditions
 The checklist is only required if the following 3 conditions are ALL met. If the answer is 'No' to ANY of these questions, do not complete the SLR checklist at this time. Retain page 1 of the checklist for your project records.

- Project has a location identified (some projects are so early in planning that they do not yet have a specific location within CCSF). Yes ☐ No ☐
- Project is within the SLR Vulnerability Zone. Yes ☐ No ☐
 (Please review the "SLR Vulnerability Zone Map" at: <https://data.sfgov.org/SLR-Vulnerability-Zone/>)
- Anticipated total project costs equal or exceed 5 million dollars. Yes ☐ No ☐

Only projects answering 'yes' for questions 1, 2 AND 3 must complete the following checklist. As noted above, if the answer to questions 1, 2 OR 3 is 'No', the SLR checklist does not need to be submitted. However, it is recommended that the project manager retain this document in their project records.

Preparer and Project Information

Department Name:	
Project Name:	
Project ID:	
Name of Project Mgr:	
Name of Preparer:	
Dept. Director:	
Date prepared:	

Ocean Beach Climate Change Adaptation Project

Project Cost: ~\$275M

- Protects critical wastewater infrastructure from sea level rise
- 3000 ft. buried sea wall with coastal multi-use trail and beach access





San Francisco
WaterPowerSewer
Services of the San Francisco Public Utilities Commission

Port Waterfront Resilience Program

THE PORT OF SAN FRANCISCO

WATERFRONT RESILIENCE PROGRAM

THE PORT OF SAN FRANCISCO manages 7.5 miles of bayside shoreline that is home to some of the region's most popular open spaces and attractions, a national historic district, hundreds of small businesses, nearby housing, and maritime and industrial uses. The Port's jurisdiction includes transportation networks like BART and Muni, critical utilities including drinking and wastewater, and key emergency response facilities. The Port's Waterfront Resilience Program efforts ensure the waterfront, and its important regional and citywide assets, are resilient in the face of hazards such as earthquakes, flooding, sea level rise due to climate change, shoreline erosion, and others.

WATERFRONT RESILIENCE PROGRAM FRAMEWORK

THE PORT DEVELOPED a Waterfront Resilience Framework to address immediate hazards including seismic and flooding, as well as longer term hazards like sea level rise. This adaptive planning framework allows the Port to act now to address risks to life safety and emergency response, while planning for mid- and long-term risks. It also allows the Port to be responsive to community priorities, changes in science, and funding and partnership opportunities.

STRENGTHEN

Immediately implement highest priority disaster response and life safety projects.

ADAPT

Identify policies and projects that will result in a Port that is resilient to seismic and increasing flood risks, and responsive to changing priorities.

ENVISION

Develop visions that can respond to remaining seismic risk and increasing flood risks and long-term sea level rise.

The Port's Waterfront Resilience Program involves close coordination with other City department and regional partners to ensure the work aligns with Citywide and regional guidance, policies, projects, and other efforts.



PORT-WIDE

Strengthen, Adapt, and Envision

Flood Study

Floodproofing the Piers

Project SLR Adaptations

Utilities Projects

Waterfront Plan

EMBARCADERO

Embarcadero Seawall Program

Historic Pier Rehabilitation

MISSION CREEK / MISSION BAY

Southern Waterfront Seismic Vulnerability Assessment

ISLAIS CREEK / BAYVIEW

Islais Creek Adaptation Strategy

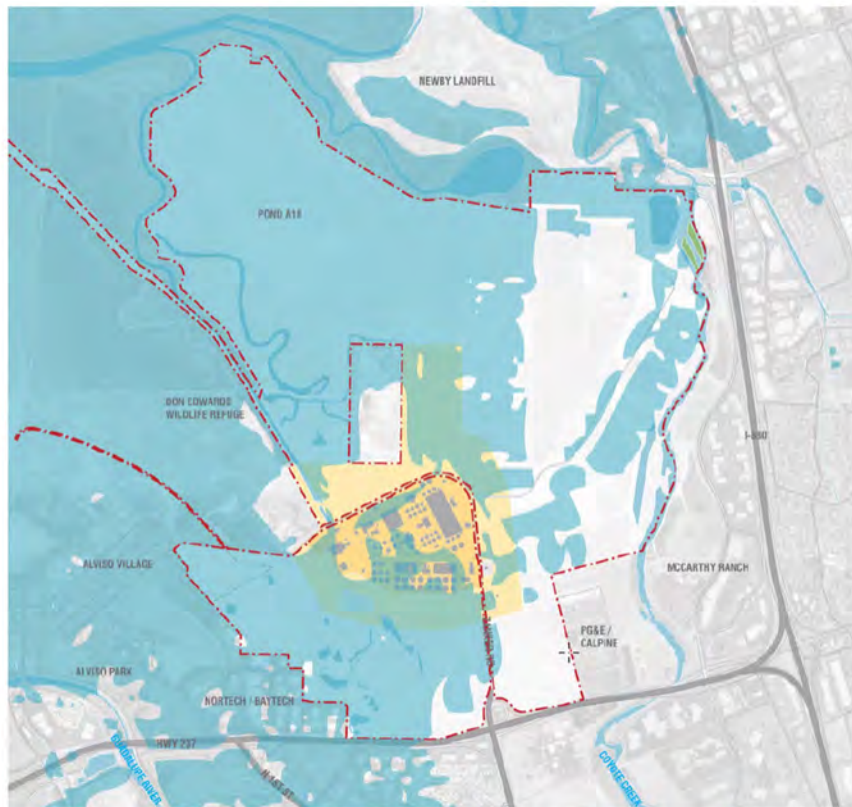
Southern Waterfront Seismic Vulnerability Assessment

Climate Change Adaptation: Developing a Local Drought Resilient Water Supply and Protecting against Sea Level Rise

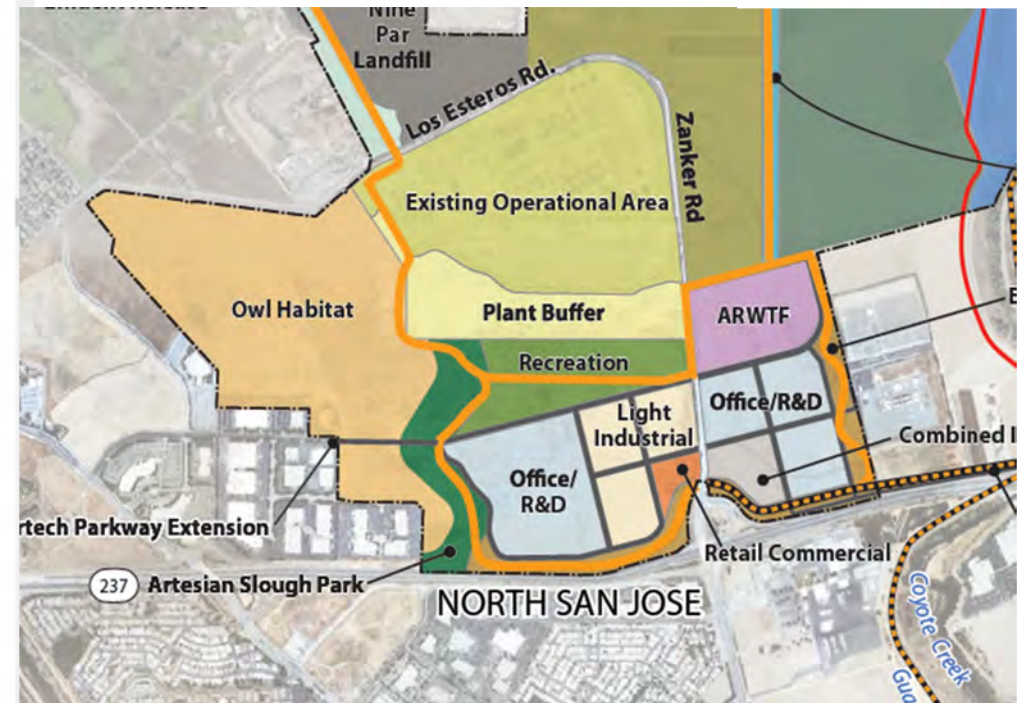
COLLABORATING FOR A SUSTAINABLE WATER FUTURE



