



**BOARD OF DIRECTORS
EAST BAY MUNICIPAL UTILITY DISTRICT**

375 - 11th Street, Oakland, CA 94607

Office of the Secretary: (510) 287-0440

Notice of Special Meeting

**Wastewater Tour and Workshop
Tuesday, October 20, 2020
9:00 a.m.
*Virtual***


At the call of President Marguerite Young, a Special Meeting of the Board of Directors of the East Bay Municipal Utility District has been set for 9:00 a.m. on Tuesday, October 20, 2020.

Due to COVID-19 and in accordance with the most recent Alameda County Health Order, and with the Governor's Executive Order N-29-20 which suspends portions of the Brown Act, **this meeting will be conducted via webinar and teleconference only**. In compliance with said orders, a physical location will not be provided for this meeting. These measures will only apply during the period in which state or local public health officials have imposed or recommended social distancing.

The Board will meet in workshop session to receive a staff presentation on the facilities and infrastructure at the Main Wastewater Treatment Plant located at 2020 Wake Avenue in Oakland, CA.

The Board will be taking no action at this meeting.

Dated: October 15, 2020



Rischa S. Cole
Secretary of the District

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AGENDA
Special Meeting
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Board Members will participate by webinar or teleconference

*****Please see appendix for public participation instructions*****

ROLL CALL:

PUBLIC COMMENT: The Board of Directors is limited by State law to providing a brief response, asking questions for clarification, or referring a matter to staff when responding to items that are not listed on the agenda.

DISCUSSION:

1. Workshop and staff presentation on facilities and infrastructure at EBMUD's Main Wastewater Treatment Plant located at 2020 Wake Avenue, Oakland, CA

ADJOURNMENT:

Disability Notice

If you require a disability-related modification or accommodation to participate in an EBMUD public meeting please call the Office of the Secretary (510) 287-0404. We will make reasonable arrangements to ensure accessibility. Some special equipment arrangements may require 48 hours advance notice.

Document Availability

Materials related to an item on this Agenda that have been submitted to the EBMUD Board of Directors within 72 hours prior to this meeting are available for public inspection in EBMUD's Office of the Secretary at 375 11th Street, Oakland, California, during normal business hours.



Special Meeting
Wastewater Tour and Workshop
October 20, 2020
9:00 a.m.

EBMUD public Board meetings will be conducted via Zoom.
Please note that Board meetings are recorded, live-streamed, and posted on the District's website.

Please visit this page beforehand to familiarize yourself with Zoom.
<https://support.zoom.us/hc/en-us/articles/201362193-Joining-a-Meeting>

Online

<https://ebmud.zoom.us/j/93305391846?pwd=Mjl4Z010OGhUZzAvQWZaMHdtd3pQZz09>

Webinar ID: 933 0539 1846

Passcode: 279816

By Phone

+1 669 900 6833

Webinar ID: 933 0539 1846

Passcode: 279816

International numbers available: <https://ebmud.zoom.us/u/adwSTkDTpU>

Providing public comment

The EBMUD Board of Directors is limited by State law to providing a brief response, asking questions for clarification, or referring a matter to staff when responding to items that are not listed on the agenda.

If you wish to provide public comment please:

- Use the raise hand feature in Zoom to indicate you wish to make a public comment
<https://support.zoom.us/hc/en-us/articles/205566129-Raising-your-hand-in-a-webinar>
 - If you participate by phone, press *9 to raise your hand
- When prompted by the Secretary, please state your name, affiliation if applicable, and topic
- The Secretary will call each speaker in the order received
- Comments on **non-agenda items** will be heard at the beginning of the meeting
- Comments on **agenda items** will be heard when the item is up for consideration
- Each speaker is allotted 3 minutes to speak; the Board President has the discretion to amend this time based on the number of speakers
- The Secretary will keep track of time and inform each speaker when his/her allotted time has concluded

To observe the Wastewater Tour and Workshop,
please visit: <https://www.ebmud.com/about-us/board-directors/board-meetings/>

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: October 15, 2020

MEMO TO: Board of Directors

THROUGH: Clifford C. Chan, General Manager *CCC*

FROM: Eileen M. White, Director of Wastewater *EMW*

SUBJECT: Virtual Wastewater Tour and Workshop – October 20, 2020

A virtual tour and workshop of the District's Main Wastewater Treatment Plant (MWWTP) will take place on October 20, 2020. The staff presentation, which is attached, includes a description of the treatment processes at the MWWTP; photos and descriptions of aging infrastructure; and the drivers for the Integrated MWWTP Master Plan, including aging infrastructure, seismic vulnerability, new regulations, climate change, and capacity.

The virtual tour and workshop focuses on the challenges of addressing the drivers while balancing competing priorities. The November 10, 2020 Infrastructure Workshop, which will also include information on the Water System infrastructure, will focus on solutions to the challenges and competing priorities facing the MWWTP.

CCC:EMW:mrh

Attachment

I:\SEC\2020 Board Related Items\102020 Special Meeting\WW –Virtual Wastewater Tour and Workshop.doc

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Virtual Wastewater Tour & Workshop

October 20, 2020

Goals

Virtual Tour
(Today)

Infrastructure Workshop
(Nov 10)



Presentation Outline



- 1 Drivers for the Master Plan
- 2 Wastewater Treatment Virtual Tour
(+ Many Extras)
- 3 Next Steps for the Upcoming
Infrastructure Workshop
- 4 Q&A

Previous Focus Plans



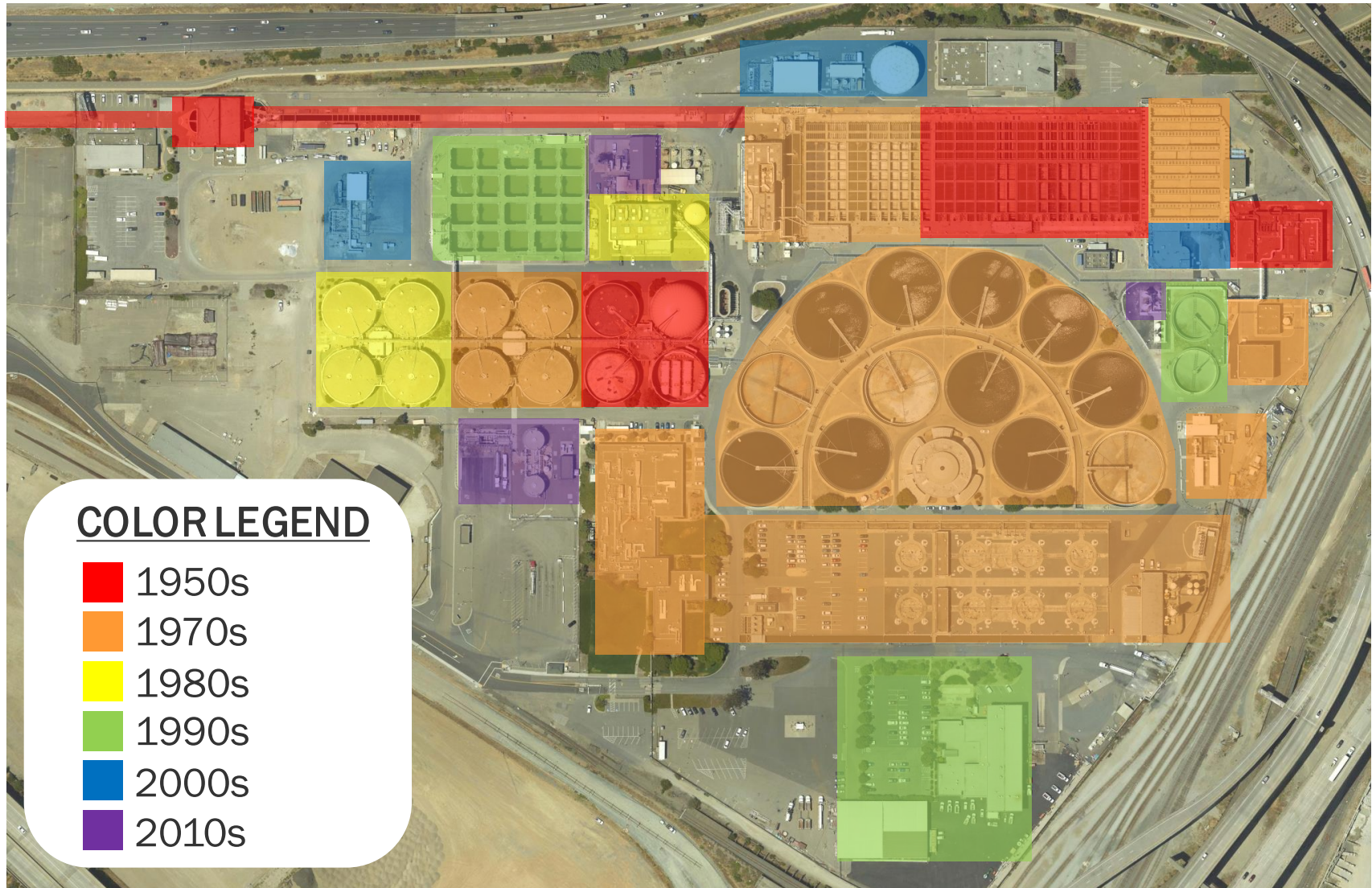
New Drivers



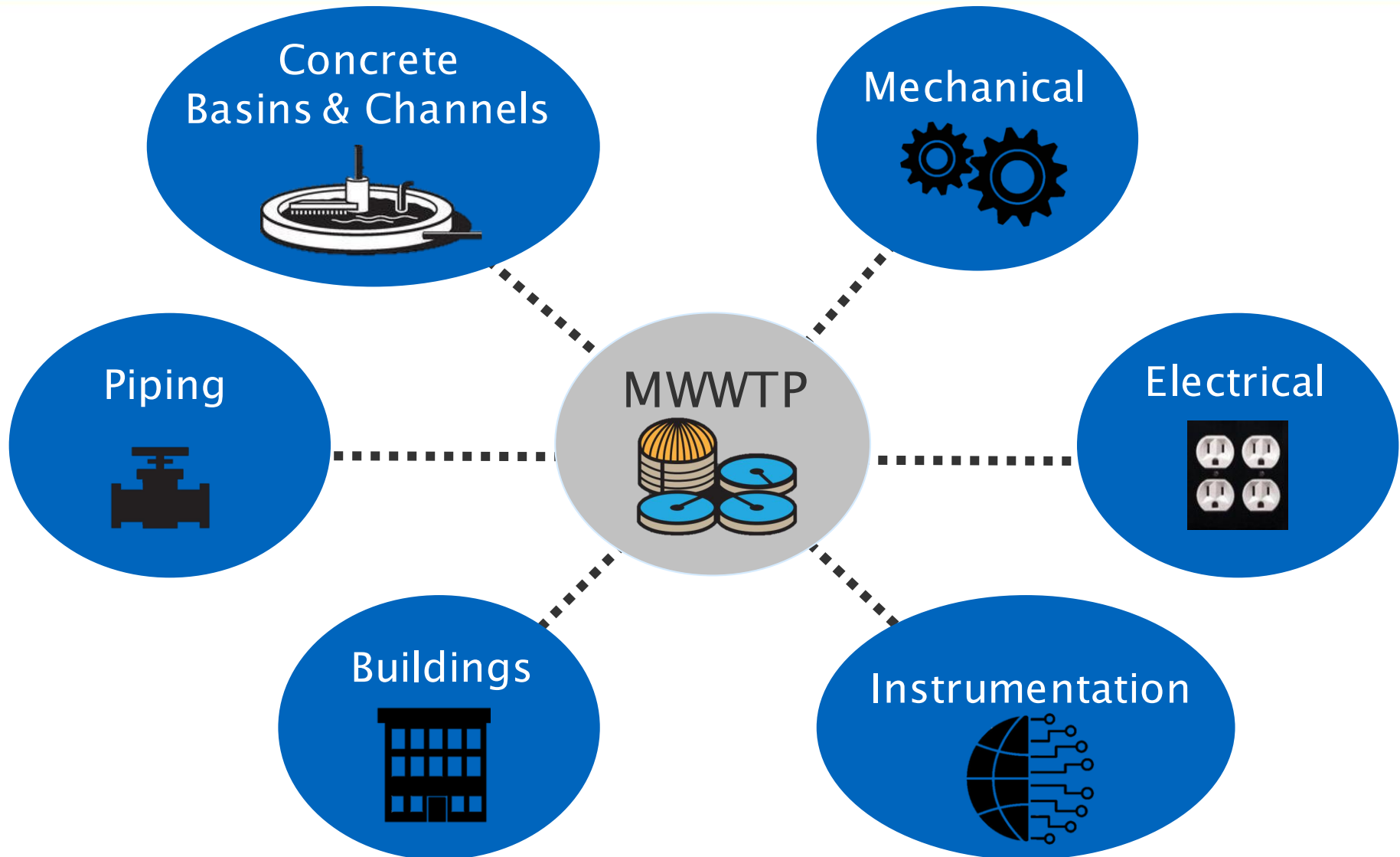
Aging Infrastructure



Aging Infrastructure



Many Types of Equipment



Condition Assessment: Overview



COMPLETED WORK

70 Years' Worth of
Infrastructure

950+ Assets >\$10k
Evaluated

Documented
In Database

Photo
O&M History
Desired improvements
Anecdotal info
Covered in CIP: yes/no

Electrical



Instrumentation



Concrete Structures



Mechanical



Tanks



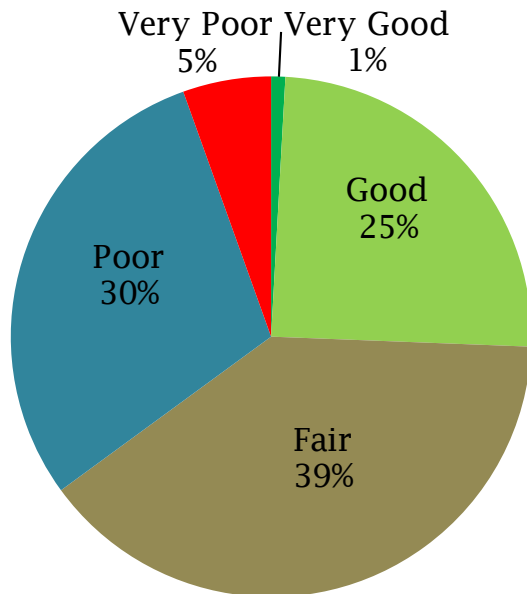
Buildings



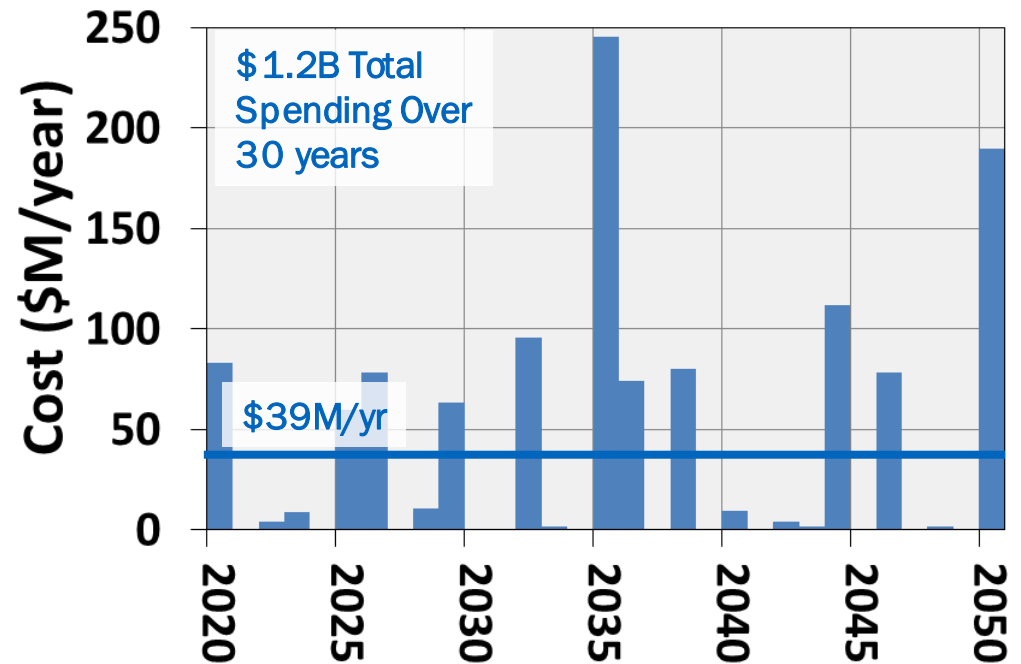
Condition Assessment: Major Findings



Condition Distribution
(By Monetary Value)



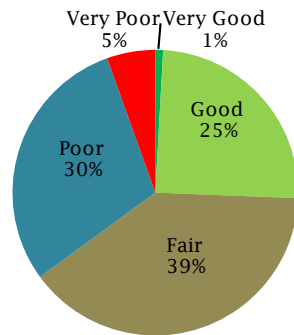
Business As Usual
Infrastructure Renewal Forecast



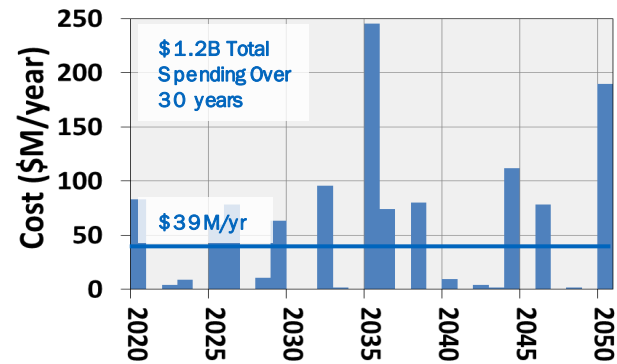
Condition Assessment: Major Findings



Condition Distribution
(By Monetary Value)



Business As Usual
Infrastructure Renewal Forecast



KEY TAKEAWAYS

- 1 Renewal forecast shows big spending milestones for maintaining business as usual...
- 2 ... yet does not take into account extra investments to address the new drivers.
- 3 Spending decisions must be strategic and consider the long term to make “no regrets” infrastructure investments.

New Drivers



**Aging
Infrastructure**

**Seismic
Vulnerability**

**Recycled Water
(2019)**

**Land Use
(1996 & 2011)**

**Energy System
(2012)**

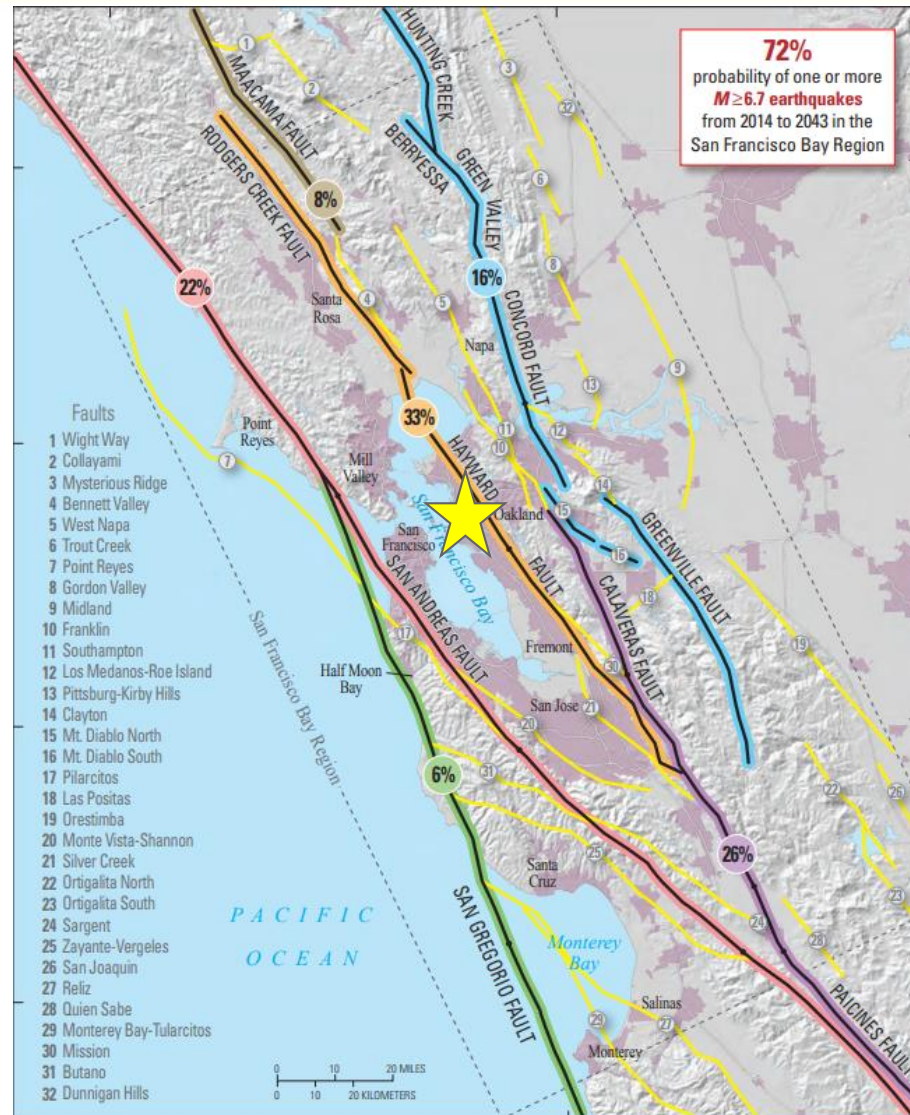
**Odor Control
(1998 & 2009)**

**Biosolids
(2004)**

**Sludge
Management
(1990)**

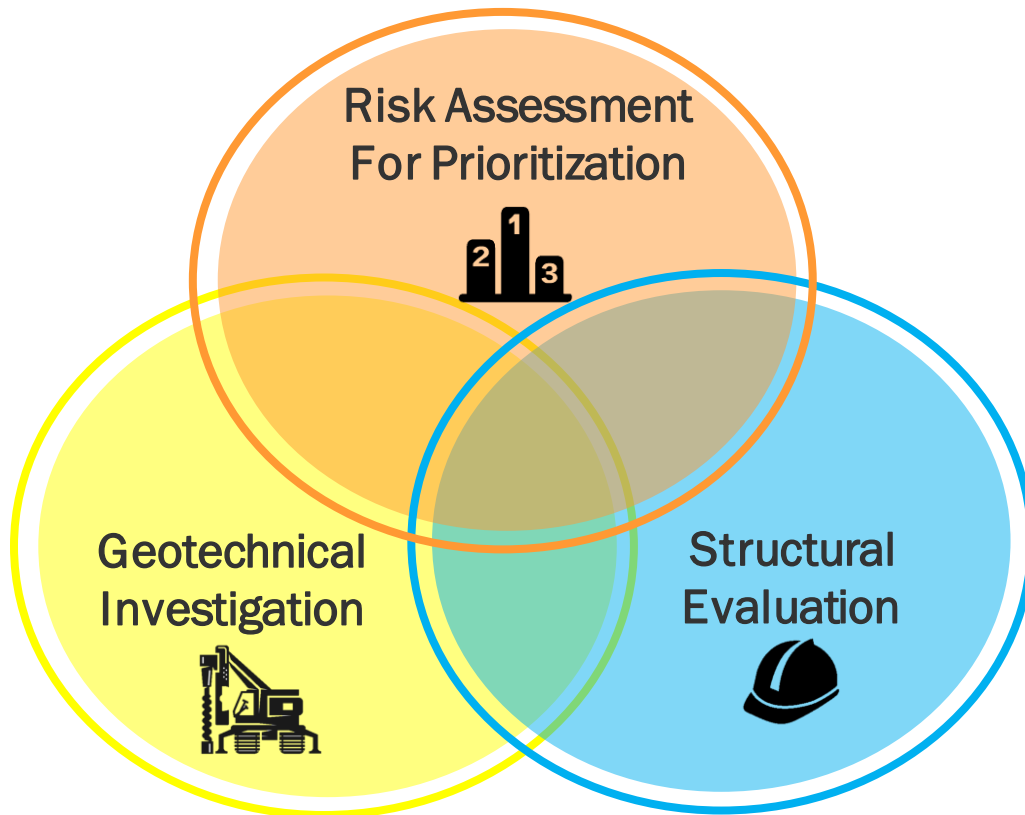
**Plant Property
(1990)**

Seismic Vulnerability



72% probability
of a **$\geq 6.7M$** earthquake
from **2014** through **2043**

Current Seismic Evaluation



HIGHLIGHTS

80

**Wastewater
Facilities**

Buildings
Concrete Basins
Concrete Channels
Pipe Chase
Pump Stations
Outfall

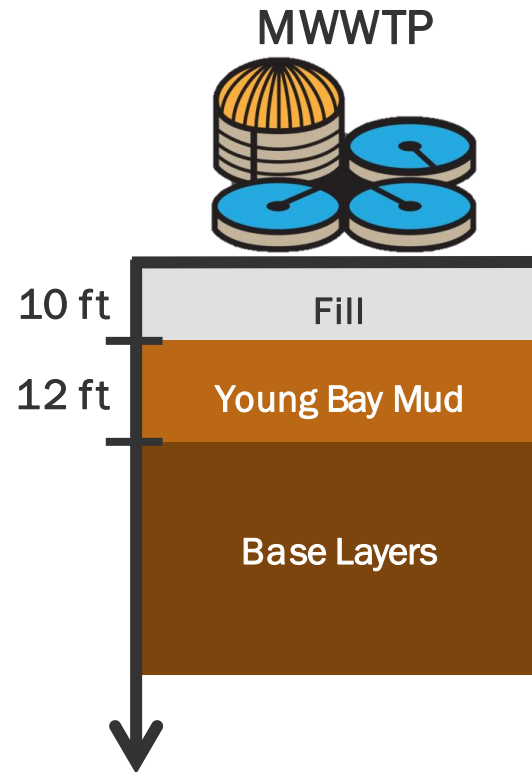
20

**Soil Borings &
CPT Tests**

Ongoing
Since

2016

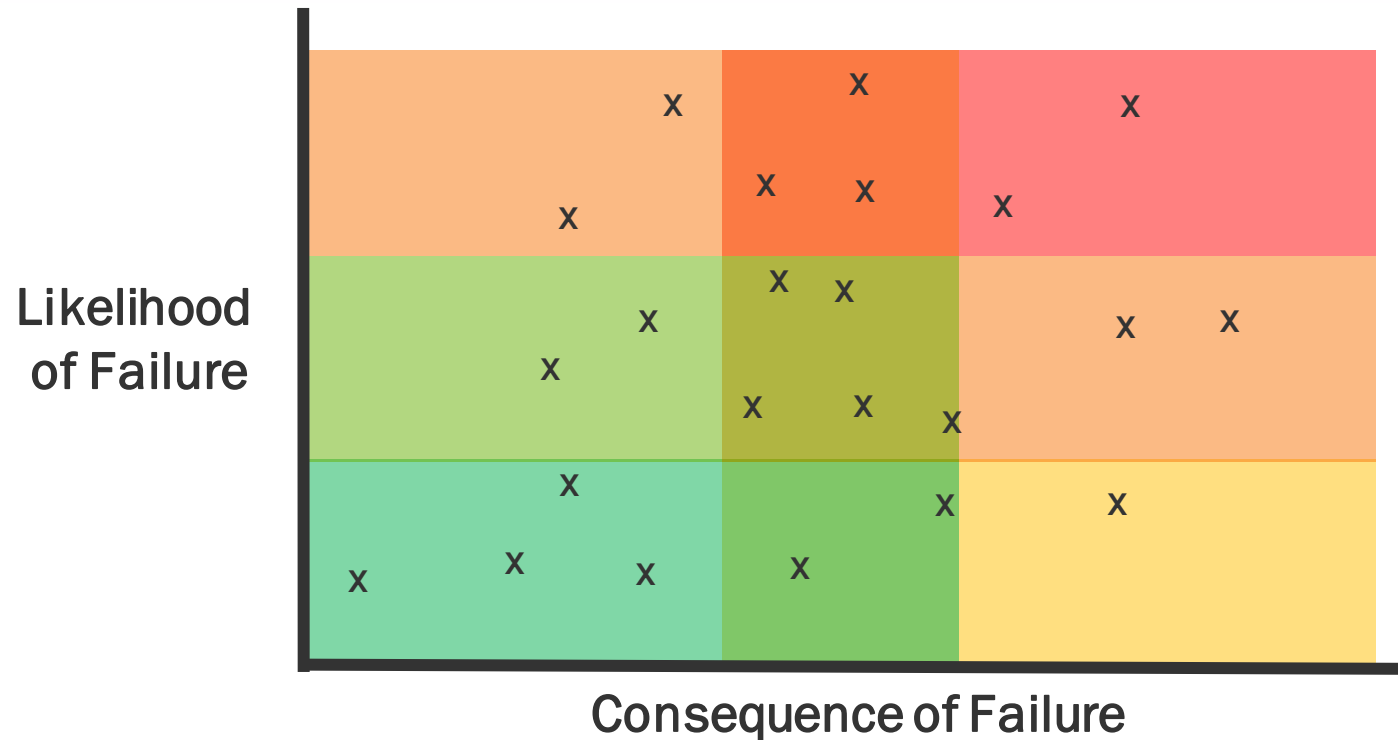
Soil Characterization



KEY TAKEAWAY

- 1 Structures need more than 22 ft of support.

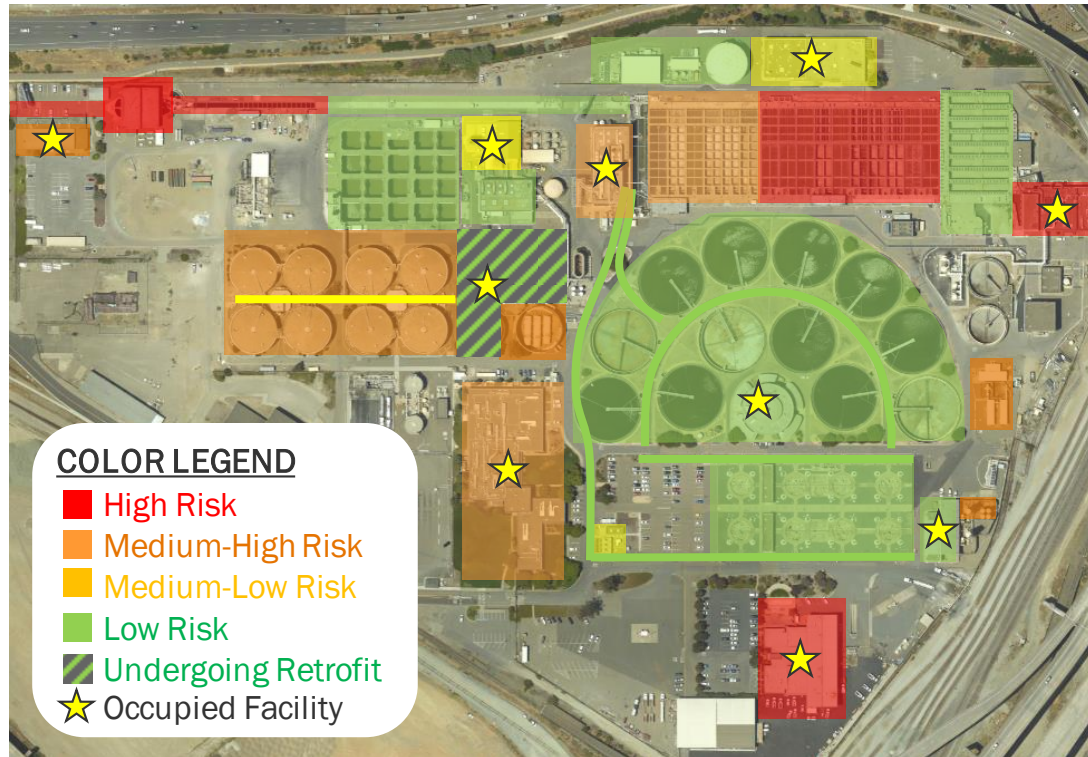
Risk Analysis for Prioritization



KEY TAKEAWAY

- 1 Life safety is the #1 priority.

Seismic Risk



KEY TAKEAWAY

1 Seismic risk varies throughout the MWWTP.

New Drivers



**Aging
Infrastructure**

**Seismic
Vulnerability**

**Recycled Water
(2019)**

**Land Use
(1996 & 2011)**

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**Odor Control
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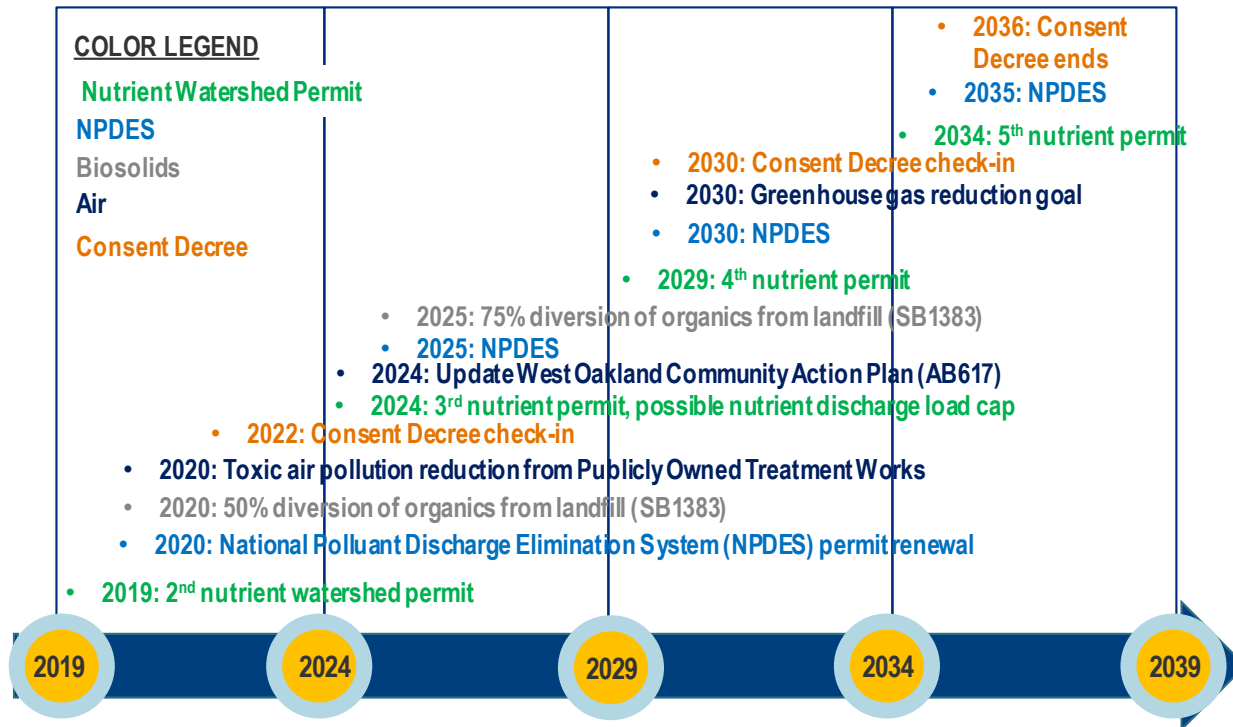
**Biosolids
(2004)**

**Sludge
Management
(1990)**

**Plant Property
(1990)**

**More Stringent
Regulations**

More Stringent Regulations



KEY TAKEAWAY

- 1 There are many emerging regulations for the wastewater industry that will require major investments.

New Drivers



**Aging
Infrastructure**

**Seismic
Vulnerability**

**Recycled Water
(2019)**

**Land Use
(1996 & 2011)**

**Energy System
(2012)**

**Odor Control
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**Biosolids
(2004)**

**Sludge
Management
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**Plant Property
(1990)**

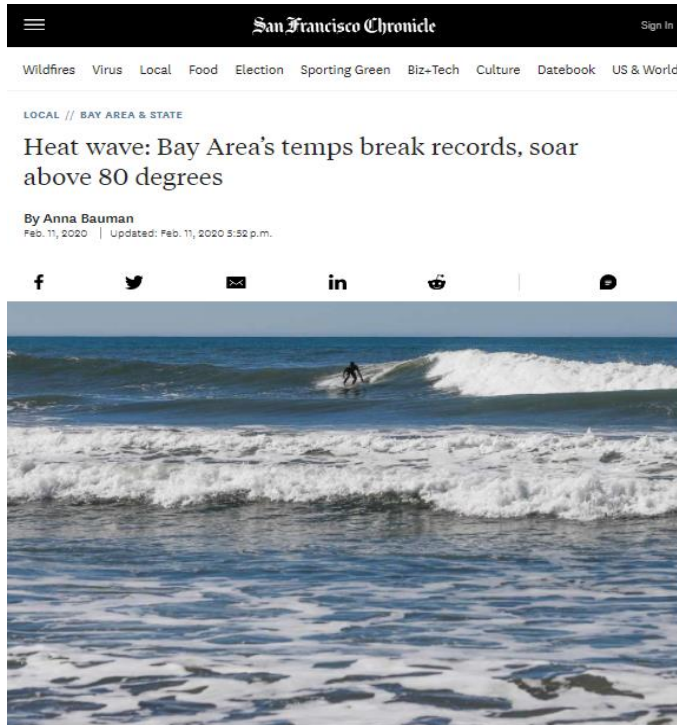
**More Stringent
Regulations**

Climate Change

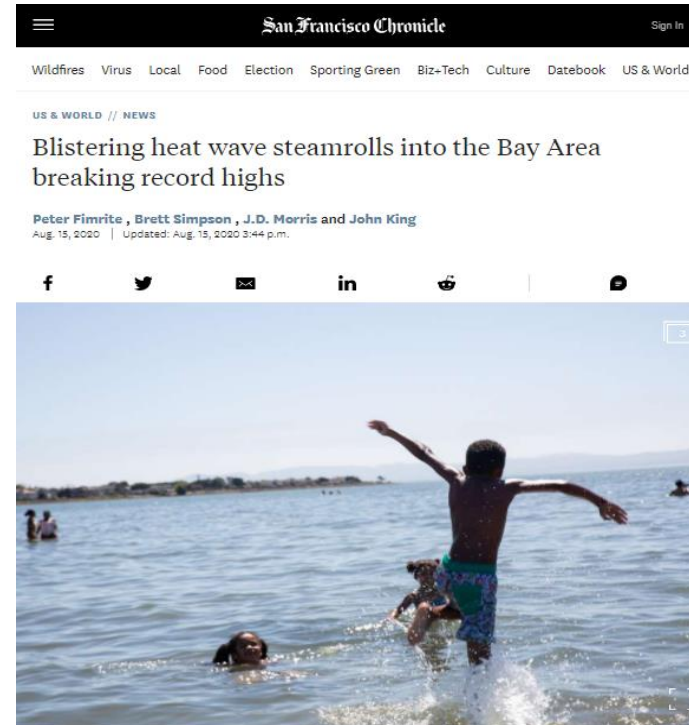
Climate Change



February 2020



August 2020



KEY TAKEAWAY

1 Climate change is increasingly more visible in the Bay Area.

New Drivers



Aging
Infrastructure

Seismic
Vulnerability

Recycled Water
(2019)

Land Use
(1996 & 2011)

Energy System
(2012)

Odor Control
(1998 & 2009)

Biosolids
(2004)

Sludge
Management
(1990)

Plant Property
(1990)

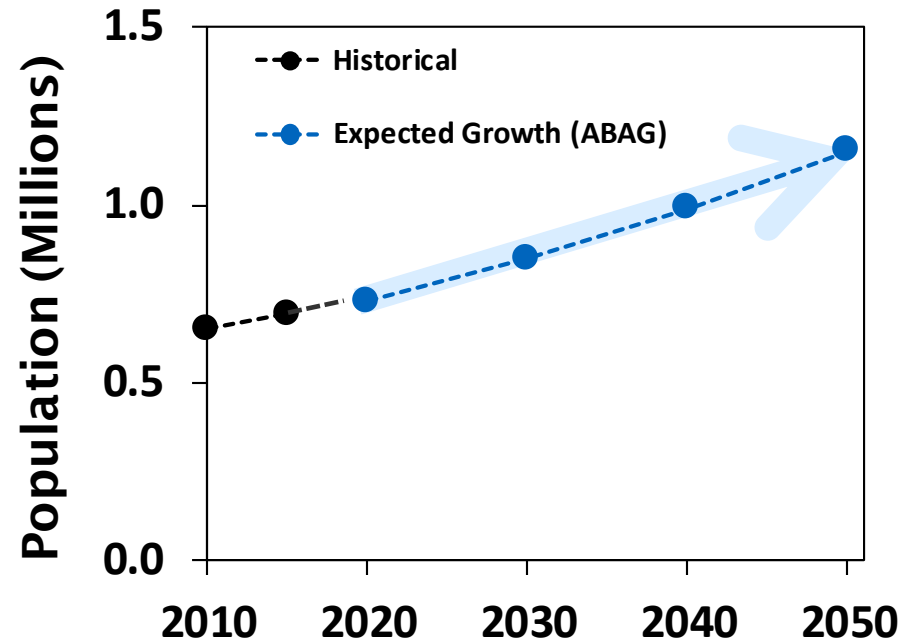
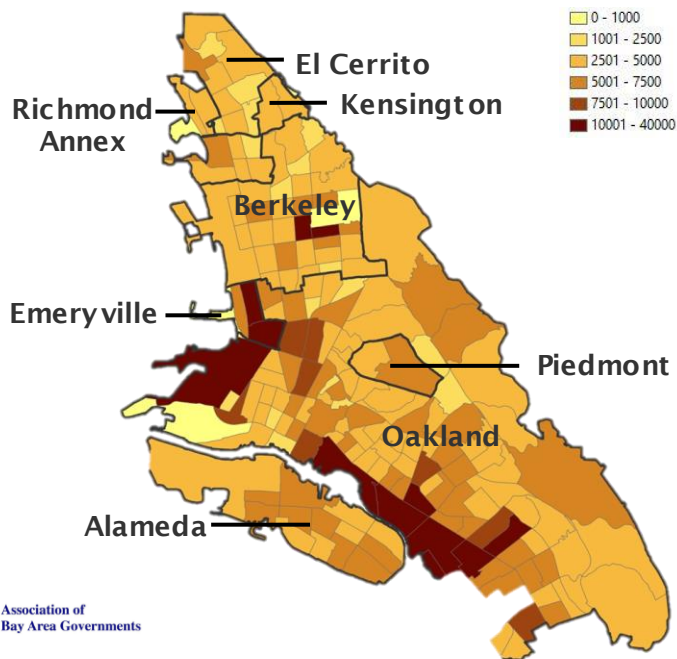
More Stringent
Regulations