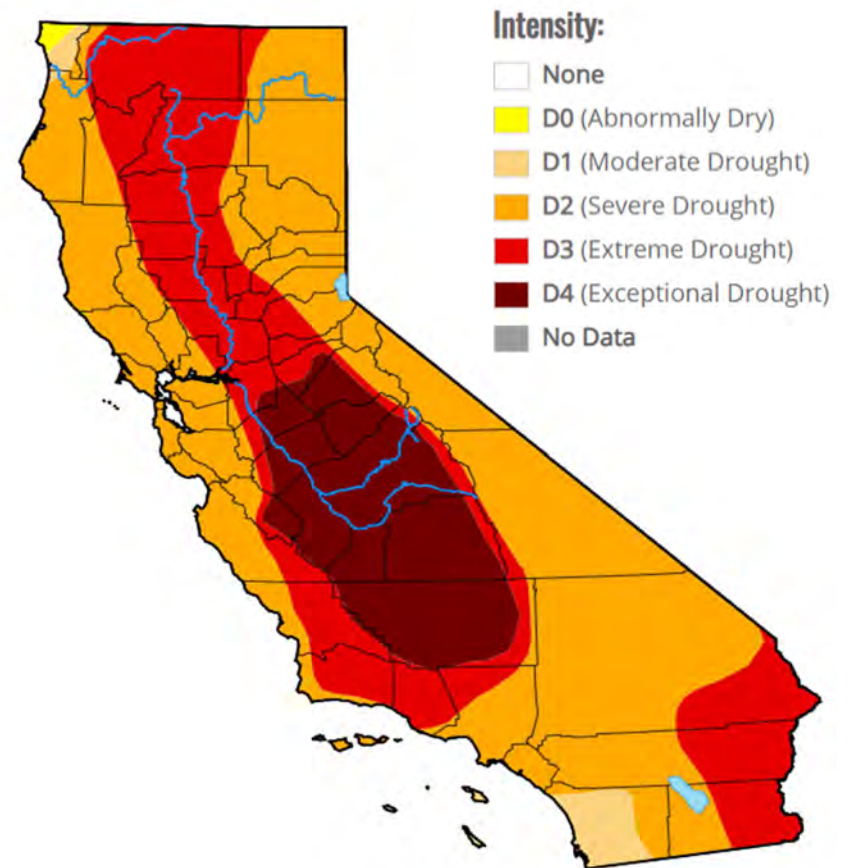
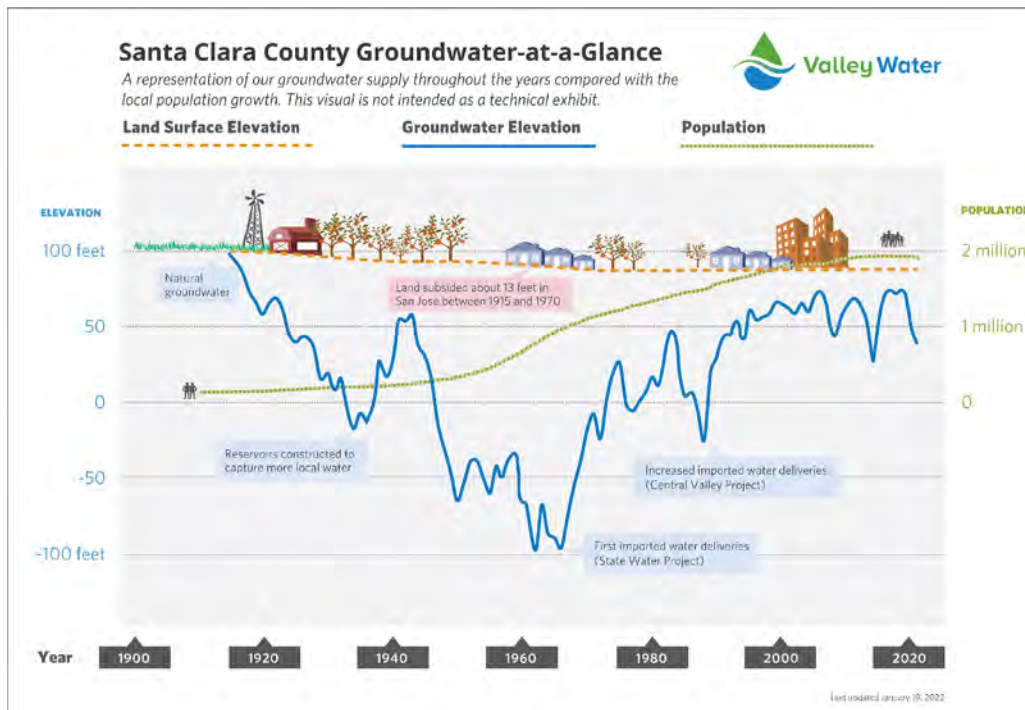
Sea Level Rise and Using Treated Wastewater



Sea-level rise estimates clearly show that the Plant is at risk from tidal flooding from a higher San Francisco Bay.



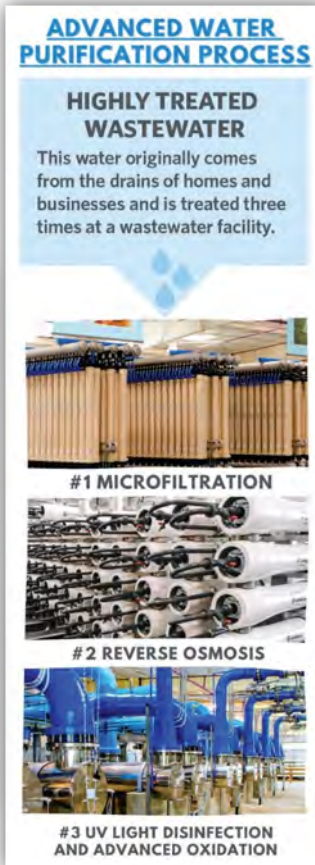
DROUGHTS AND CLIMATE CHANGE



**U.S. Drought Monitor -
2023**

A new source of water: the long-term solution

A partnership with cities of San Jose and Santa Clara



- Opened in early 2014
- Takes treated wastewater from SJ-SC Regional Wastewater Facility
- Provides purified water to enhance the quality of nonpotable recycled water
- Serves as a demonstration, research, and educational facility
- Hosts educational tours provided on-site and virtual

Water Reuse & The Water Reuse Master Plan

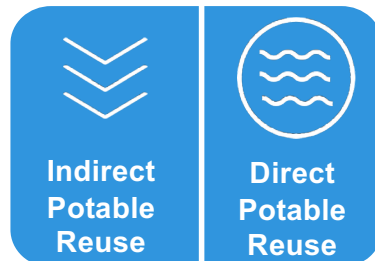
Ensuring Water Reliability

Water Reuse

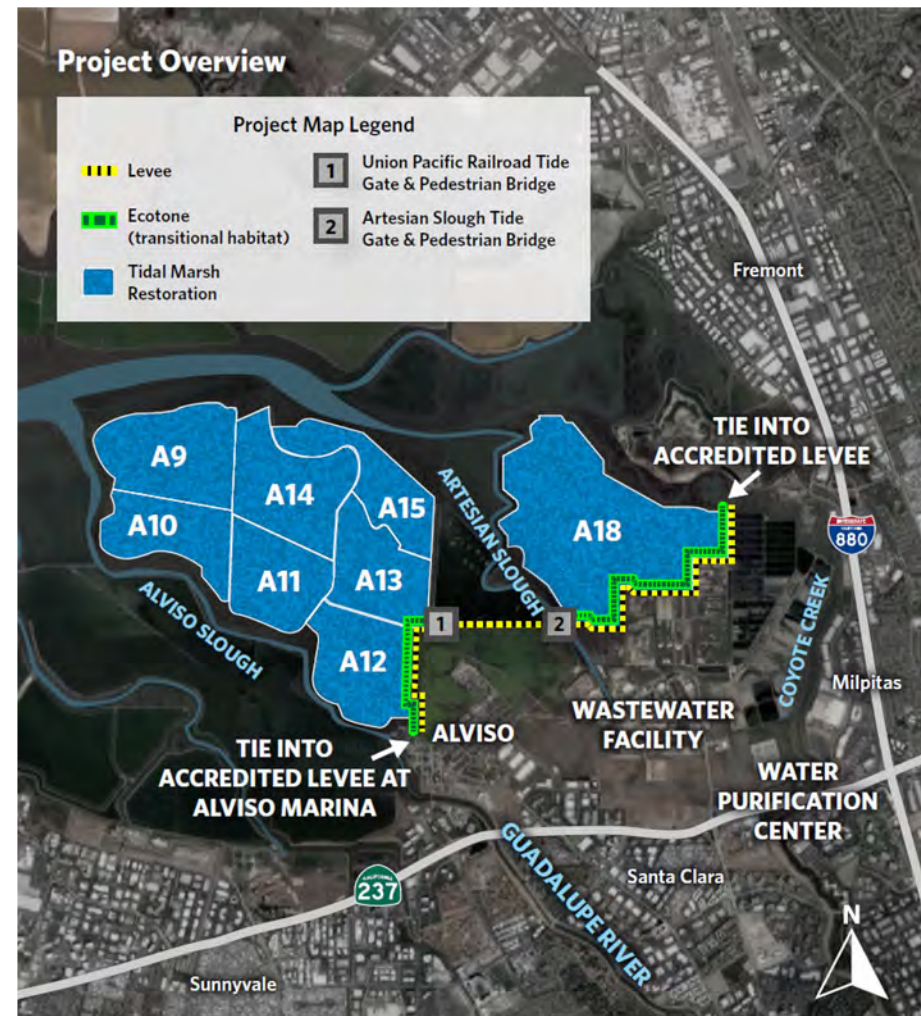
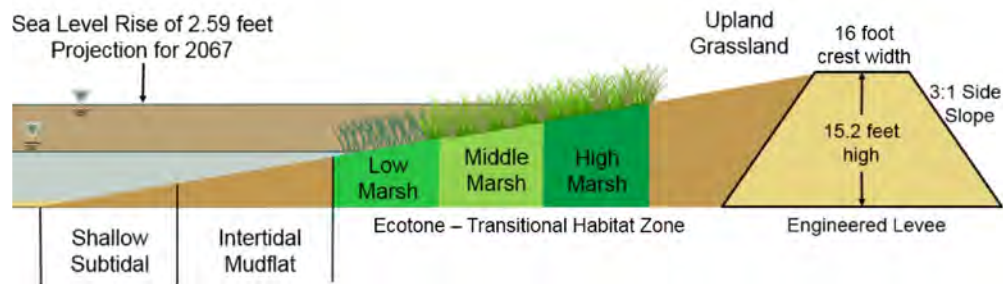
Potable reuse:
recycled water
people can drink



Non-Potable
recycled water used
for commercial
agriculture, parks,
commercial
landscaping, etc.



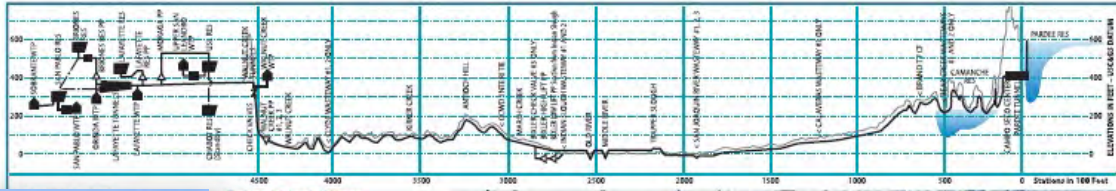
South San Francisco Bay Shoreline Phase I





- **Operational Effects of Climate Change on Water Treatment and How EBMUD is Planning For It**
- February 27, 2025

Overview of EBMUD Water System

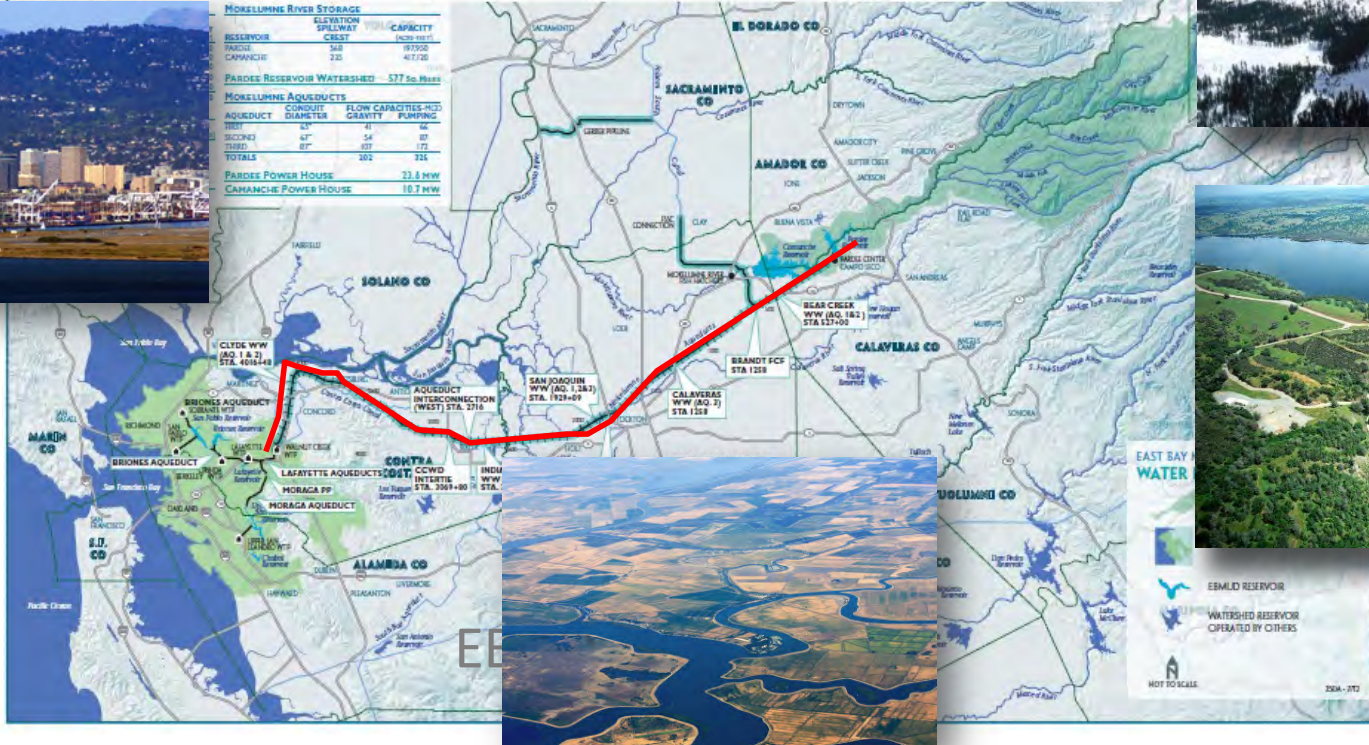


MOKELEMUNE RIVER STORAGE		
RESERVOIR	ELEVATION SPILLWAY CHST	CAPACITY (ACRE-FT)
PARDEE	548	197320
CAMACHIE	233	417720

PARDEE RESERVOIR WATERSHED 577 sq. miles

MOKELEMUNE AQUEDUCTS		
AQUEDUCT	CONDUIT DIAMETER	FLOW CAPACITIES-400 GAL. MIN. PUMPING
TRF#1	35"	41
TRF#2	36"	54
TRF#3	48"	173
TOTALS		268