Climate Change

Capacity

Capacity

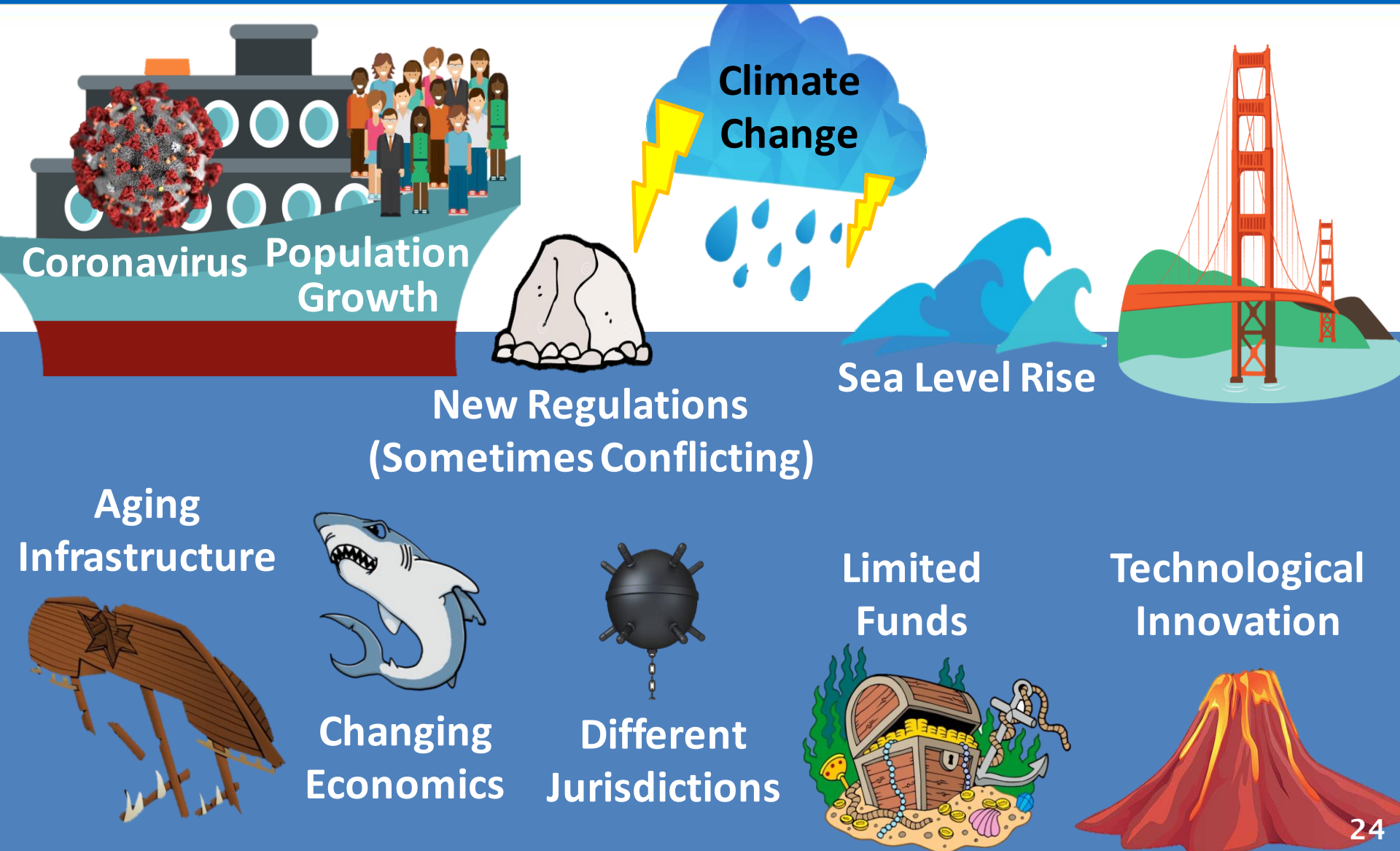
Estimated Population in 2040



KEY TAKEAWAYS

- 1 As population grows, more wastewater will be generated.
- 2 More wastewater will increase nutrients and greenhouse gas emissions generated to treat the wastewater.

Competing Priorities



Today's Speakers



Matt Hoeft

Supervisor of
Wastewater Planning



Yun Shang

Manager of Lab &
Technical Services



James Hake

Engineer &
Tour Guide



Wastewater System



BY THE NUMBERS

1 Wastewater Treatment Plant

3 Wet Weather Facilities

1,600 Miles of Private Sewer Laterals

1,600* Miles of Pipe in the Collection System

29 Miles of Interceptor Pipe

15 Pump Stations

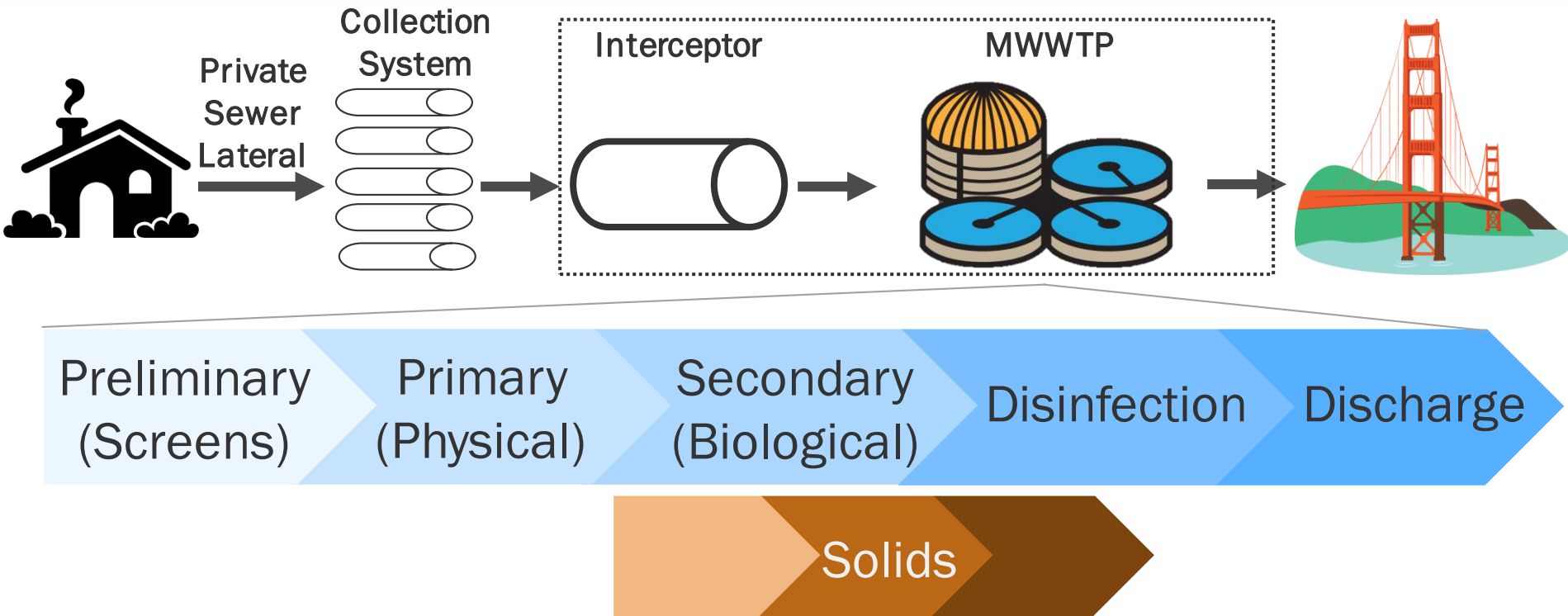
9 Diversion & Overflow Structures

18 Level Monitoring Stations



*Owned by the satellite cities, not EBMUD

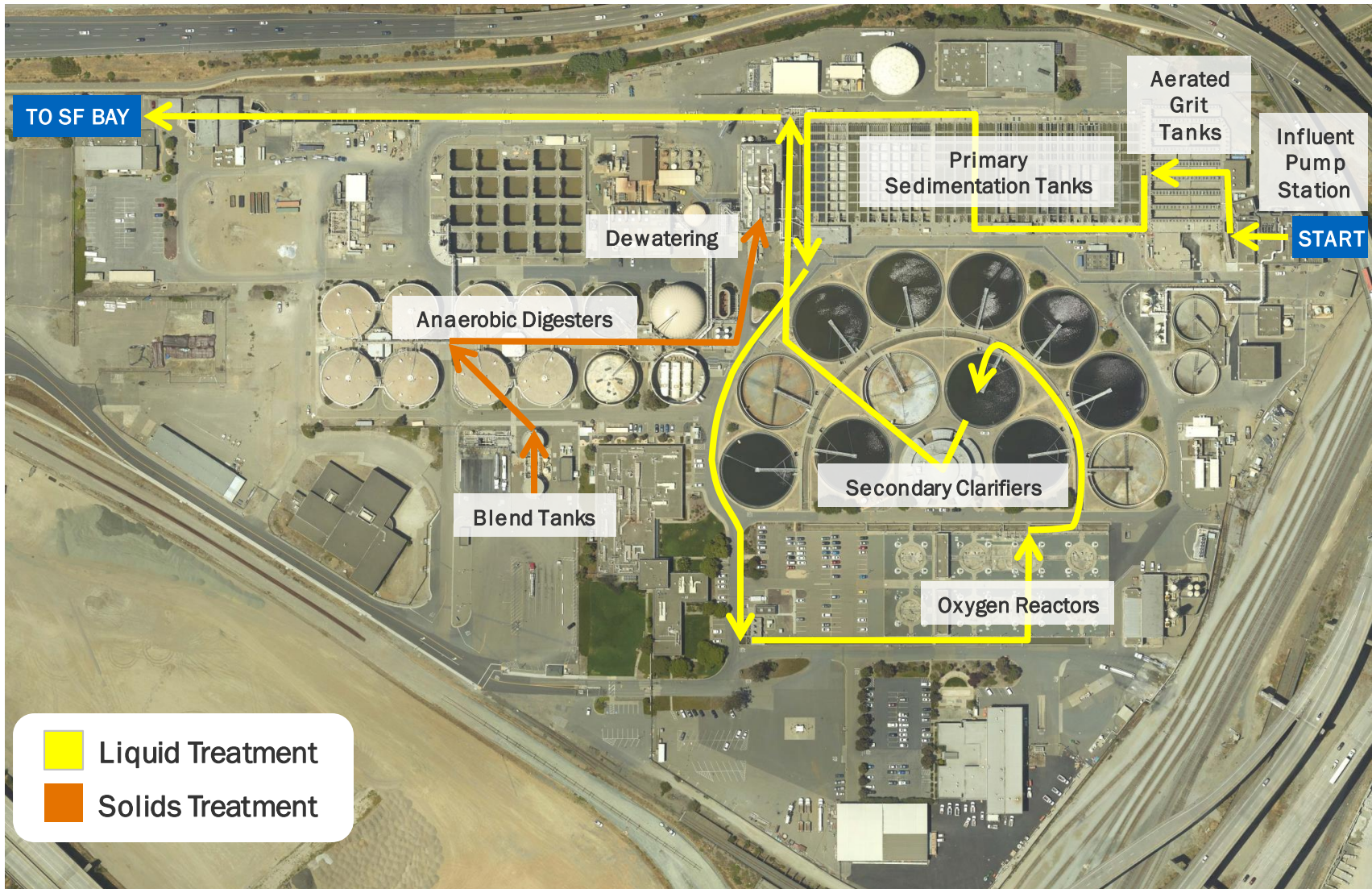
Wastewater Treatment Overview



KEY TAKEAWAYS

- 1 Wastewater treatment involves both liquids & solids.
- 2 The liquid treatment process is strategically designed to remove progressively smaller & smaller contaminants.

Flow Path: Liquids & Solids



Wastewater Treatment Begins in 1951



Preliminary

Primary

Secondary

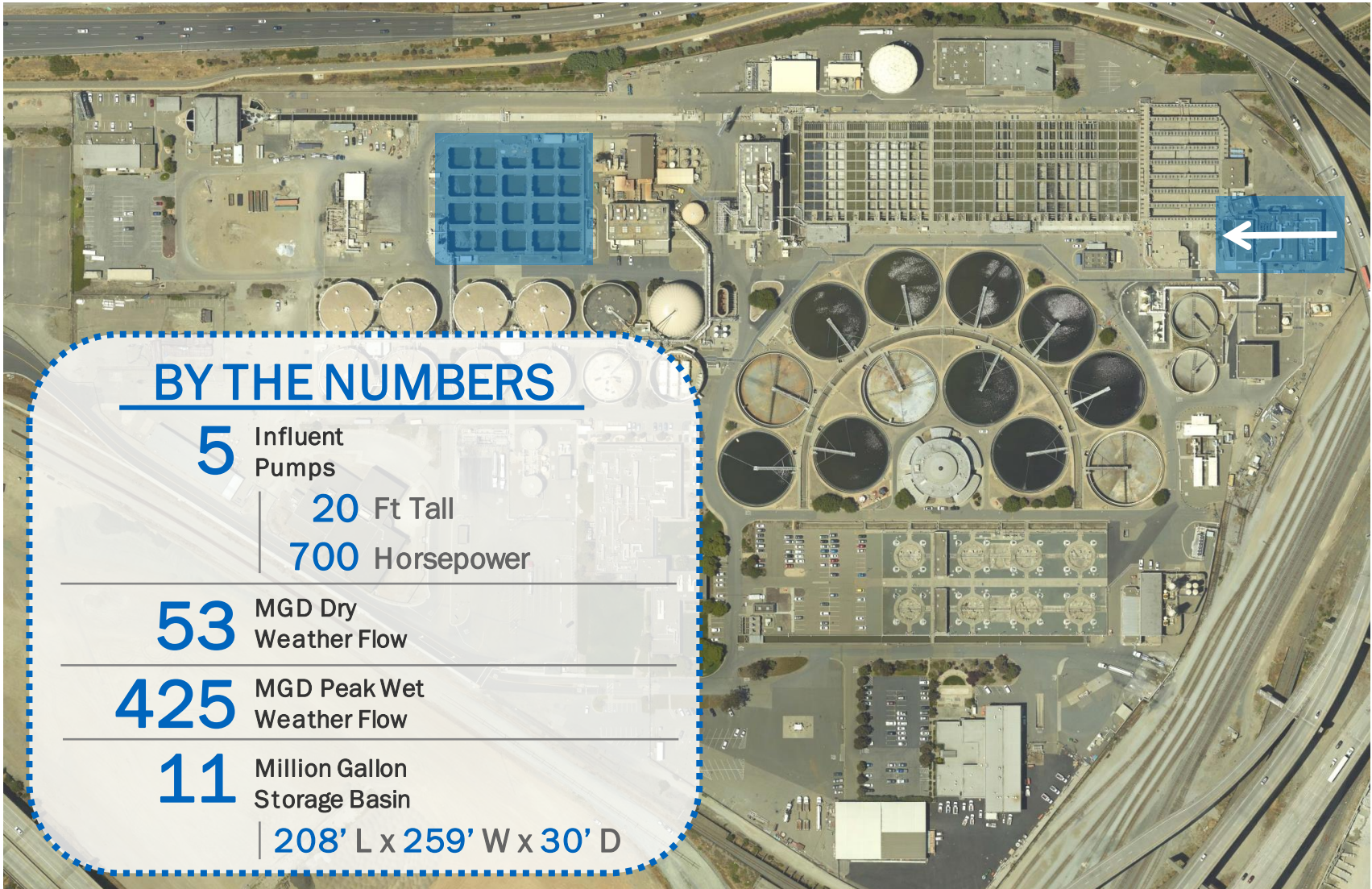
Disinfection

Discharge



PRELIMINARY TREATMENT

Overview: Preliminary Treatment



BY THE NUMBERS

5

Influent
Pumps

20 Ft Tall

700 Horsepower

53

MGD Dry
Weather Flow

425

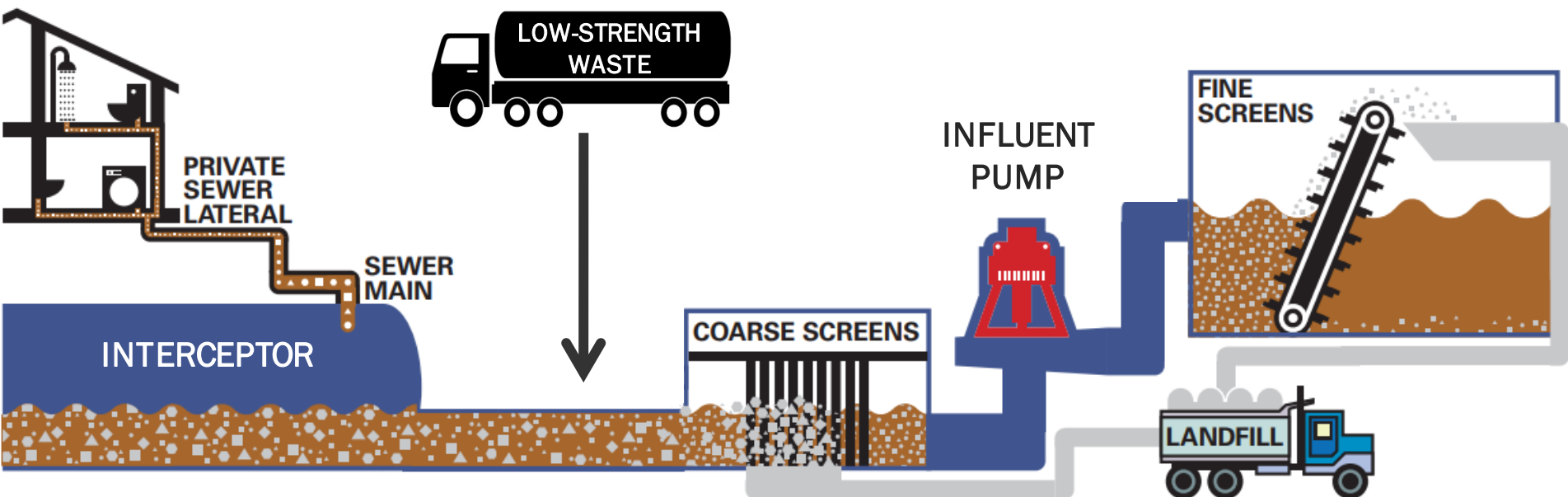
MGD Peak Wet
Weather Flow

11

Million Gallon
Storage Basin

208' L x 259' W x 30' D

Preliminary Treatment



KEY TAKEAWAY

- 1 Preliminary treatment uses screens to remove large trash & debris.