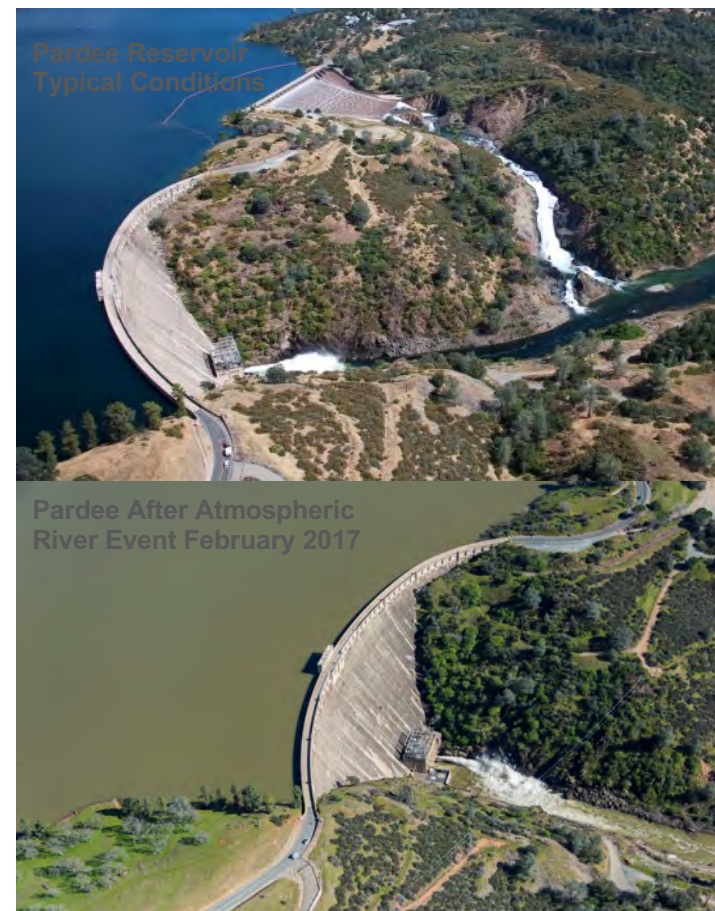
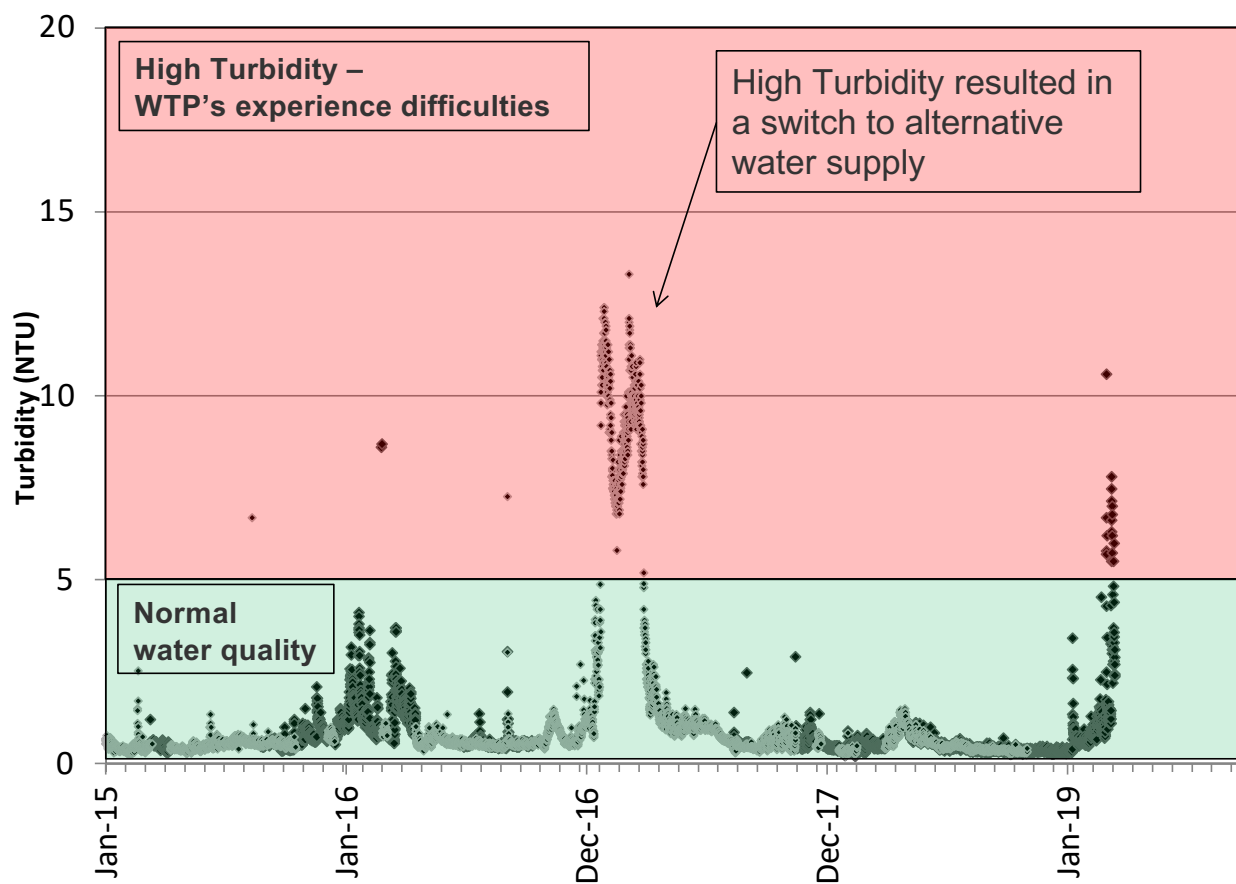
PARDEE POWER HOUSE 23.6 MW
CAMACHIE POWER HOUSE 107.1 MW



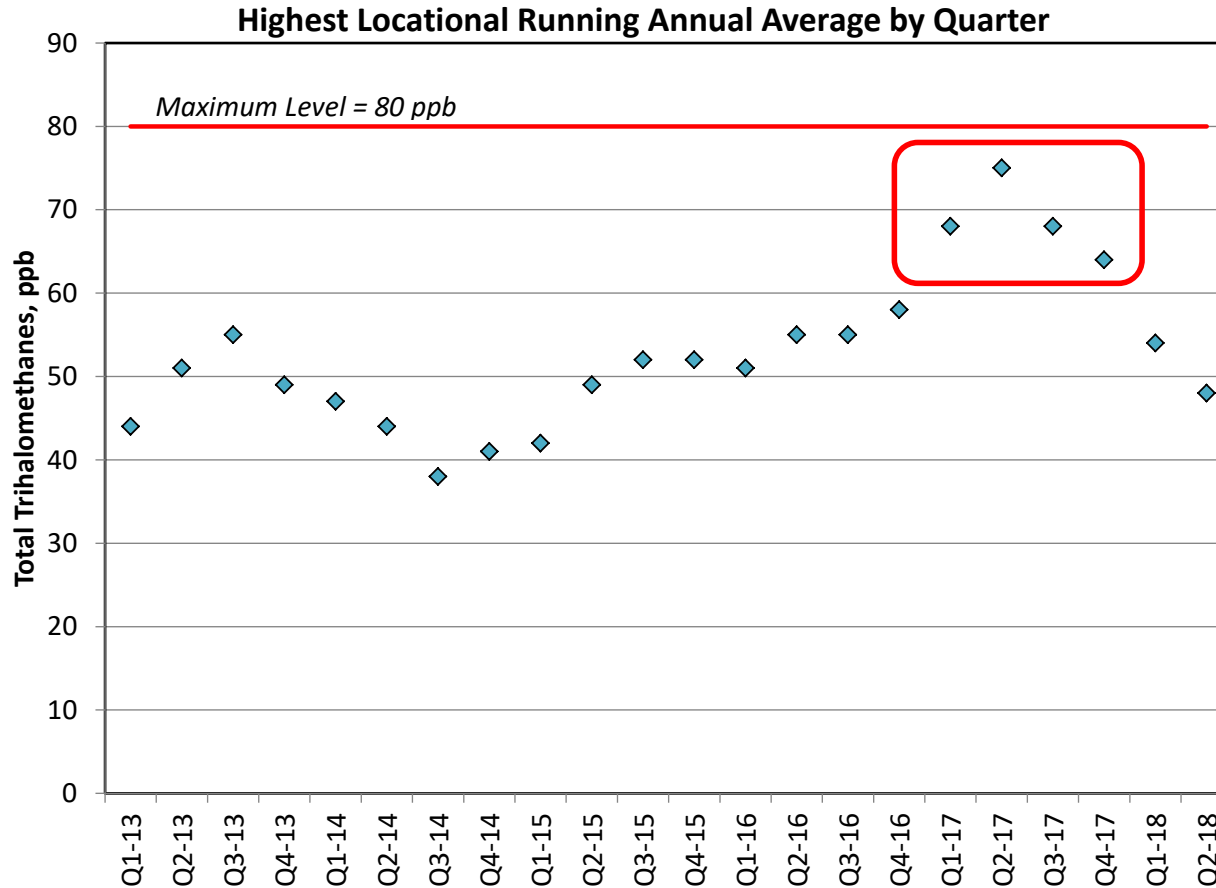
What do EBMUD WTPs look like?



- High Intensity Storms – High Influent Turbidity



Drought + Aqueduct Chlorination = More DBPs



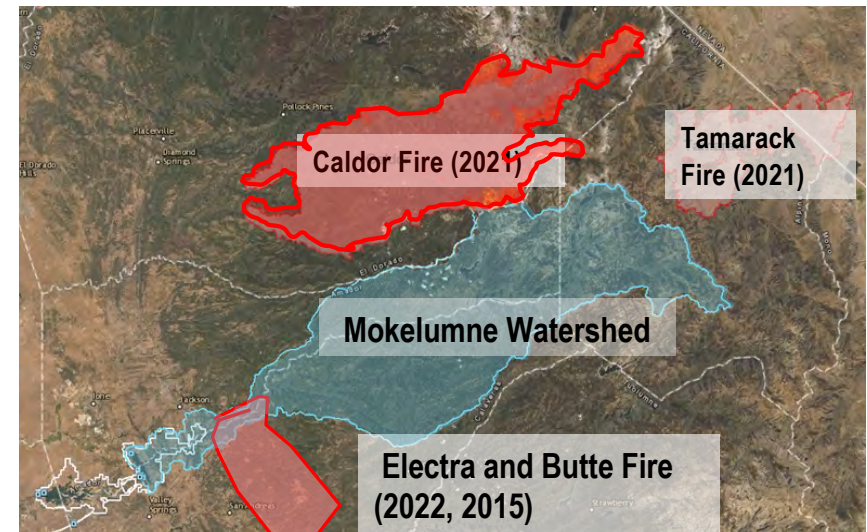
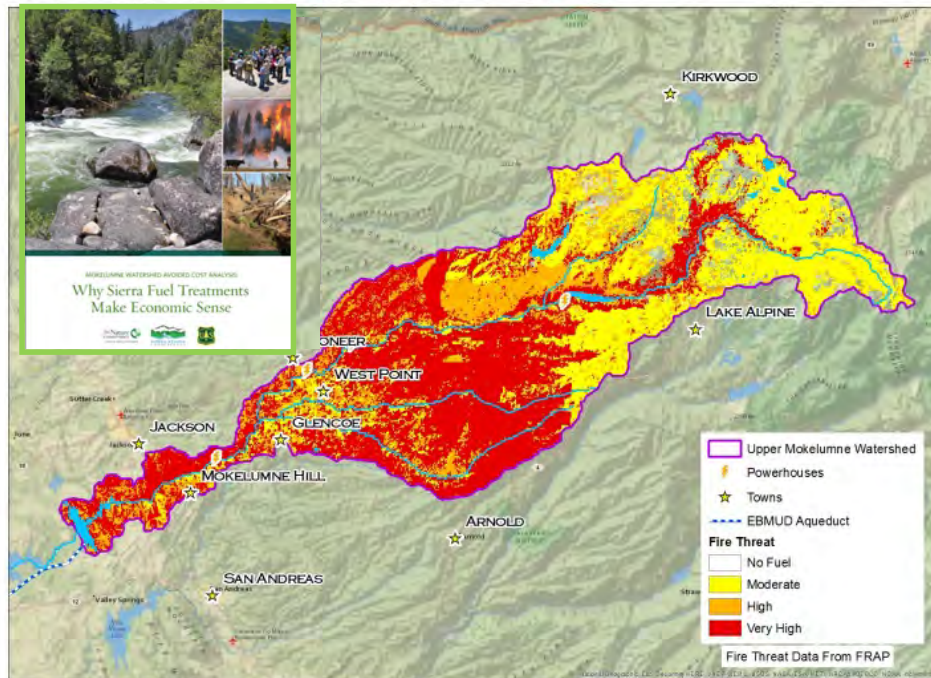
How safe is your East Bay drinking water?



Mokelumne Watershed Fire Hazard



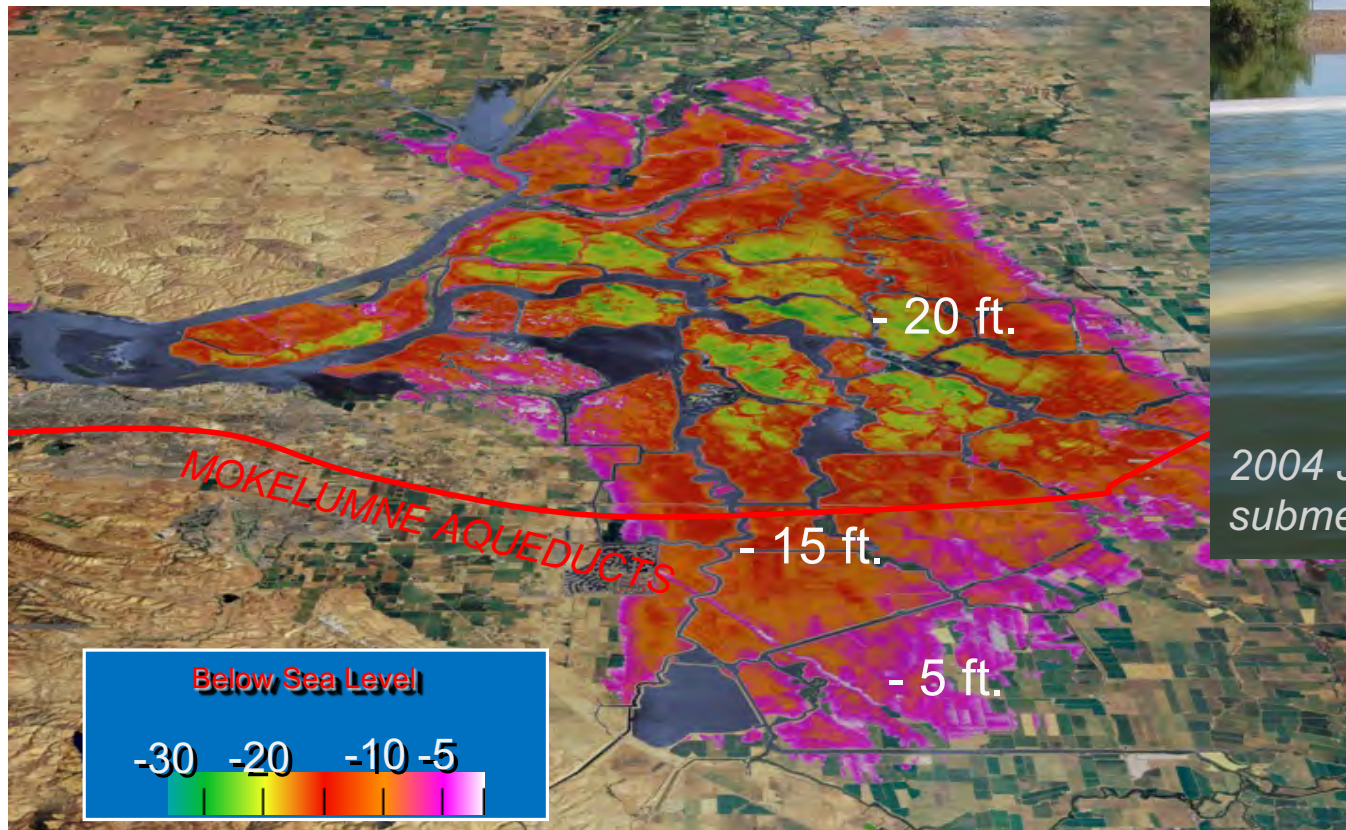
Figure ES-1. Fire hazard in the upper Mokelumne watershed