Interceptor

9-ft Diameter



Live Sewer Flow



3rd St., West Oakland



Interceptor

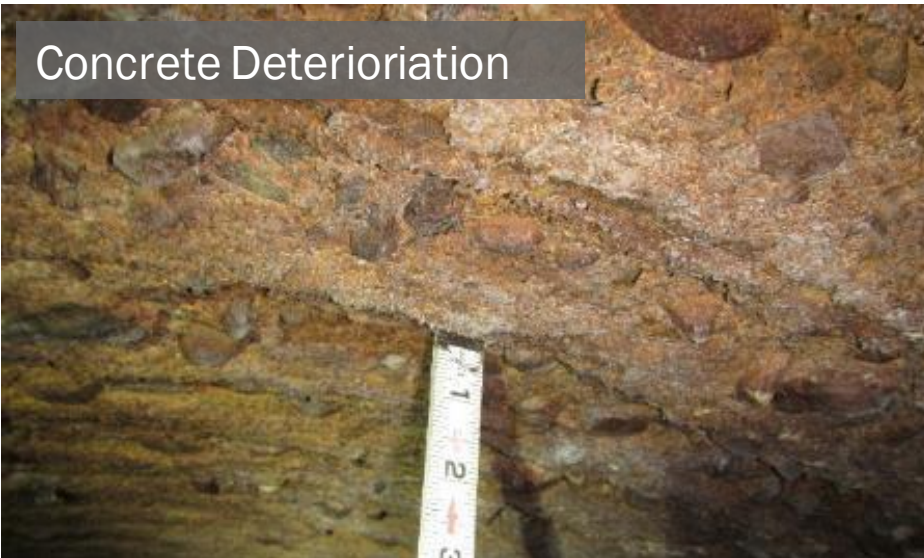
Hole with Exposed Rebar



Exposed Rebar



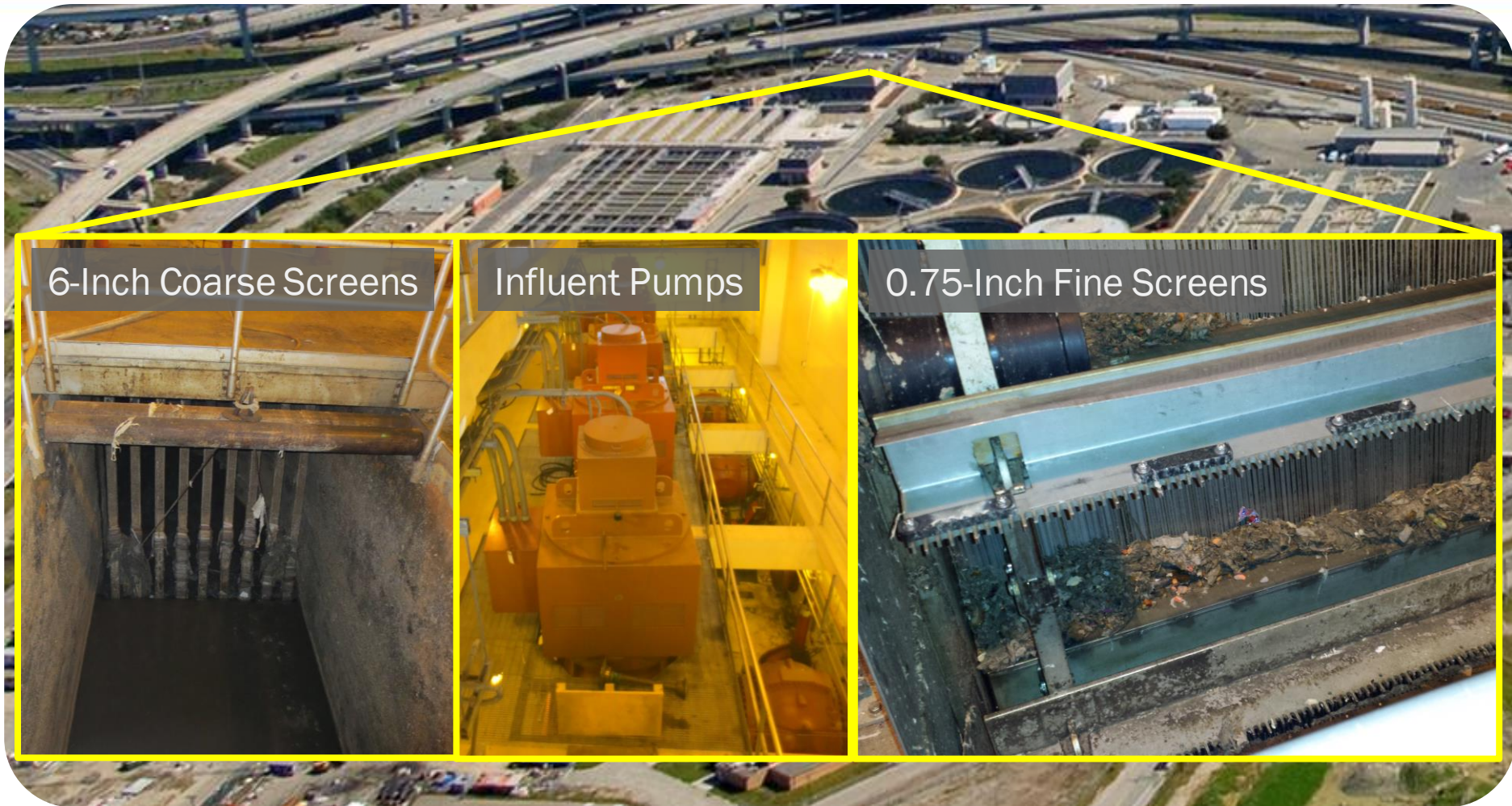
Concrete Deterioration



Metal Corrosion



Preliminary Treatment



Preliminary

Primary

Secondary

Disinfection

Discharge

Contaminants: To the Trash

Trash



All Wipes



Paper Towels



Tampons & Pads



Pills



Hair



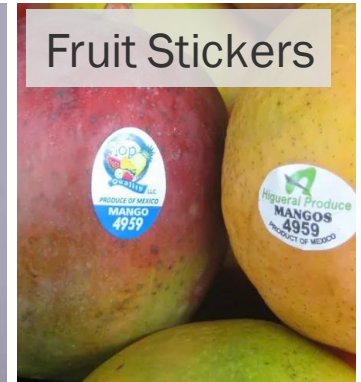
Floss



Cotton Swabs



Fruit Stickers



Condoms



Diapers



Needles



Kitty Litter



Fats, Oils, and Grease (FOG)



Toilet Paper vs. Wipes



Clog at Fine Screens





Rochelle

Wastewater Plant Operator II

Hired: 2013

“You won’t believe the things people flush down the toilet! Effective screening is critical for our treatment process to work properly. Throwing trash in the toilet has huge financial consequences for our community to repair expensive pump and screening equipment.”

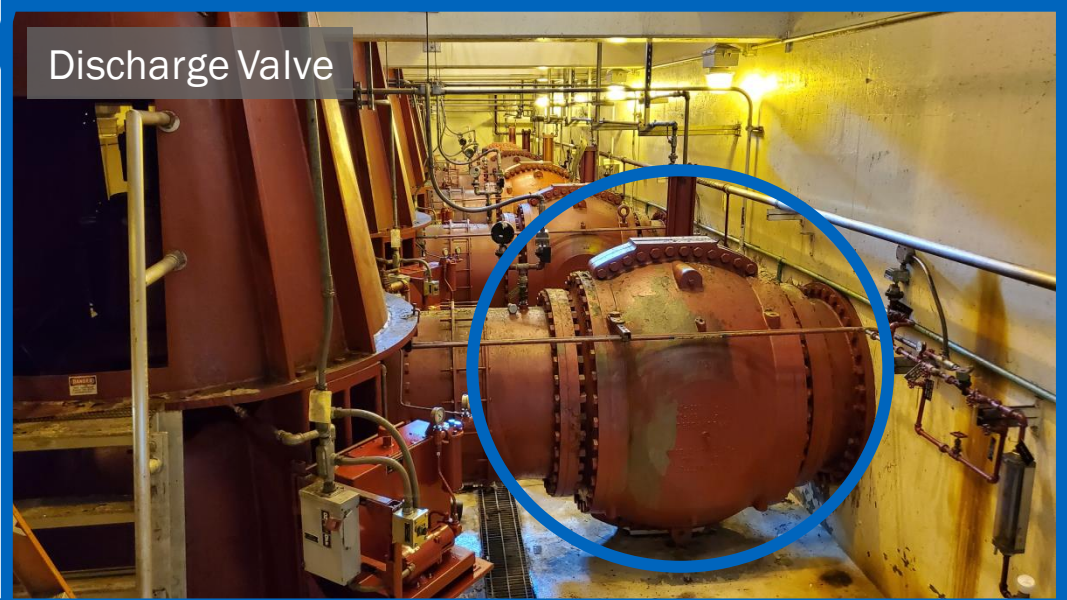
Influent Pumps & Discharge Valves



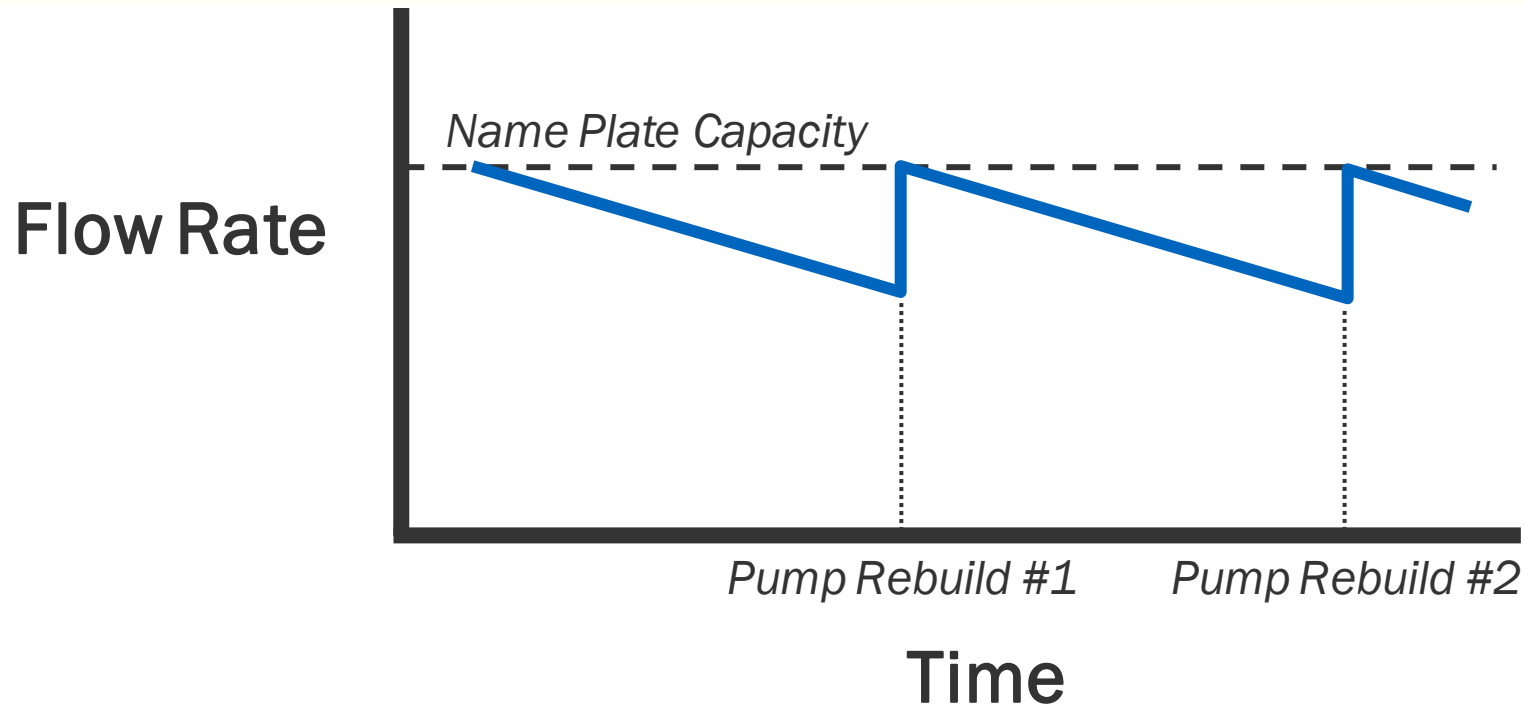
Influent Pumps



Discharge Valve



Influent Pumps

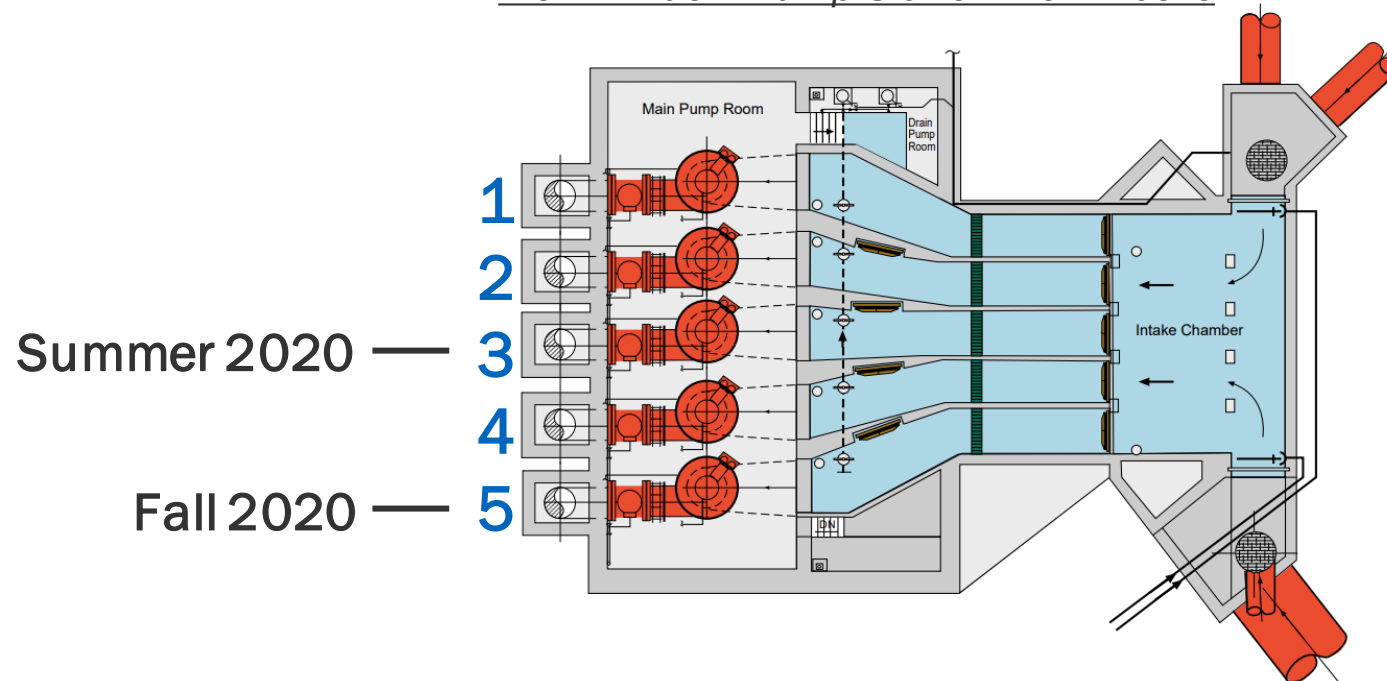


KEY TAKEAWAY

- 1 Influent pumps require routine rebuilds due to heavy wear & tear.
- 2 Replacement parts are harder & harder to find over time.

Discharge Valve Refurbishment

View: Influent Pump Station From Above



KEY TAKEAWAYS

- 1 One discharge valve is refurbished at a time.
- 2 Each refurbishment takes over 3 months.