Recent Wildfires in the Mokelumne Watershed

- Elevated sediments and organic carbon would flow into Pardee Reservoir.
- Water would be untreatable by the District's Inline WTPs for multiple years.

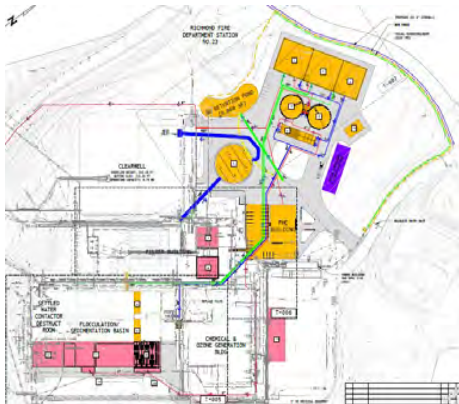
- Mokelumne Aqueducts Below Sea Level and Protected by Levees



How Are We Preparing?



- Water Supply Diversification
- Water Treatment Improvements
- Infrastructure Hardening
- Watershed Management



- Summary of Existing WTP Process



Treatment Step	<u>Orinda</u>	<u>Walnut Creek</u>	<u>Lafayette</u>	<u>Sobranite</u>	<u>USL</u>	<u>San Pablo</u>
Filter Pretreatment	Coagulation	Coagulation	Coagulation	Coagulation Flocculation Sedimentation	Coagulation Flocculation Sedimentation	Coagulation Flocculation Sedimentation
T&O Control/ Oxidation				Ozone & Peroxide	Ozone & Peroxide	
Filtration	Dual-Media	Dual-Media	Dual-Media	Dual-Media	Dual-Media	Dual-Media
Disinfection	Upstream Cl ₂	CCB	Upstream Cl ₂	Upstream Cl ₂	CCB	Upstream Cl ₂
Post-Treatment	Fluoridation Caustic Ammonia	Fluoridation Caustic Ammonia	Fluoridation Caustic Ammonia	Fluoridation Caustic Ammonia	Fluoridation Caustic Ammonia	Fluoridation Caustic Ammonia
Equalization	Claremont Tunnel	Clearwell	Mini Clearwell	Clearwell	Clearwell	Clearwell

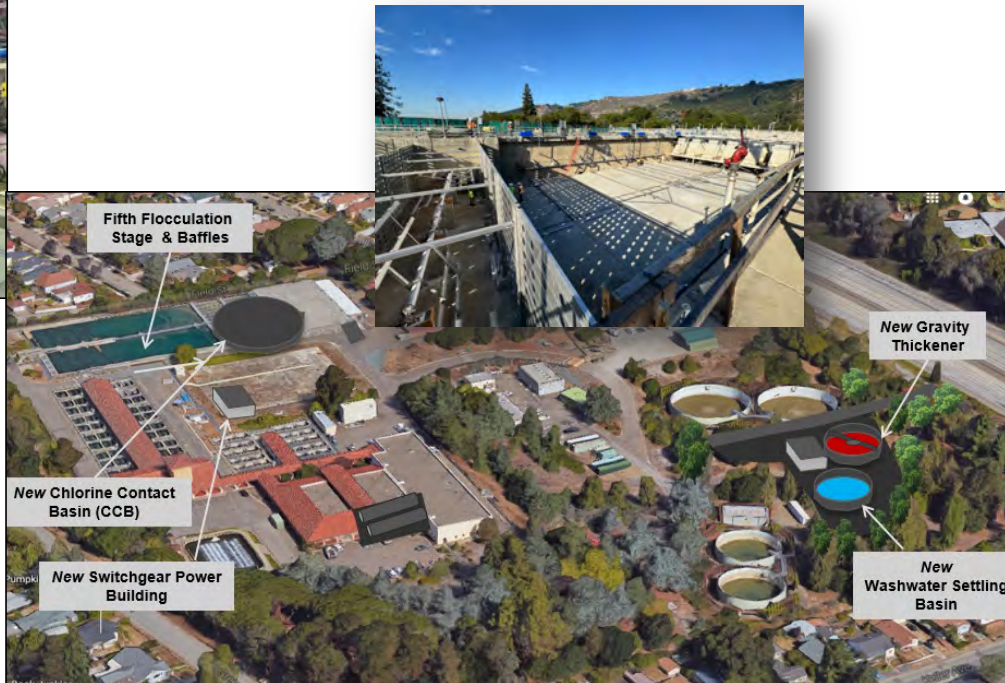
- Limited volume of supplemental water that can be treated at conventional WTPs
- Inline plants unable to treat supplemental water to District standards
- Lack of reliability for East of Hills System



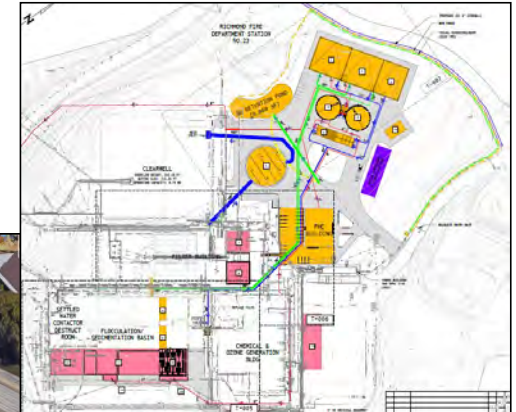
1. Improve Reliability, Capacity and Treatment Capabilities at Conventional WTPs



Upgraded and Increased Dosage for 120 MGD of Ozone and Peroxide Capacity (USL and Sobrante WTPs)