Odor Control System

BEFORE



AFTER



Wet Weather Storage Basin

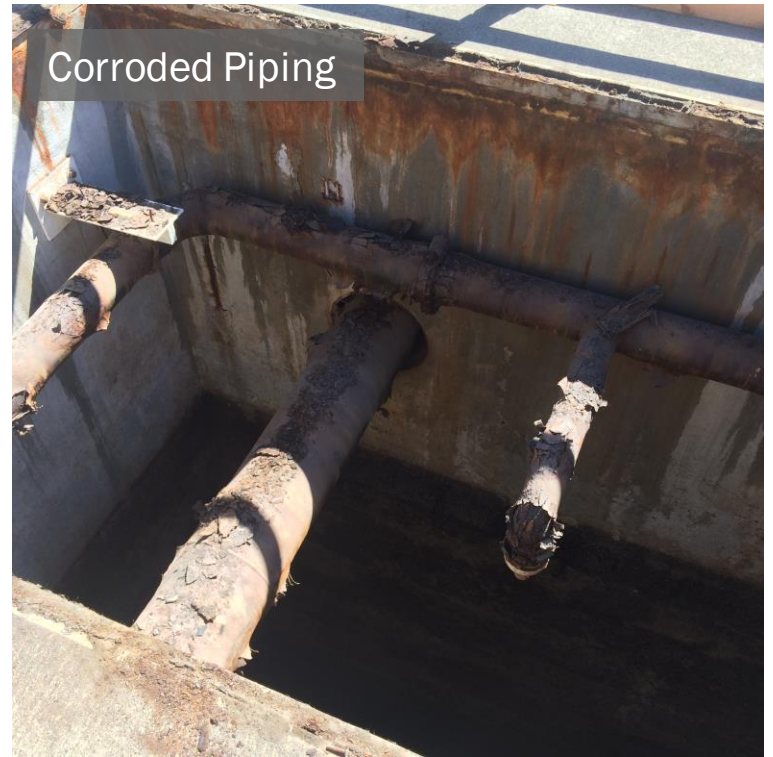


Wet Weather Storage Basin

Concrete Cracks That Leak



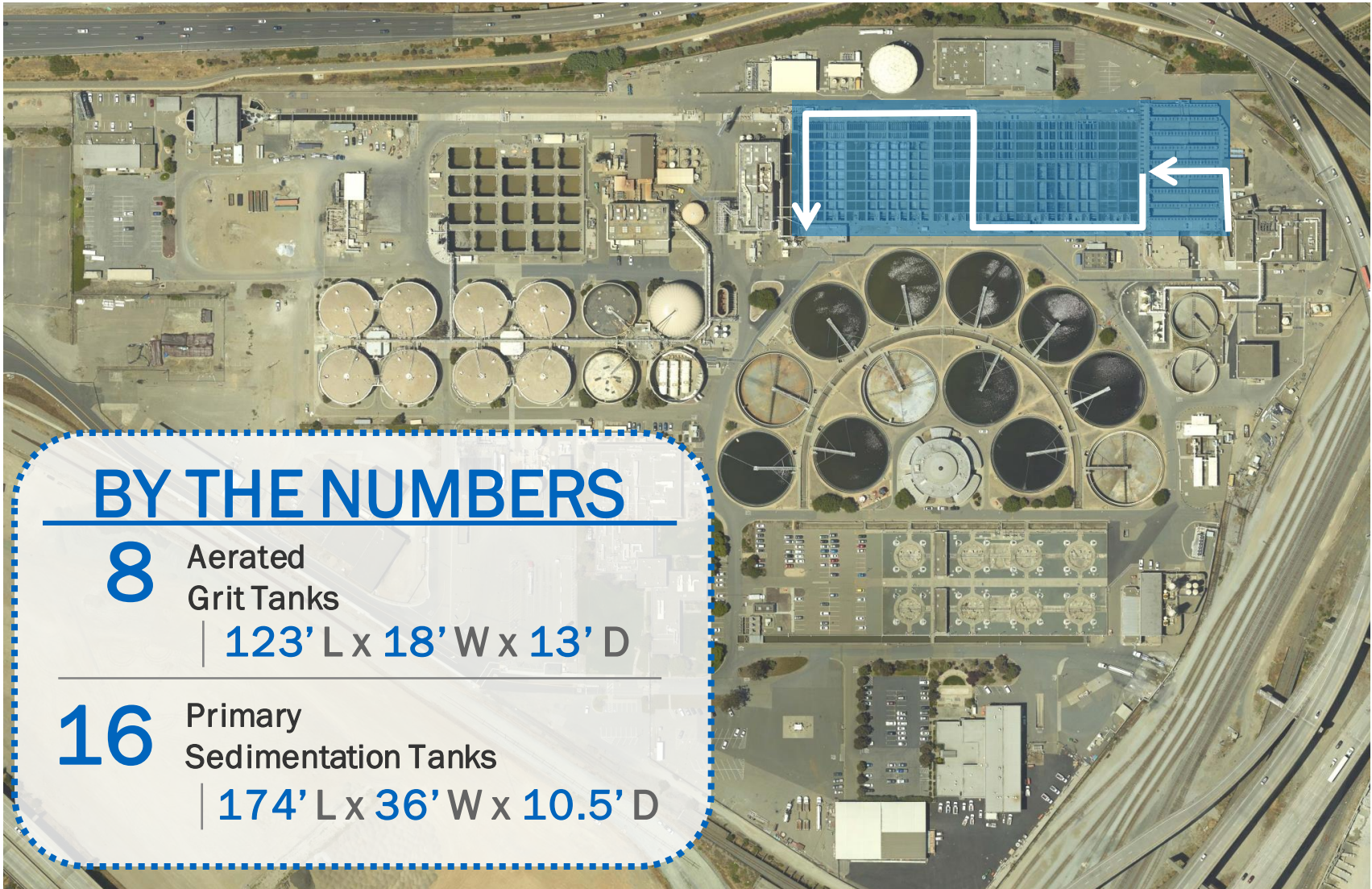
Corroded Piping





PRIMARY TREATMENT

Overview: Primary Treatment



BY THE NUMBERS

8

Aerated
Grit Tanks

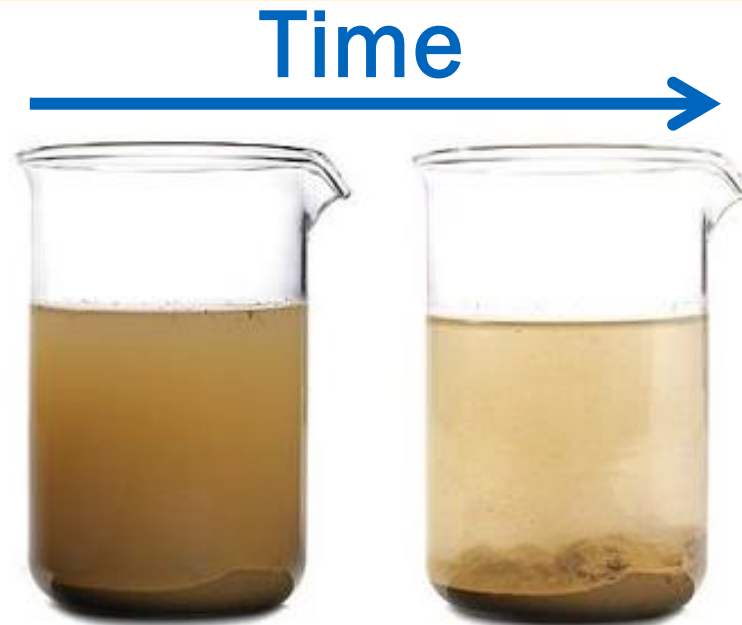
| 123' L x 18' W x 13' D

16

Primary
Sedimentation Tanks

| 174' L x 36' W x 10.5' D

Primary Treatment



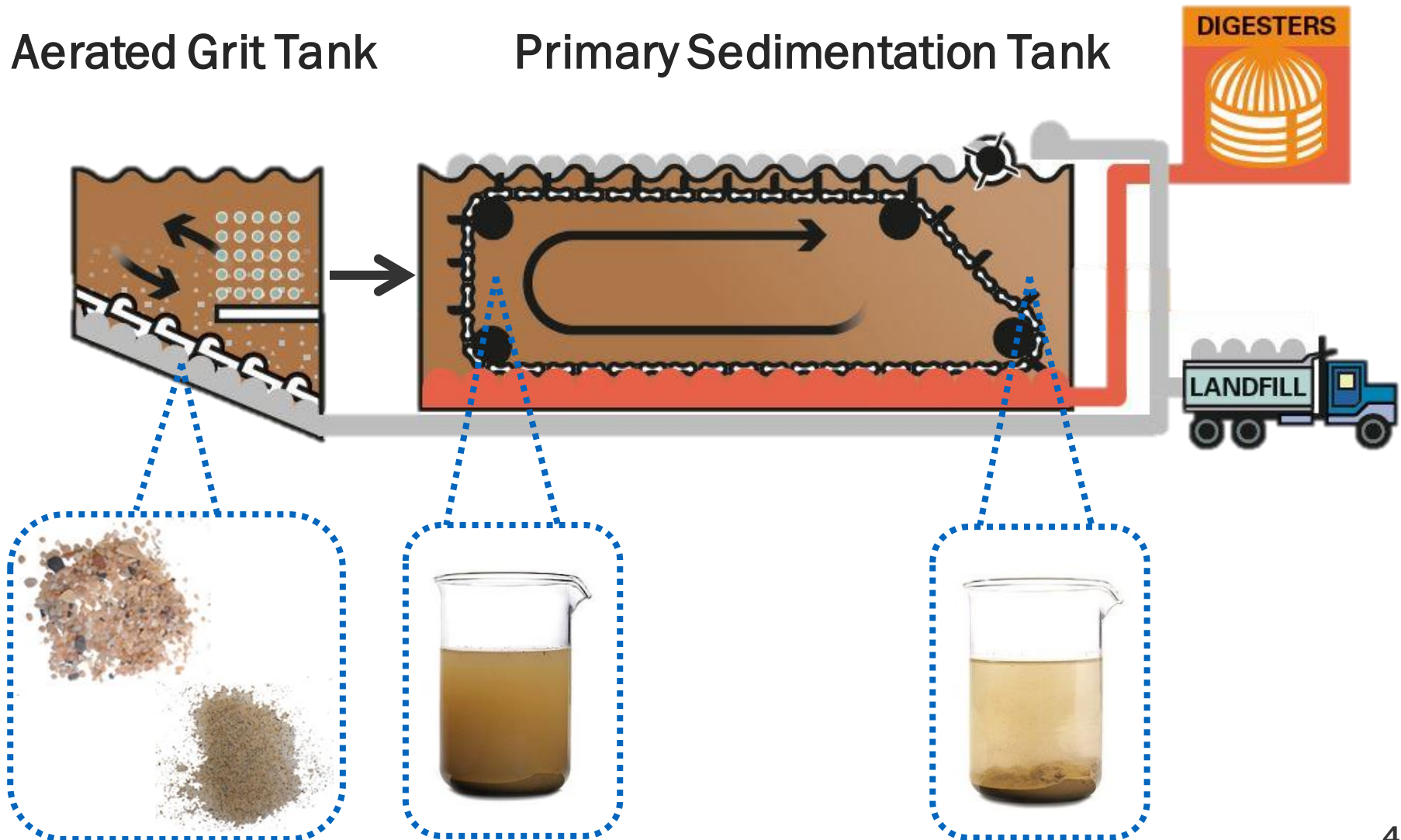
KEY TAKEAWAYS

- 1** Primary treatment is a physical process in which particles settle to the bottom of tanks by gravity.
- 2** Not all contaminants can settle easily, so additional treatment is needed.

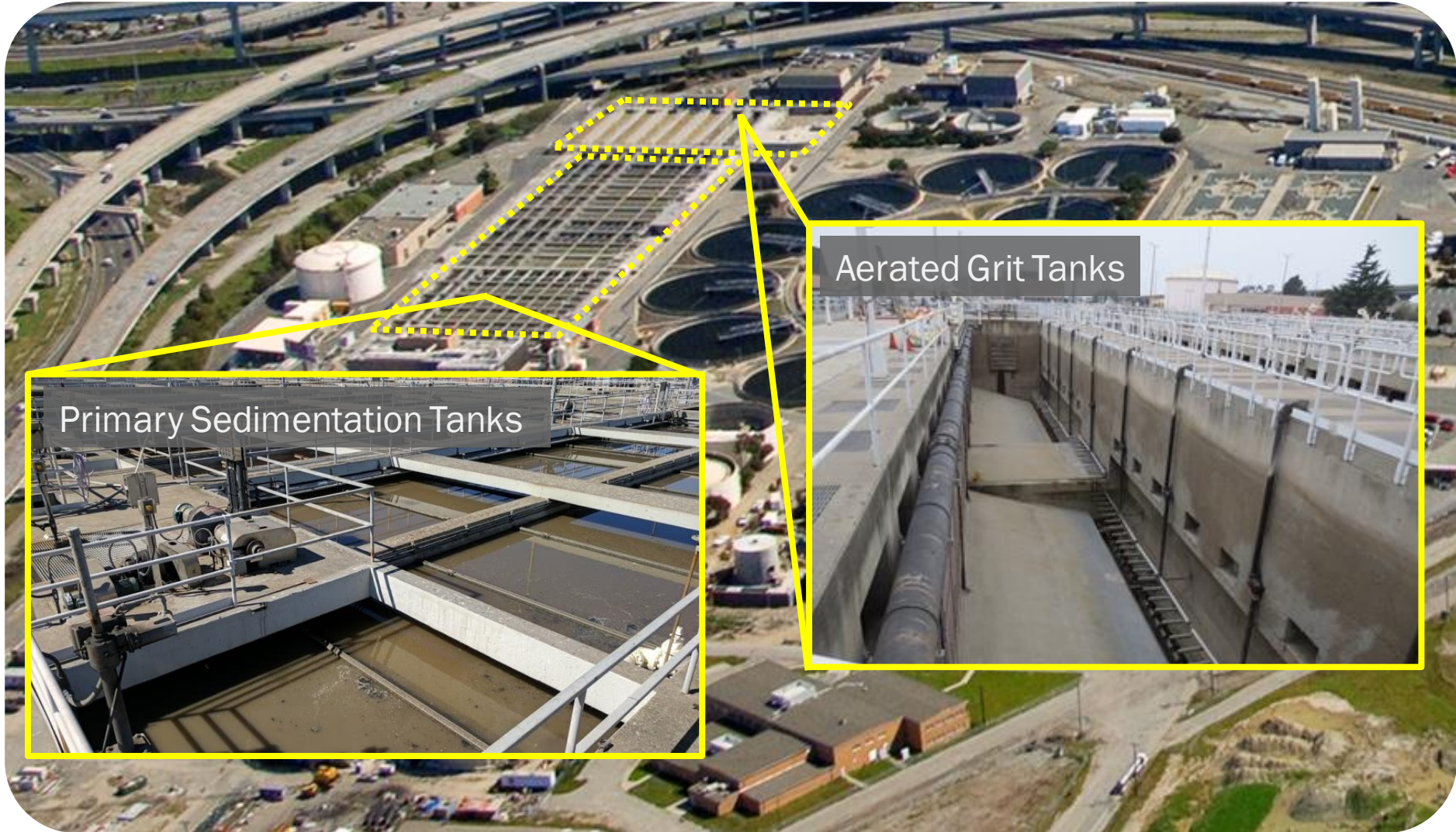
Primary Treatment

Aerated Grit Tank

Primary Sedimentation Tank



Primary Treatment



Aerated Grit Tanks

BEFORE



AFTER



Grit Removal



KEY TAKEAWAY

- 1 Some grit is not removed and travels to the solids treatment process, where it causes O&M challenges (stay tuned).

Primary Sedimentation Tanks

BEFORE



AFTER





Angela

Associate Civil Engineer

Hired: 2010

“

Some of the respective challenges and joys of working on aging infrastructure is that the conditions can be much worse, or much better than expected.

Either way, we patch up the “patients” and restore them to a “healthy” condition to continue their sprints, miles, hurdles and marathons for years to come. ”

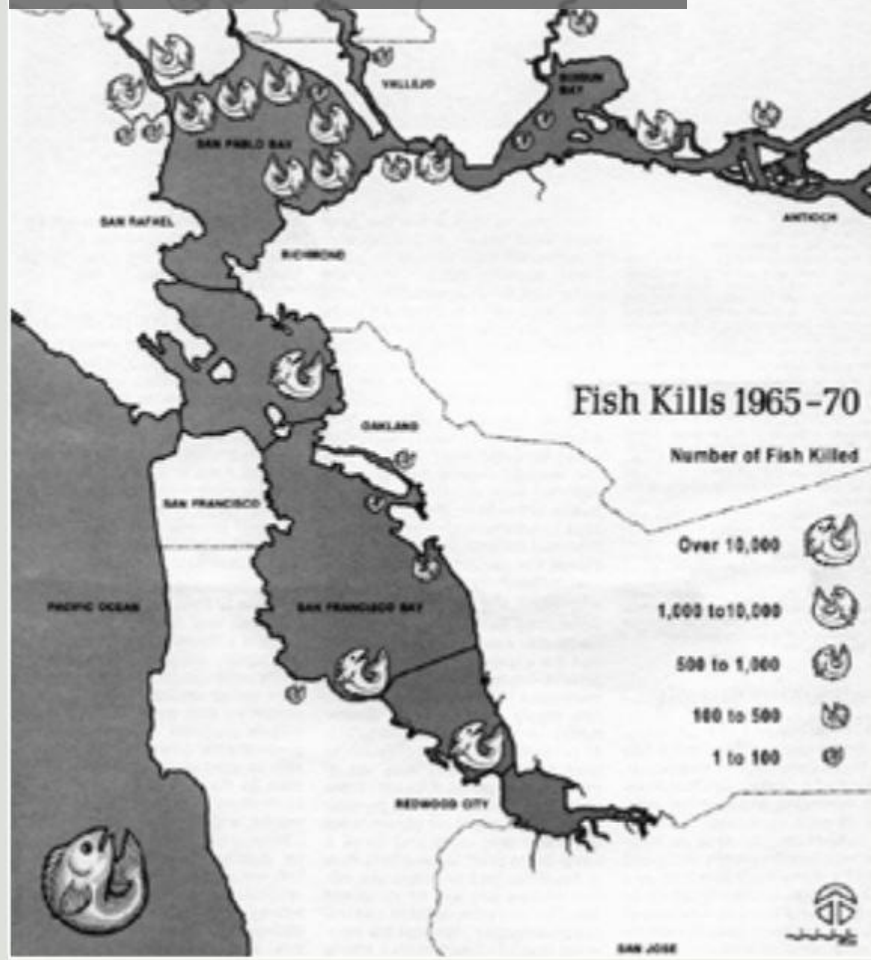


SECONDARY TREATMENT

Environmental Movement Grows



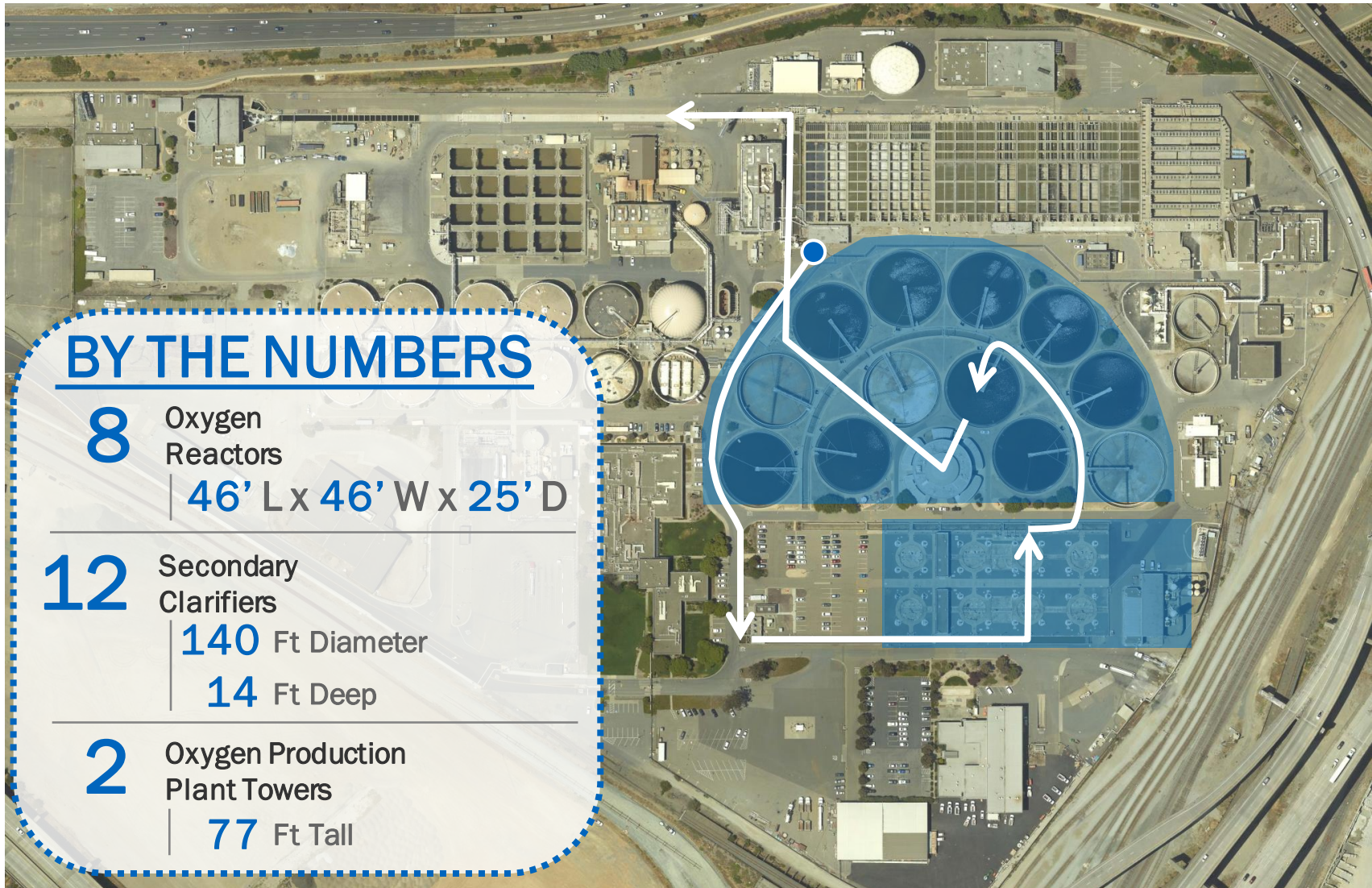
Low Dissolved Oxygen Leads to Fish Kills Across the US



Clean Water Act of 1972 Requires Secondary (Biological) Treatment



Overview: Secondary Treatment



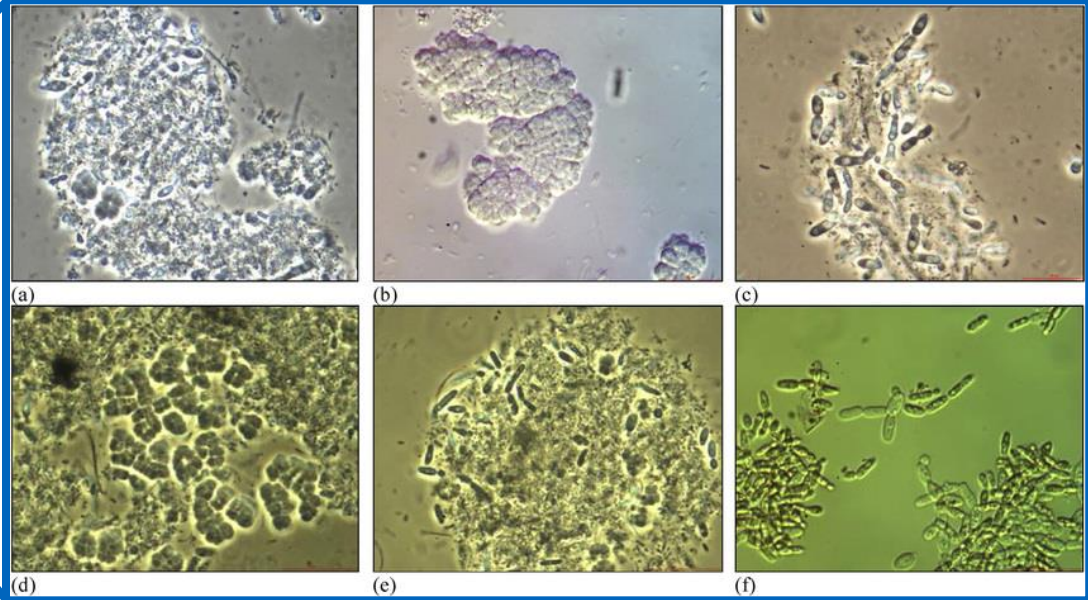
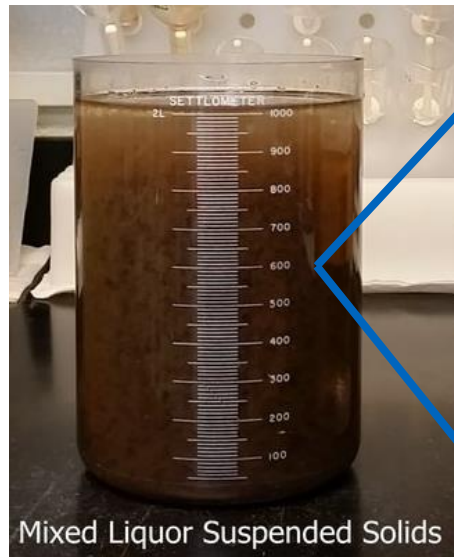
BY THE NUMBERS

8 Oxygen Reactors
| **46'** L x **46'** W x **25'** D

12 Secondary Clarifiers
| **140** Ft Diameter
| **14** Ft Deep

2 Oxygen Production Plant Towers
| **77** Ft Tall

Secondary Treatment

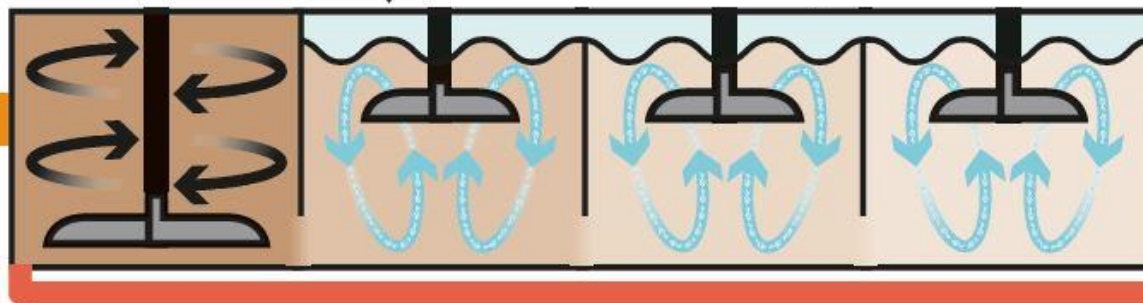


KEY TAKEAWAYS

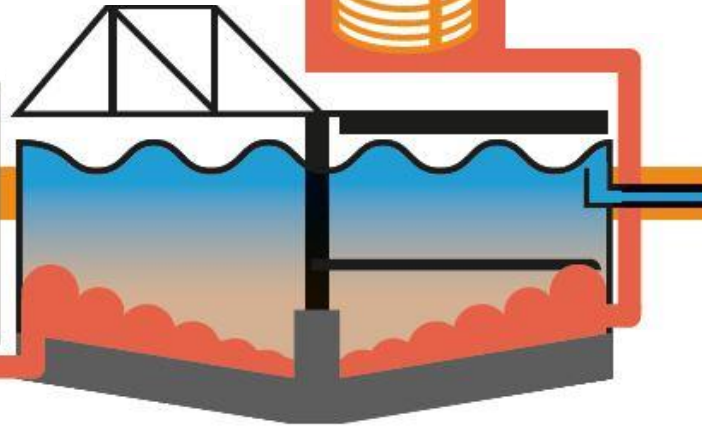
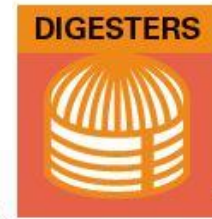
- 1 Secondary treatment is a biological process that relies on microorganisms to break down dissolved organic wastes.
- 2 This process is similar to our own bodies, which use oxygen to digest the food we eat to release energy.