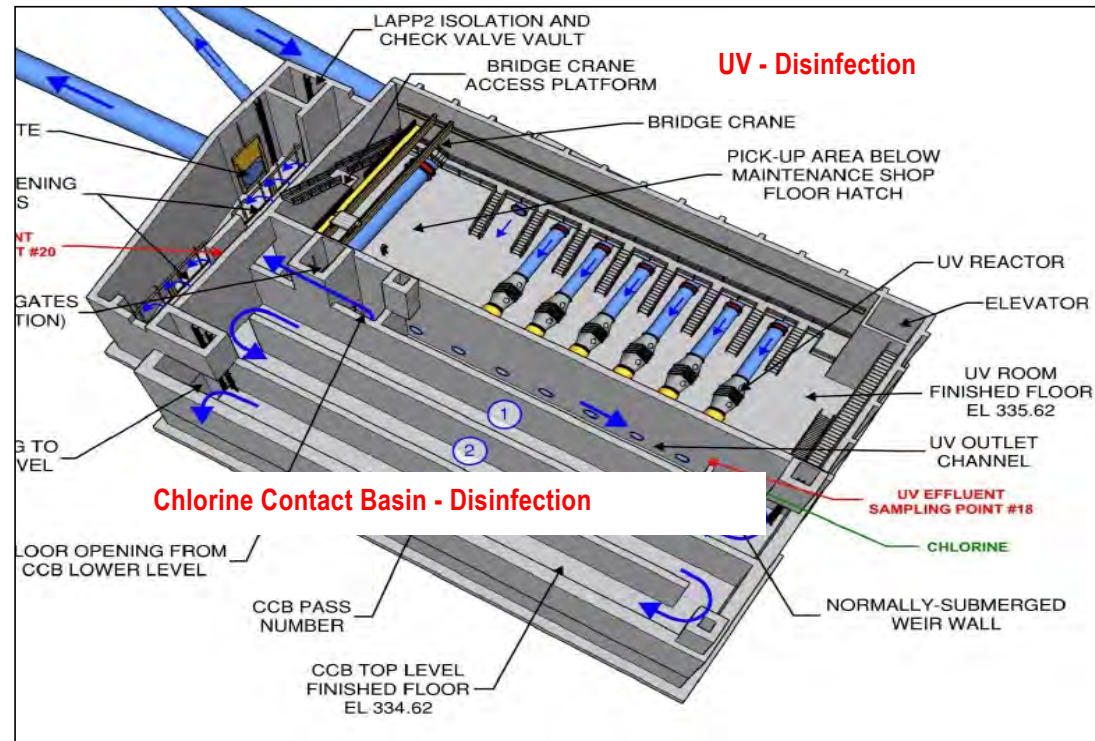
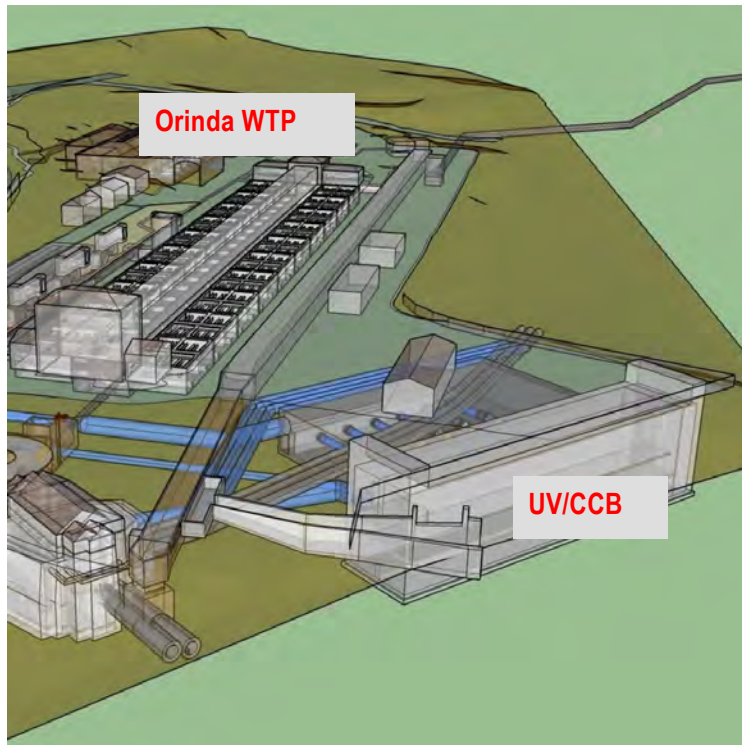


USL WTP Maintenance & Reliability and Chemical Systems Safety Improvements Project (*in construction*)



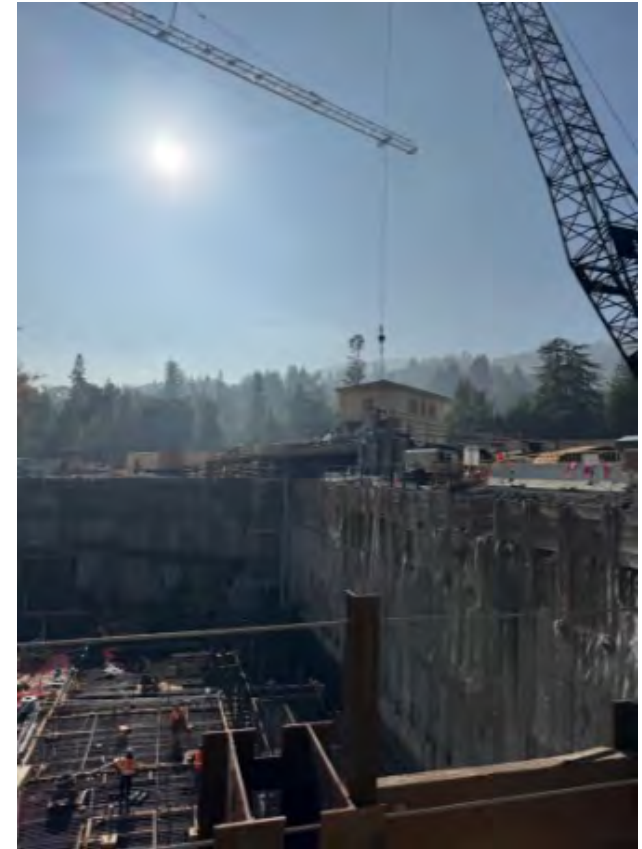
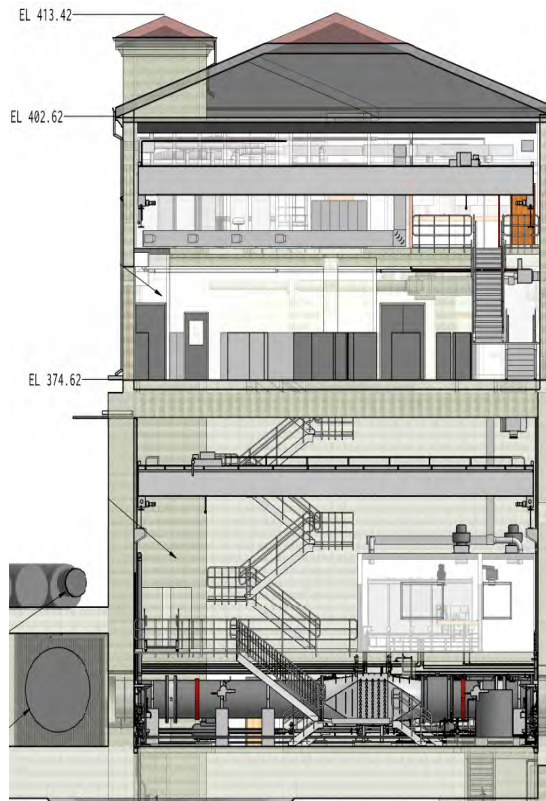
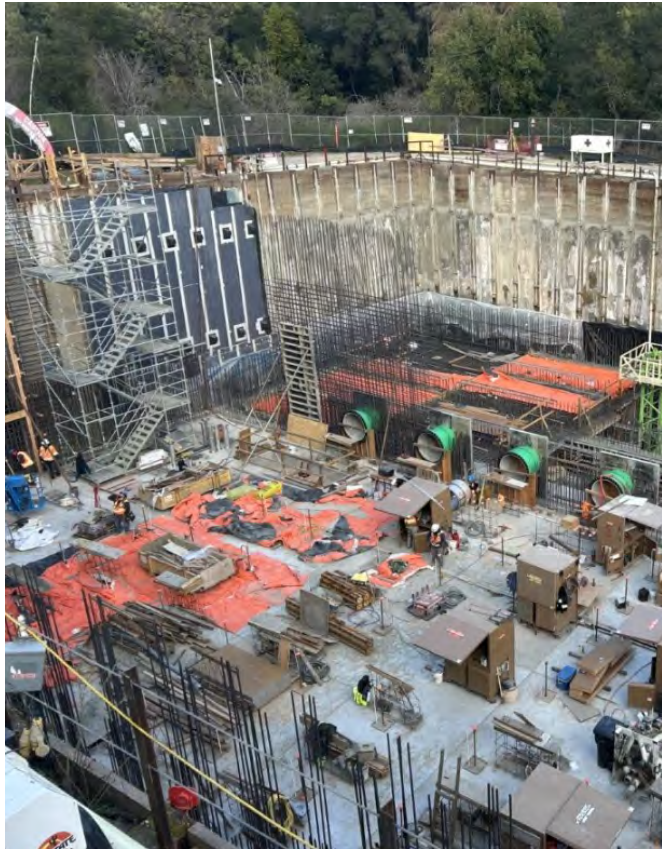
Sobrante WTP Reliability Improvements project (*future*)

- 2. Make Inline WTPs more Conventional – Pretreatment, Ozone, and Post-Filter Disinfection

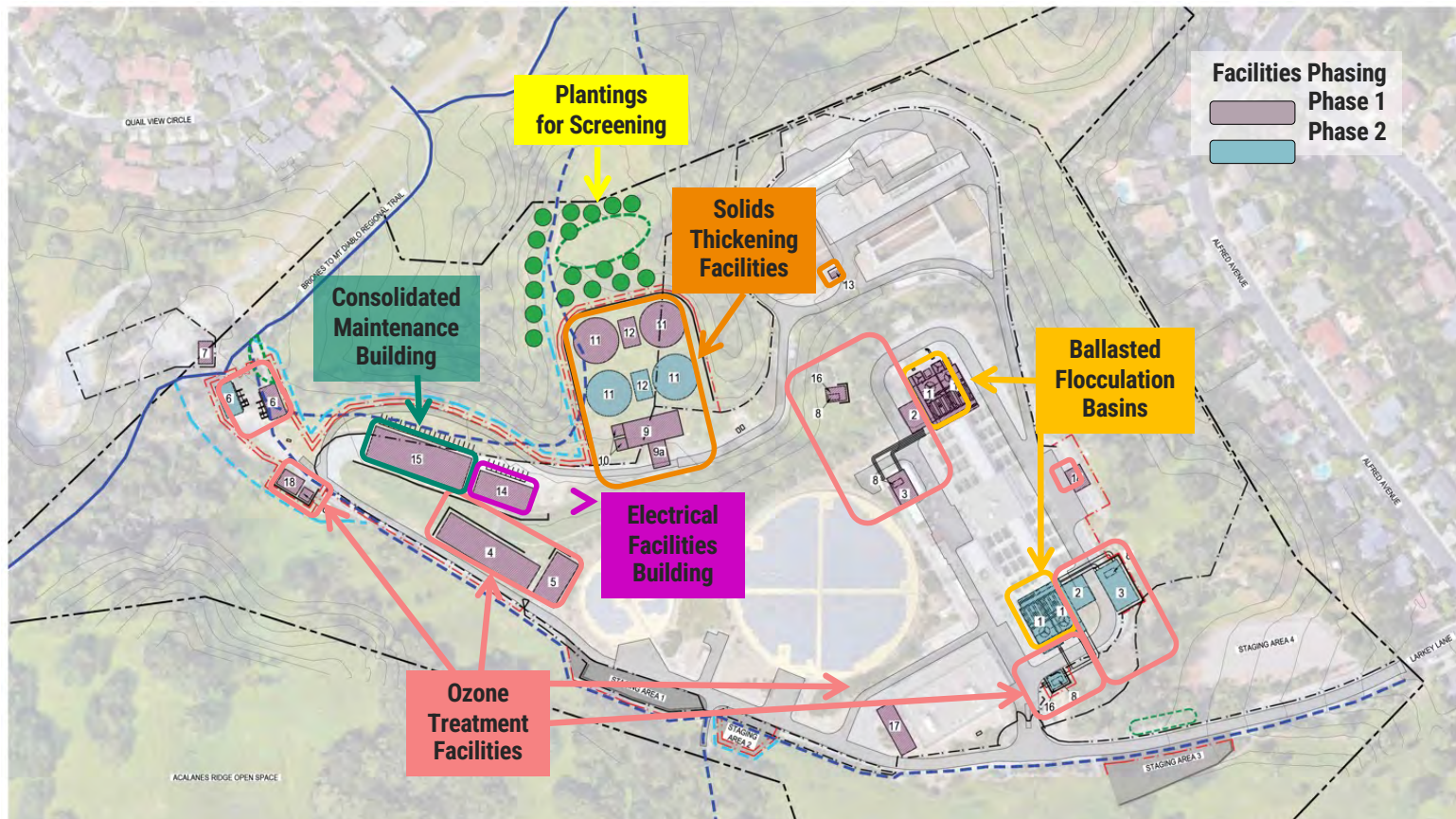


Orinda WTP Disinfection and Chemical Systems Safety Improvements Project (in construction)

- Orinda WTP Disinfection and Chemical Systems Safety Improvements Project - Construction



- 2. Make Inline WTPs more Conventional – Pretreatment, Ozone, and Post-Filter Disinfection



Walnut Creek WTP Pretreatment Project
(in design – construction estimated to begin 2029)

All WTPs will be Conventional to deal with WQ Challenges



Treatment Step Orinda Walnut Creek Lafayette Sobrante USL San Pablo

Filter Pretreatment	<u>Coagulation</u> <u>Ballasted Flocc</u> <u>Sedimentation</u>	<u>Coagulation</u> <u>Ballasted Flocc</u> <u>Sedimentation</u>	Coagulation Flocculation Sedimentation	Coagulation Flocculation Sedimentation	Coagulation Flocculation Sedimentation	Coagulation Flocculation Sedimentation
T&O Control/ Oxidation	<u>Ozone</u>	<u>Ozone</u>	DECOMMISSION	Ozone & Peroxide	Ozone & Peroxide	DECOMMISSION
Filtration	Dual-Media	Dual-Media		Dual-Media	Dual-Media	
Disinfection	<u>UV & mini CCB</u>	CCB		<u>CCB</u>	CCB	
Post-Treatment	Fluoridation Caustic Ammonia	Fluoridation Caustic Ammonia		Fluoridation Caustic Ammonia	Fluoridation Caustic Ammonia	
Equalization	Claremont Tunnel	Clearwell		Clearwell	Clearwell	

BAYWORK Water Industry Summit

Breakout Discussion Two: Climate Change

- ☐ Introductions – 5 min.
- ☐ Assign roles (note-taker/presenter) – 3 min.
- ☐ Review assignment – 2 min.
- ☐ Group discussion – 20 min.
- ☐ ID key points to share – 5 min.
- ☐ Present key points to the larger group – 20 min.

BAYWORK Water Industry Summit

Climate Change Table Assignment

Three Key Elements: Weather, Infrastructure, and Regulatory

Each group will focus on one element to answer the following questions.

Answer these questions:

- What is the one thing that each agency can take on that could improve your agencies climate resilience?
- What tools seem most compelling to you for our industry to use when planning for climate change?
- How does your agency educate staff about projects or initiatives related to climate change?



Bay area water/wastewater workforce reliability

WATER INDUSTRY SUMMIT

THANK YOU!!