Oxygen Reactors & Clarifiers

Oxygen Reactors



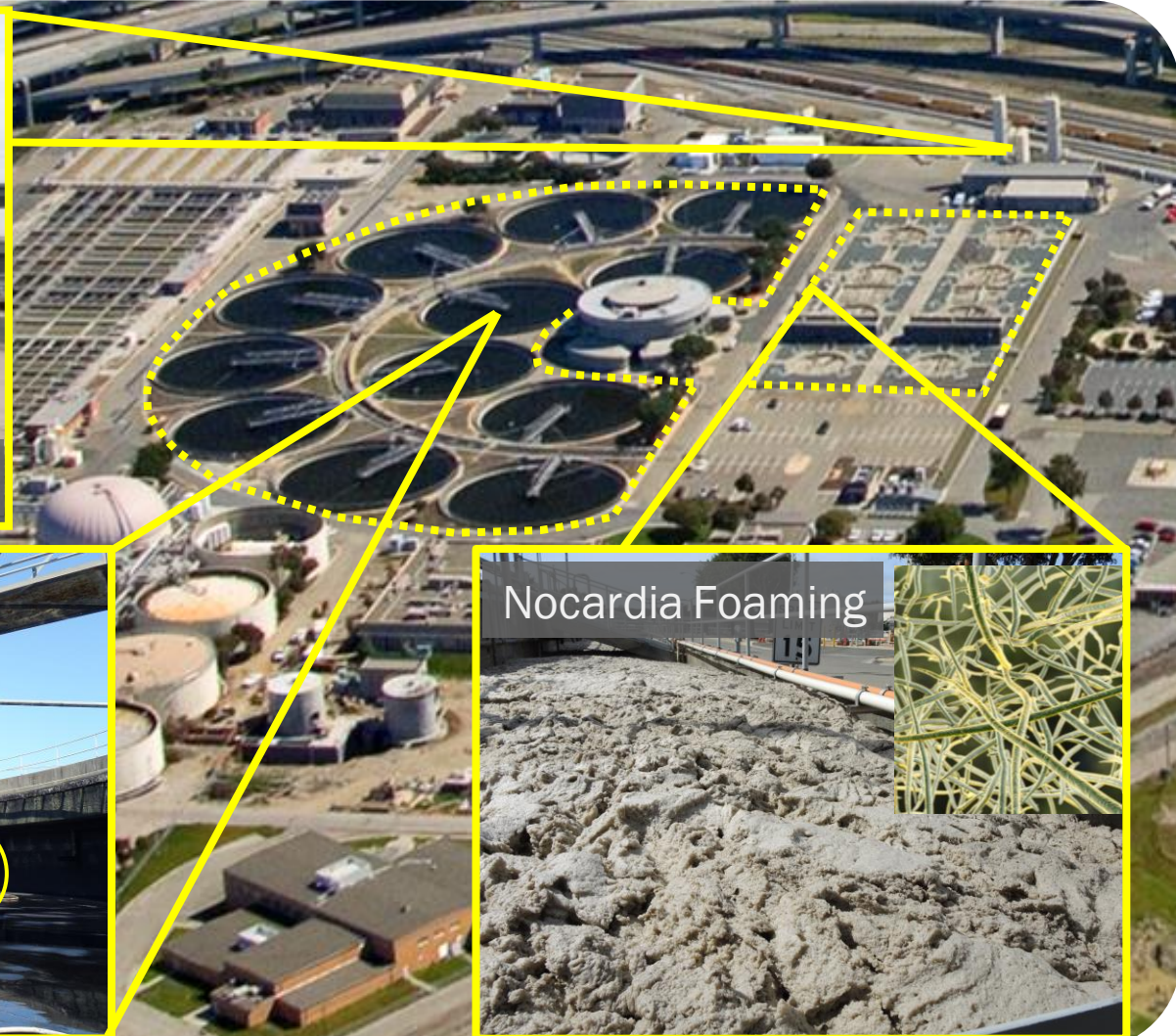
Clarifier



KEY TAKEAWAYS

- 1 Microorganisms in the oxygen reactors breathe concentrated oxygen that is produced on-site.
- 2 Particles settle by gravity in the clarifiers. Some of this sludge is recycled, and the rest is beneficially reused.

Secondary Treatment



Oxygen Reactors (Exterior)

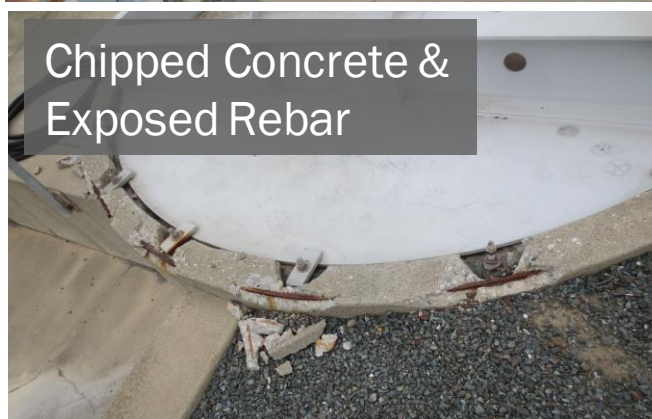
Hole in Skimmer



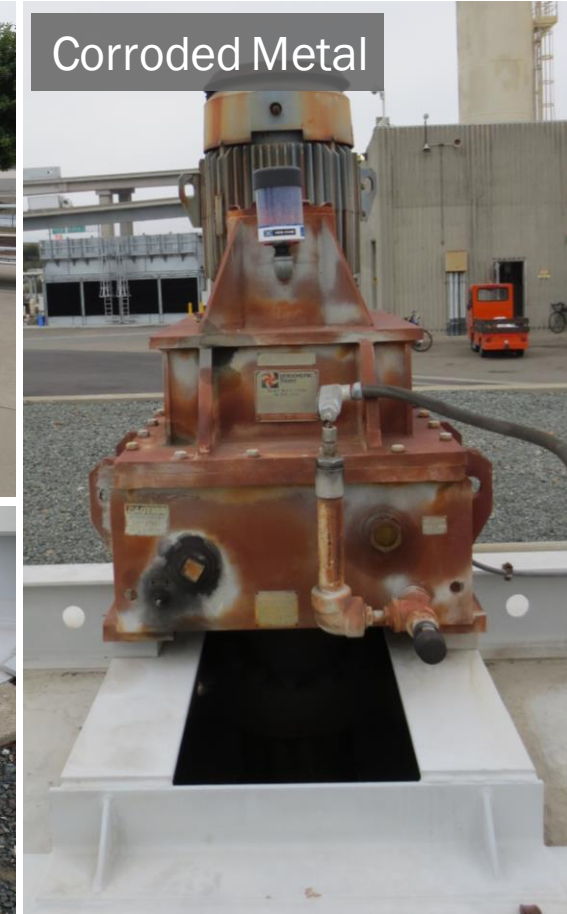
Corroded Metal



Chipped Concrete & Exposed Rebar



Corroded Metal

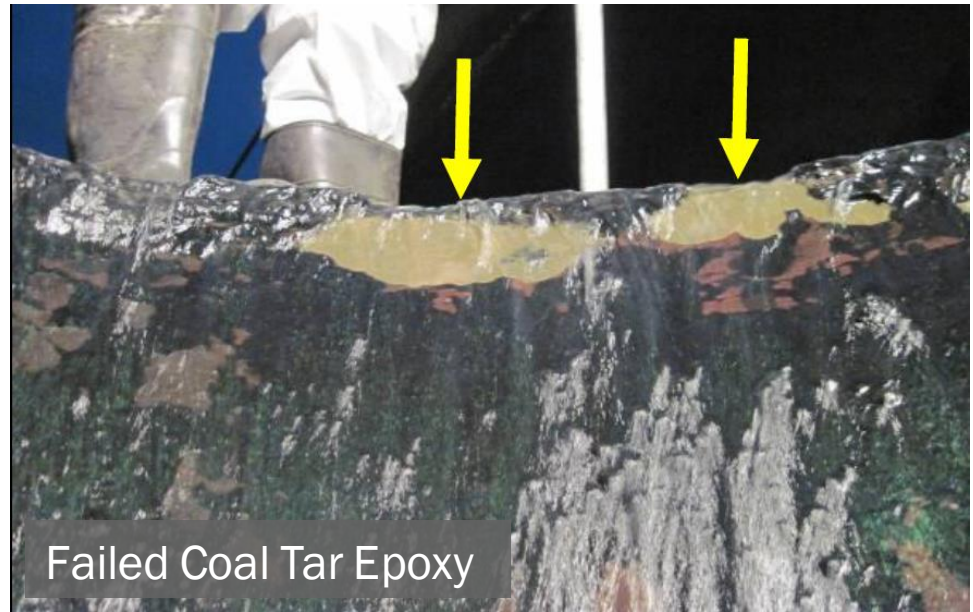


Oxygen Reactors (Interior)

Exposed Aggregate



Exposed Aggregate & Patchwork



Failed Coal Tar Epoxy

Secondary Clarifiers

BEFORE



AFTER



Secondary Treatment: Instrumentation

Flow Meter



Flow Transmitter



TSS & pH Analyzer



Turbidimeter

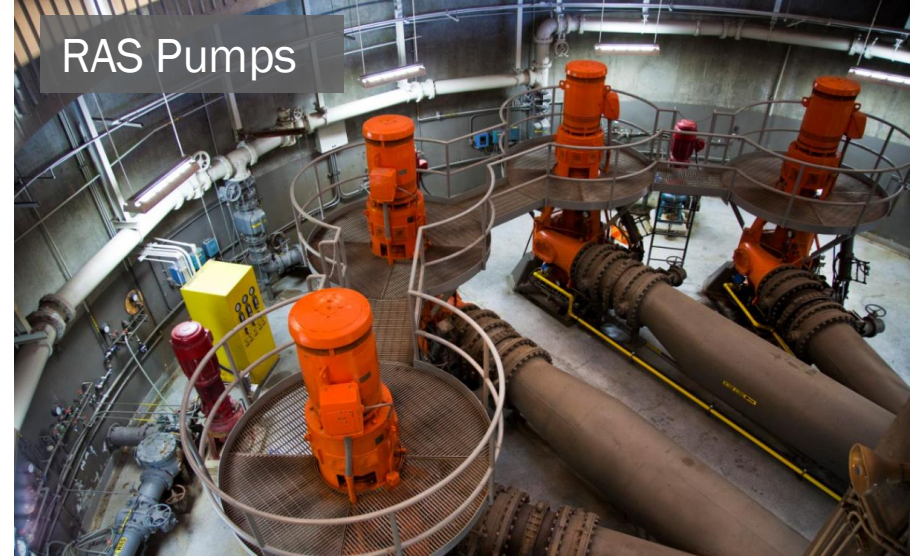


Secondary Clarifiers

Crooked Influent Gates



RAS Pumps



Crooked Effluent Weirs



RAS Flow Meter



Secondary Treatment Gallery

Standing Water



Leaking Penetrations



Oxygen Production Plant

BEFORE



AFTER

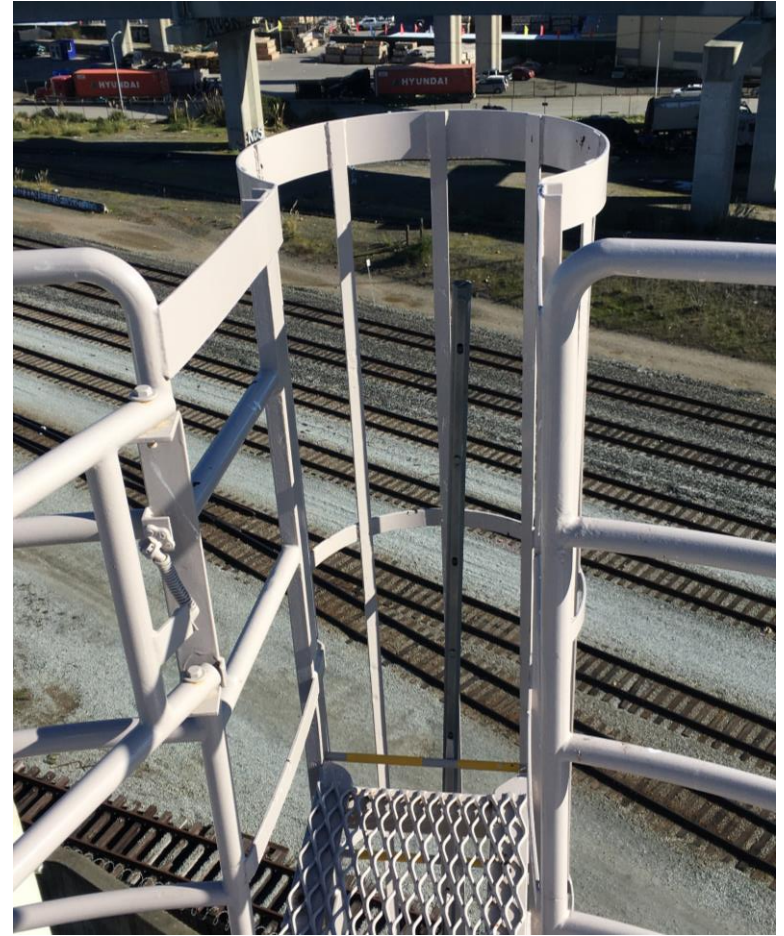


Oxygen Production Plant

BEFORE



AFTER



Oxygen Production Plant

Replace Pneumatic & Hand Valves



Risk of Obsolescence



Improve Reliability

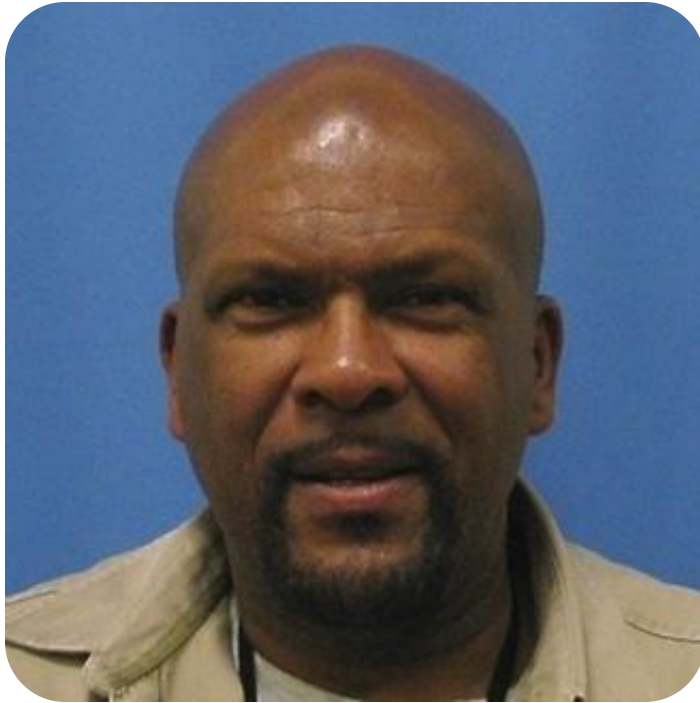


Fix Leaks



Reduce Foaming





Charles

Electrical Technician

Hired: 2013

“As electrical equipment reaches its end-of-life, replacement parts are neither produced nor supported. This creates a challenging environment for maintaining our critical facilities such as the Oxygen Production Facility.”



DISINFECTION, DECHLORINATION, & DISCHARGE

Disinfection, Dechlorination, & Discharge



KEY TAKEAWAYS

- 1 Disinfection with chlorine (bleach) kills germs.
- 2 Chlorine must then be removed before discharge.
- 3 Treated wastewater is discharged to the Bay through an outfall.

Preliminary

Primary

Secondary

Disinfection

Discharge

NPDES Permit



San Francisco Bay Regional Water Quality Control Board

ORDER No. R2-2015-0018
NPDES NO. CA0037702

The following discharger is subject to waste discharge requirements (WDRs) set forth in this Order.

Table 1. Discharger Information

Discharger	East Bay Municipal Utility District (EBMUD)
Facility Name	Special District No. 1 Main Wastewater Treatment Plant and EBMUD's Interceptor Conveyance System
Facility Address	2020 Wake Avenue Oakland, CA 94607 Alameda County
CIWQS Place Number	222132

Table 2. Discharge Locations

Discharge Point	Effluent Description	Discharge Point Latitude (North)	Discharge Point Longitude (West)	Receiving Water
001	Secondary Treated Municipal Wastewater	37.817222	-122.348611	Central San Francisco Bay

Table 3. Administrative Information

This Order was adopted on:	May 13, 2015
This Order shall become effective on:	July 1, 2015
This Order shall expire on:	June 30, 2020
CIWQS Regulatory Measure Number	401017
The Discharger shall file a Report of Waste Discharge as an application for reissuance of WDRs in accordance with California Code of Regulations, title 23, and an application for reissuance of a National Pollutant Discharge Elimination System (NPDES) permit no later than:	October 4, 2019
The U.S. Environmental Protection Agency (U.S. EPA) and the California Regional Water Quality Control Board, San Francisco Bay Region, have classified this discharge as follows:	Major

I, Bruce H. Wolfe, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of the Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on the date indicated above.

Bruce H. Wolfe
Bruce H. Wolfe, Executive Officer

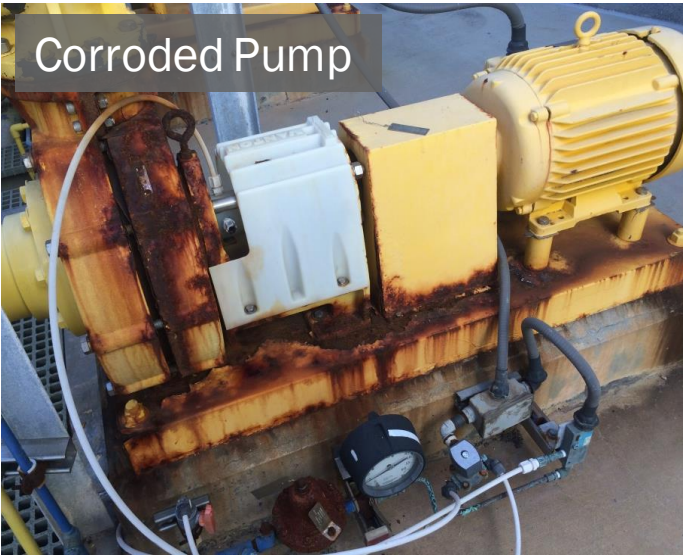
Digitally signed by Bruce H. Wolfe
DN: cn=Bruce H. Wolfe,
o=SWRCB, ou=Region 2,
email=bruce.wolfe@waterboards.ca.gov, c=US
Date: 2015.05.15 18:07:56 -0700

REGULATED CONSTITUENTS

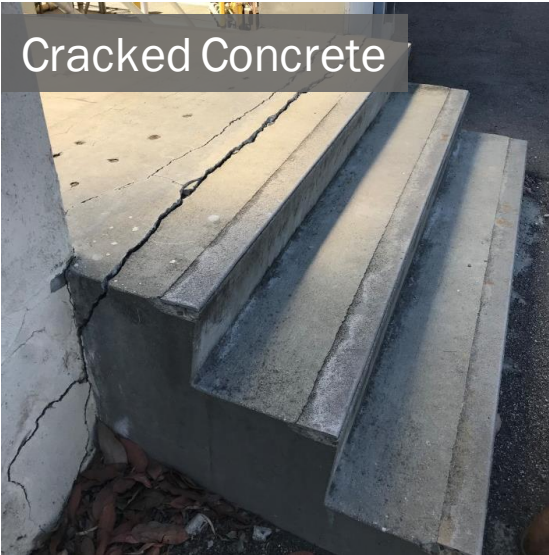
- Carbonaceous Biological Oxygen Demand
- % Removal of Biological Oxygen Demand
- Total Suspended Solids
- Oil & Grease
- pH
- Total Residual Chlorine
- Copper
- Cyanide
- Hexachlorobenzene
- Dioxin
- Total Ammonia
- Enterococcus
- Fecal Coliform
- Whole Effluent Acute Toxicity

Disinfection

Corroded Pump



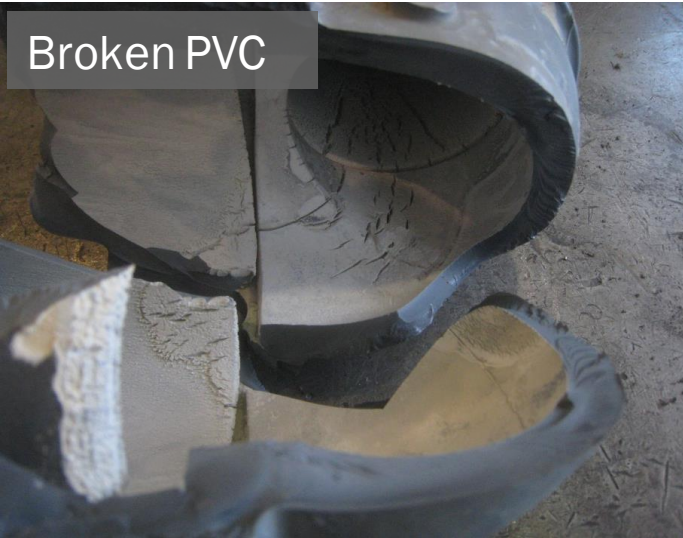
Cracked Concrete



Inside of Tank - Before



Broken PVC



Tank Coating



Inside of Tank - After



Dechlorination



Dechlorination

1950



Today





Ke'Ayna

Real Estate Representative II


Hired: 2018

“

Engagement with outside agencies allows for a better understanding and awareness of the importance of EBMUD facilities. Nevertheless, competing priorities and expectations with regard to the land make any project more difficult around the Dechlorination Facility. ”

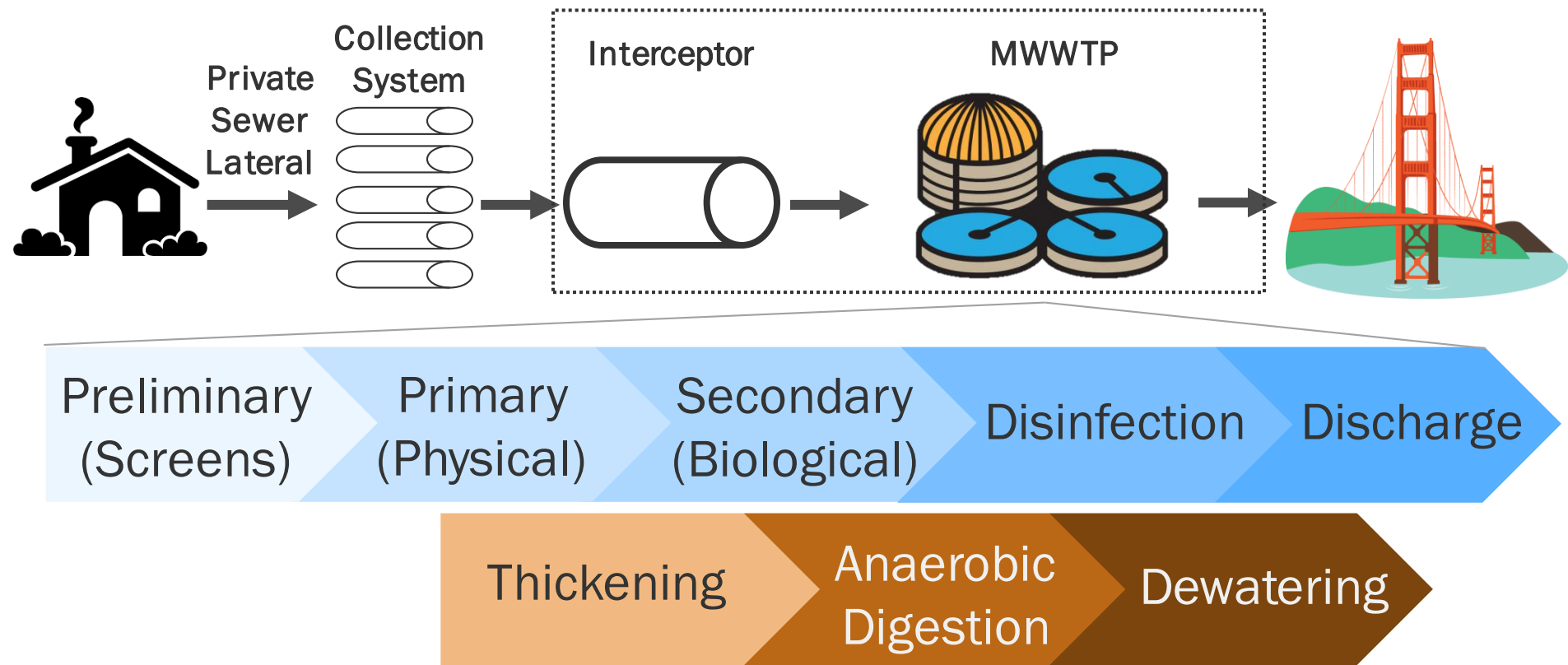
Sea Level Rise: Dechlorination Facilities



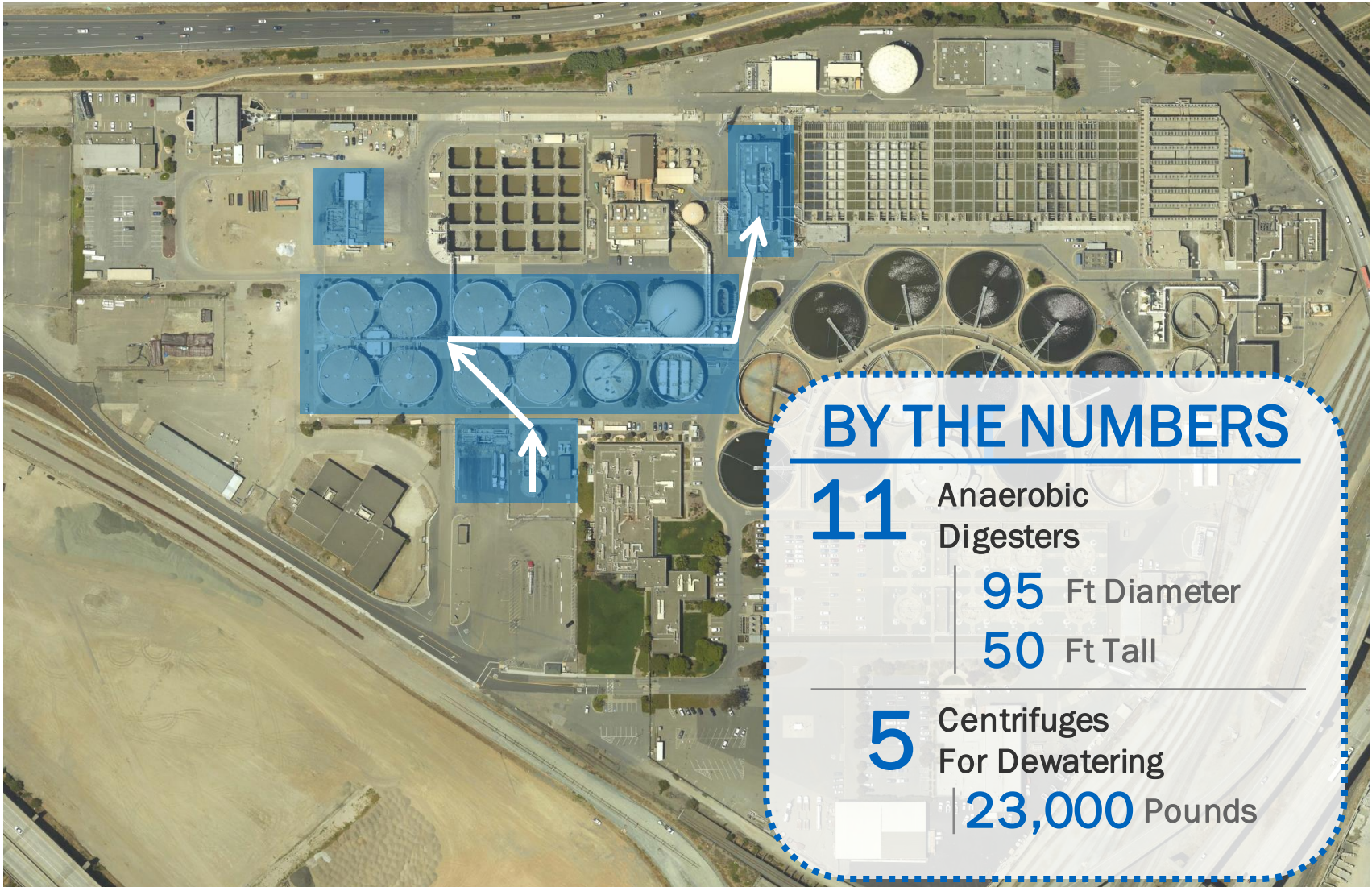


SOLIDS TREATMENT

Overview of Wastewater Treatment



Overview: Solids Treatment



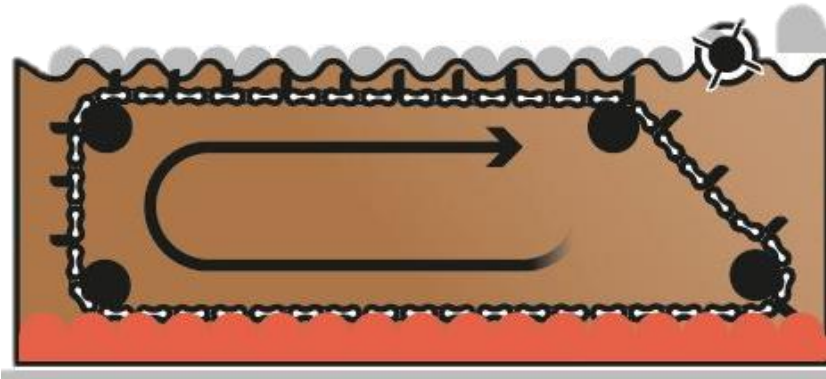
BY THE NUMBERS

11 Anaerobic
Digesters
| **95** Ft Diameter
| **50** Ft Tall

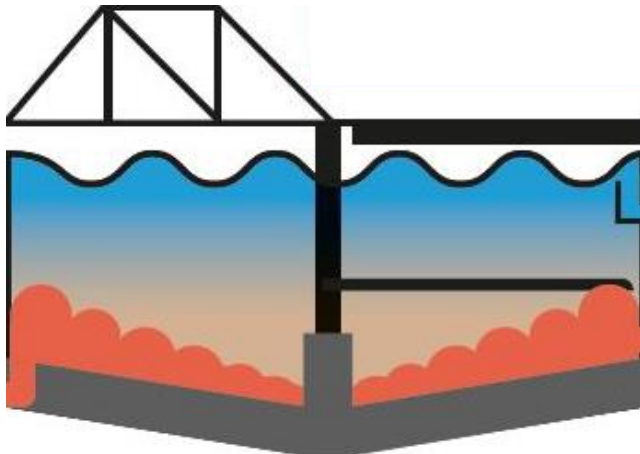
5 Centrifuges
For Dewatering
| **23,000** Pounds

3 Solids Waste Streams

1 Primary Sludge

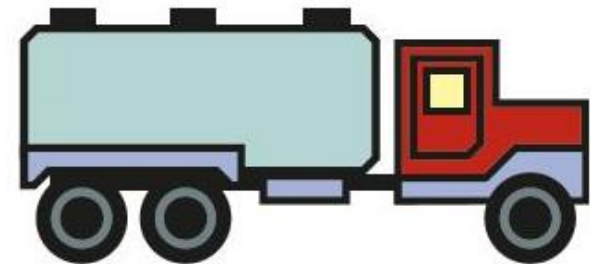


2 Secondary Sludge



3 High-Strength Waste

Fats, Oils, & Grease (FOG)
Solid Liquid Waste (SLW)



Resource Recovery Program



Protein



Dairy



Food



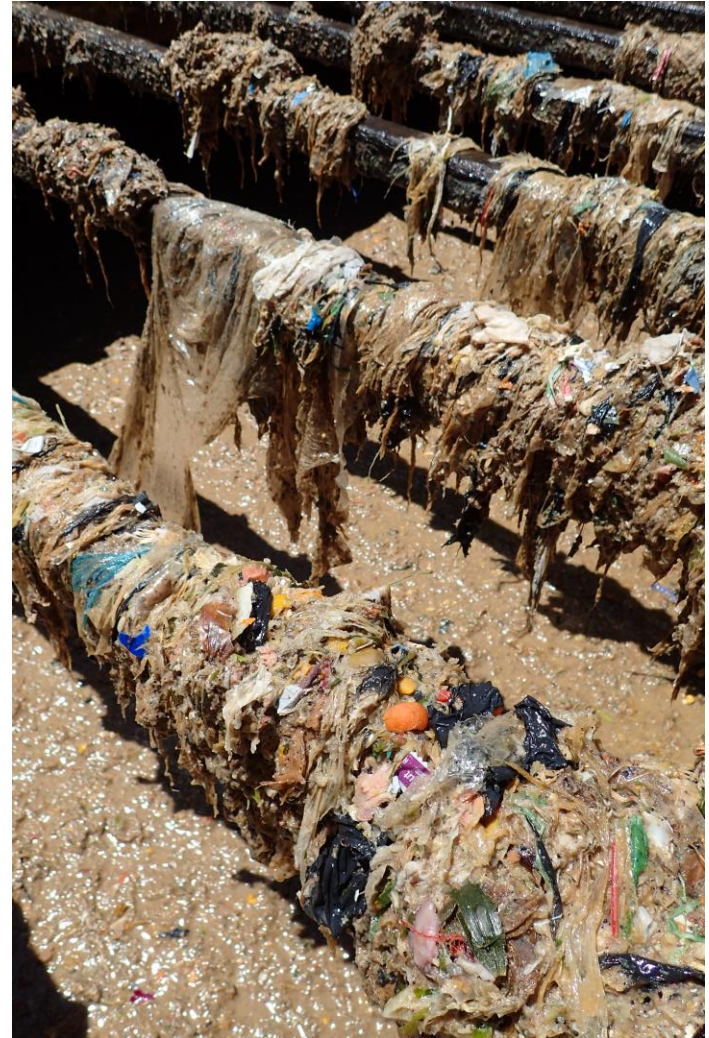
Wine

An aerial photograph of a large industrial facility, likely a wastewater treatment plant. The central area is dominated by several large, circular clarifiers arranged in a grid-like pattern. Each clarifier has a central mechanical structure. Surrounding these are rectangular aeration tanks. In the foreground, there are parking lots and a building with a complex roof structure. The background shows more industrial buildings and a large cylindrical storage tank. The text "RESOURCE RECOVERY" is overlaid in large, bold, blue letters across the center of the image.

RESOURCE RECOVERY

Resource Recovery

Abrasive Contaminants



Resource Recovery

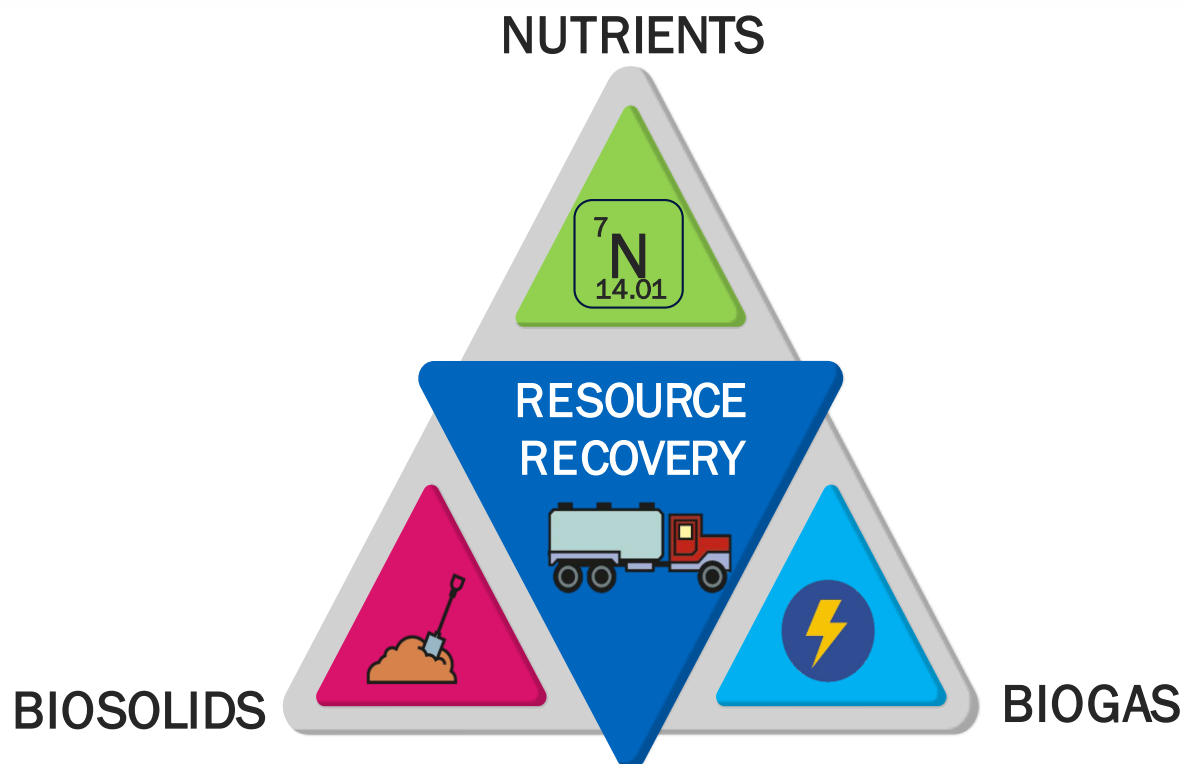
BEFORE



AFTER



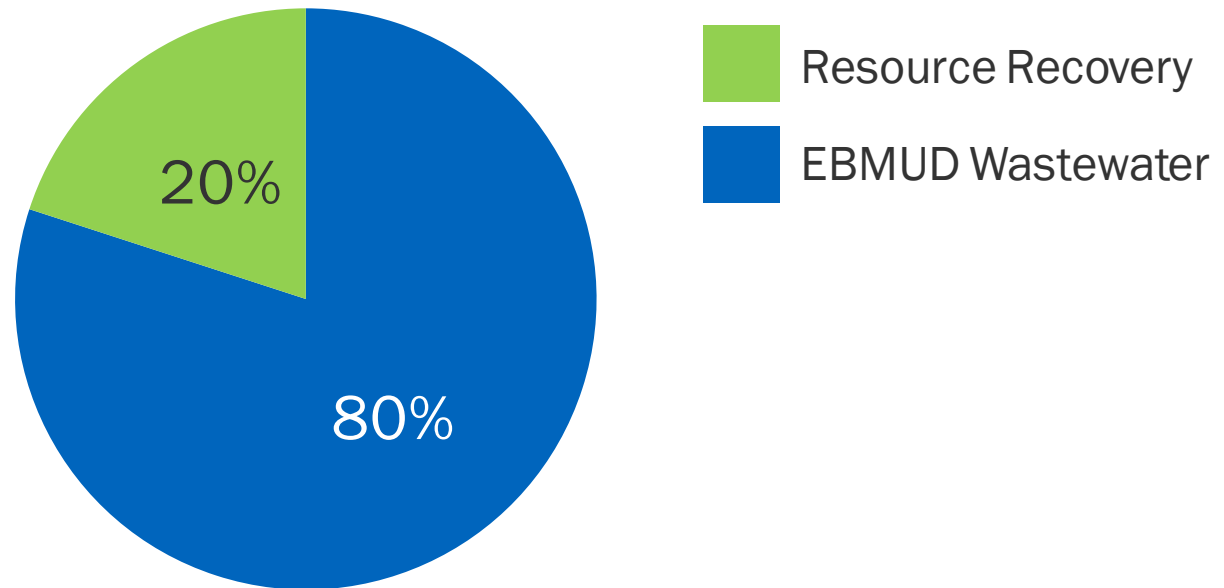
Resource Recovery



KEY TAKEAWAY

- 1 Resource Recovery impacts the wastewater treatment process in many ways – both good & bad.

Nitrogen To the Bay



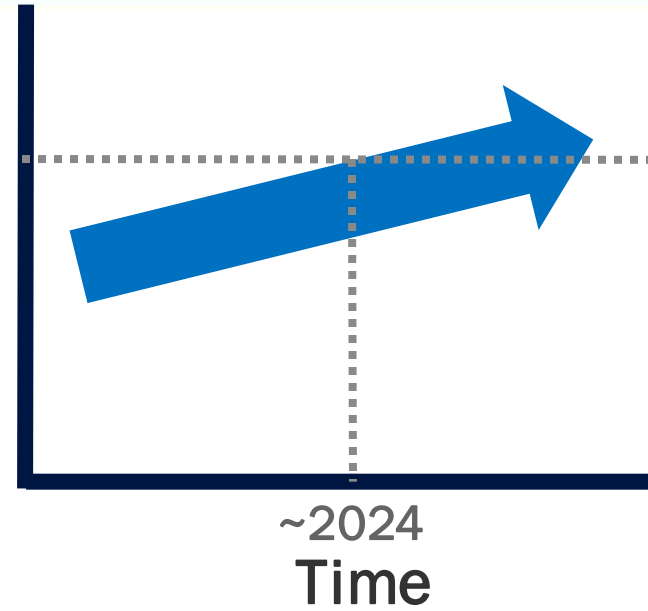
KEY TAKEAWAYS

- 1** EBMUD contributes the most nitrogen to the Bay of any POTW.
- 2** Approximately 20% of nitrogen in EBMUD's treated wastewater is from Resource Recovery.

Potential Nutrient Load Cap



Nitrogen
In EBMUD Wastewater
Discharged to Bay



KEY TAKEAWAYS

- 1 Bay stakeholders are using sound science to investigate whether the Bay is impacted by nitrogen.
- 2 If the Bay is impacted by nitrogen, then a load cap will likely be issued.
- 3 We are collaborating with the regulators to define the load cap.



Mortay

Wastewater Control Representative
Hired: 2017

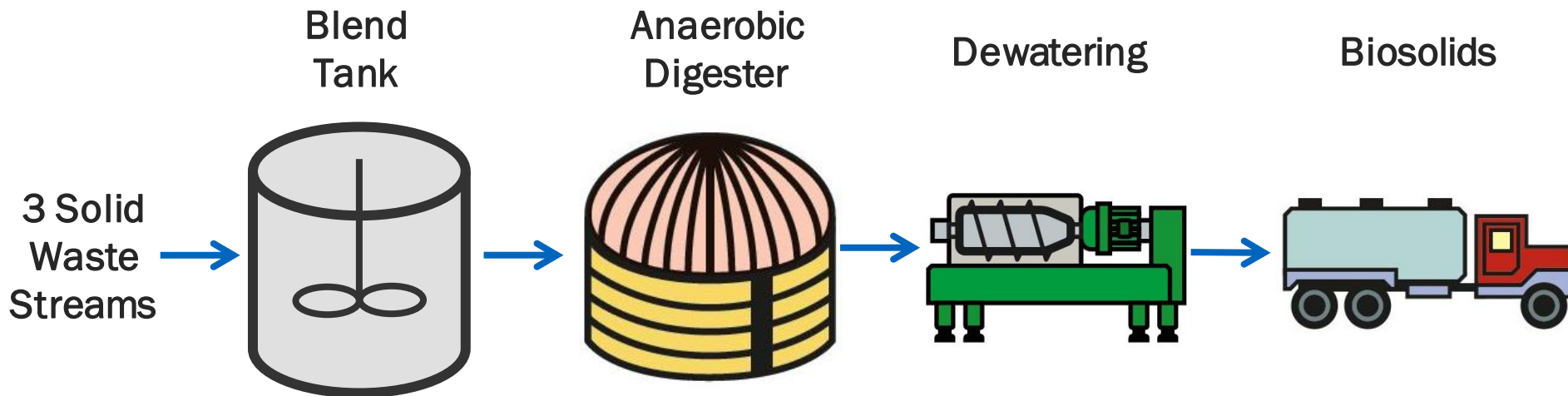
“

The R2 program was born out of creativity to better utilize existing infrastructure. While it's been very successful, more creative thinking will be needed to push the program forward into the future. That will include improvements in efficiency, infrastructure resiliency, and new ways of renewable energy utilization.”



BIOSOLIDS

Solids Treatment



KEY TAKEAWAYS

- 1** Anaerobic digestion breaks down the solids at high temperatures for a long period of time, which kills pathogens.
- 2** Dewatering removes excess water for hauling.
- 3** Biosolids are a nutrient-rich end product.

End Uses of Biosolids



57%

Farms (Land Application)



36%

Landfills (Alternative Daily Cover)



7%

Compost Facilities



Senate Bill 1383

BY THE NUMBERS

40% Reduction in Methane Emissions by 2030

75% Diversion of Organics Away from Landfills

15% CA Biosolids Requiring New End Use

2022 Law Takes Effect

End Uses of Biosolids



Farms

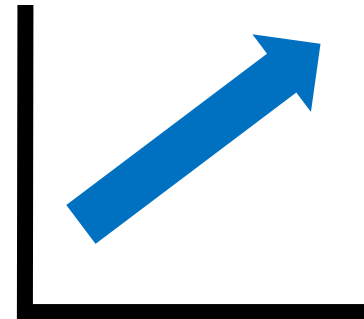


Compost



Landfill

Costs



Time

KEY TAKEAWAY

- 1 Biosolids management costs have already begun increasing, and will continue to rise.

Anaerobic Digesters

Interior Lining



Metal Coating



Floating Cover



Steel Cover

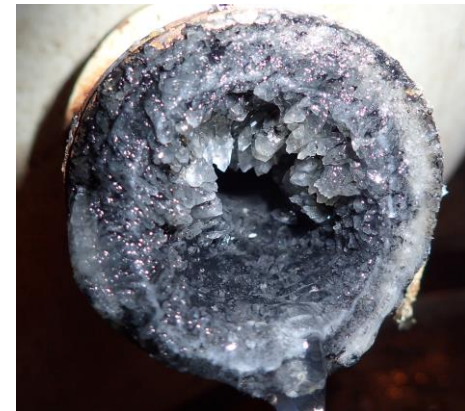


Solids Treatment Lining

Deteriorated Lining Inside Pipe and Digester



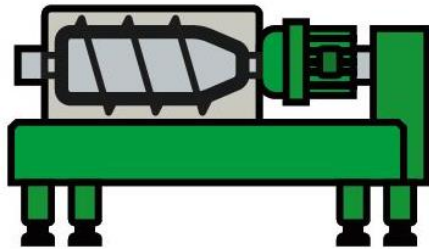
Struvite



KEY TAKEAWAY

- 1 Struvite impacts many types of infrastructure across multiple treatment processes, and is a constant challenge for O&M.

Dewatering



KEY TAKEAWAYS

- 1 More time is spent fixing spontaneous failures at Dewatering than any other part of the plant.
- 2 Failures must be immediately addressed, thereby disrupting maintenance elsewhere in the plant.



Juan

Assistant WW Shift Supervisor
Hired: 2014

“

Our Dewatering infrastructure experiences daily wear & tear from our unique waste streams. As a result, it ages fast and is prone to frequent failures.

When multiple trains fail at the same time, it causes a bottleneck and disrupts other areas of the MWWTP. ”

Dewatering

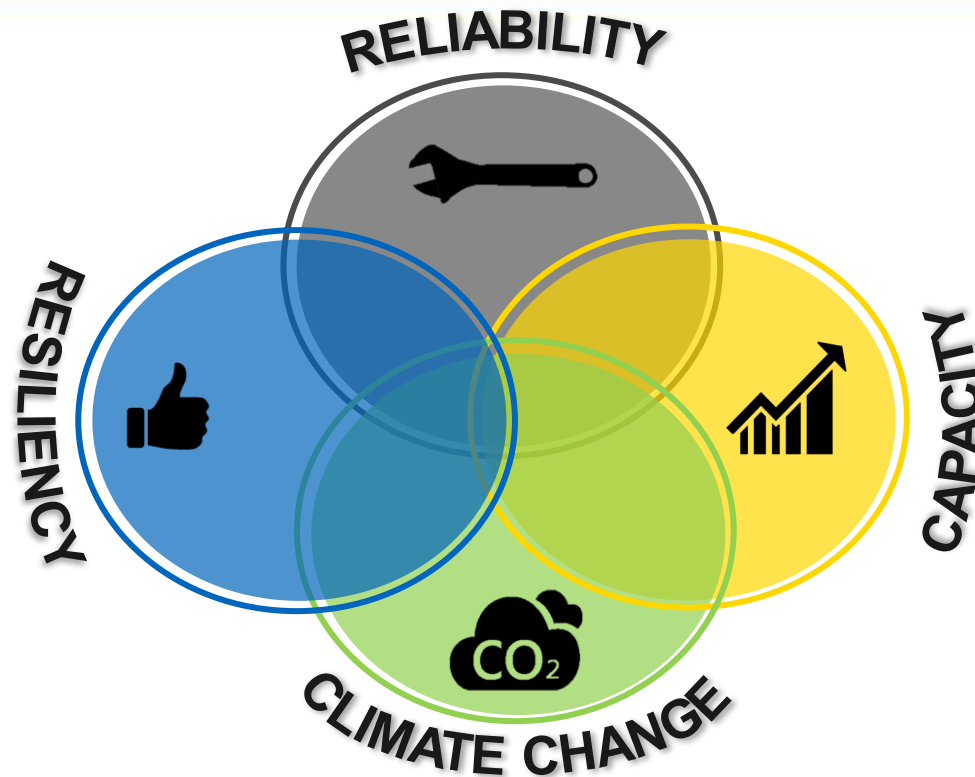
Remember these photos?



KEY TAKEAWAYS

- 1 Grit that was not removed effectively upstream damages and disrupts Dewatering.
- 2 Action has been taken to mitigate the impact of grit, and preliminary findings are promising.

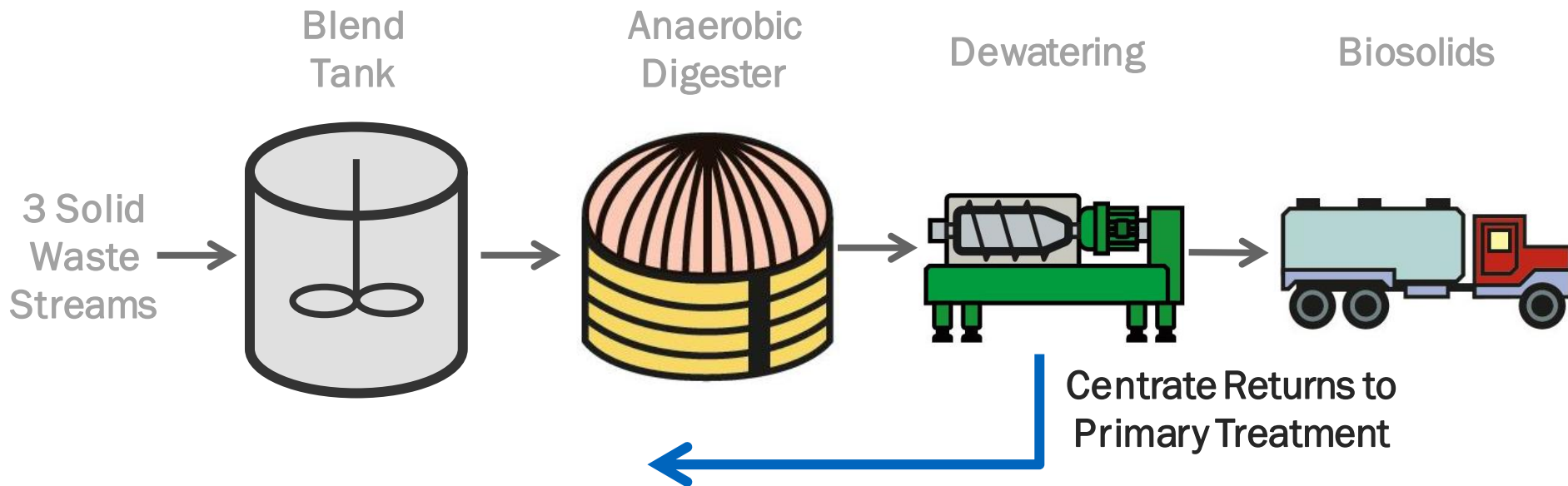
Dewatering Evaluation



KEY TAKEAWAY

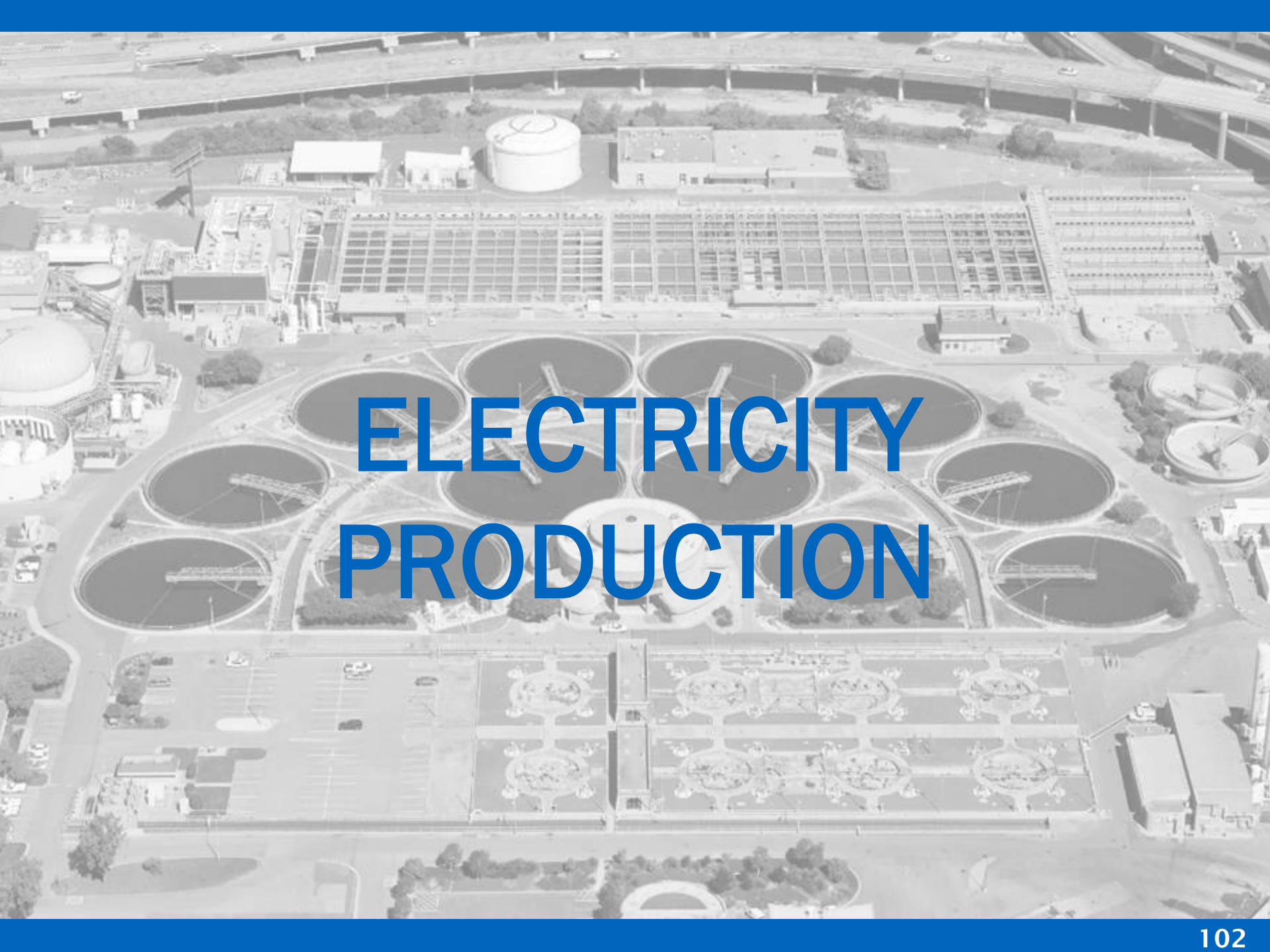
- 1 There are many opportunities to improve Dewatering in terms of functionality, reliability, resilience, & sustainability.

Solids Treatment



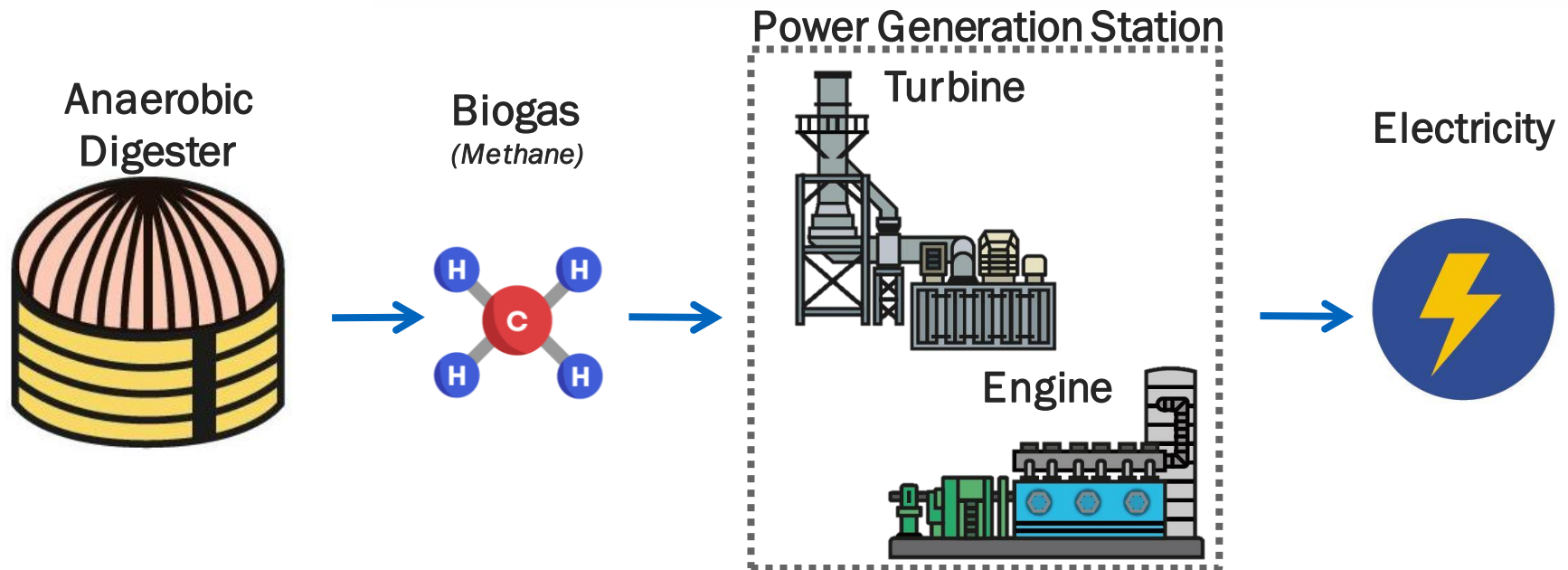
KEY TAKEAWAYS

- 1** Centrate is a concentrated stream that is returned back to primary treatment.
- 2** One method to reduce nutrients to the Bay is to treat centrate directly (sidestream treatment).

An aerial photograph of a large industrial facility, likely a wastewater treatment plant. The central area is dominated by several large, circular aeration tanks, each with a mechanical arm extending into the water. Surrounding these are numerous rectangular basins and smaller circular structures. In the background, there are large storage tanks and various industrial buildings. The foreground shows a parking lot and some landscaped areas with trees. The entire image is overlaid with a semi-transparent blue layer, and the text "ELECTRICITY PRODUCTION" is written in large, bold, blue capital letters across the center.

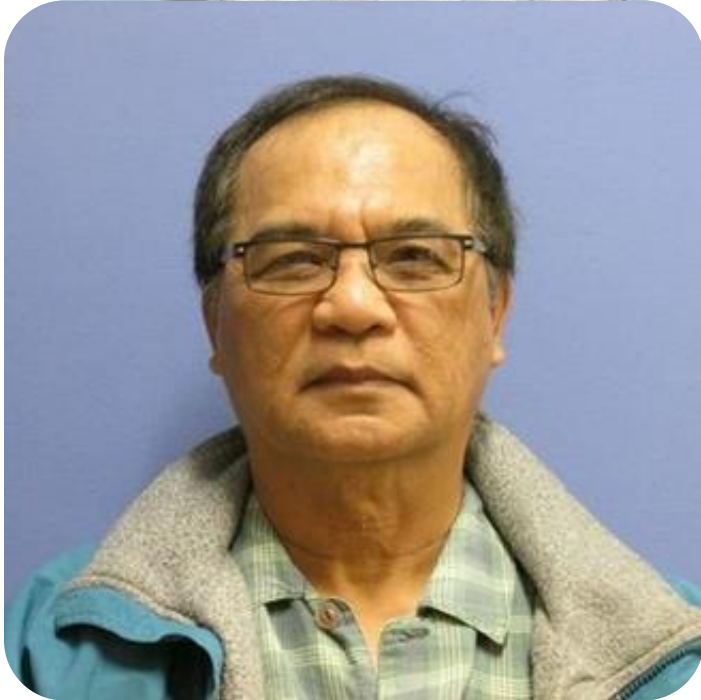
ELECTRICITY PRODUCTION

Electricity Generation



KEY TAKEAWAYS

- 1 Anaerobic digestion produces energy-rich biogas.
- 2 Electricity is produced using the turbine or engines.
- 3 Enough electricity is produced to power the entire MWWTP.



Abraham

Power Plant Supervisor

Hired: 2012



The Power Generation Station (PGS) is very complex in terms of mechanical and electrical equipment.

In other parts of the plant, when equipment fails, it doesn't necessarily trigger an emergency response. In contrast, at the PGS, failures require immediate attention. ”

Power Generation Station

Build Up of Pyrophoric Iron



Corrosion

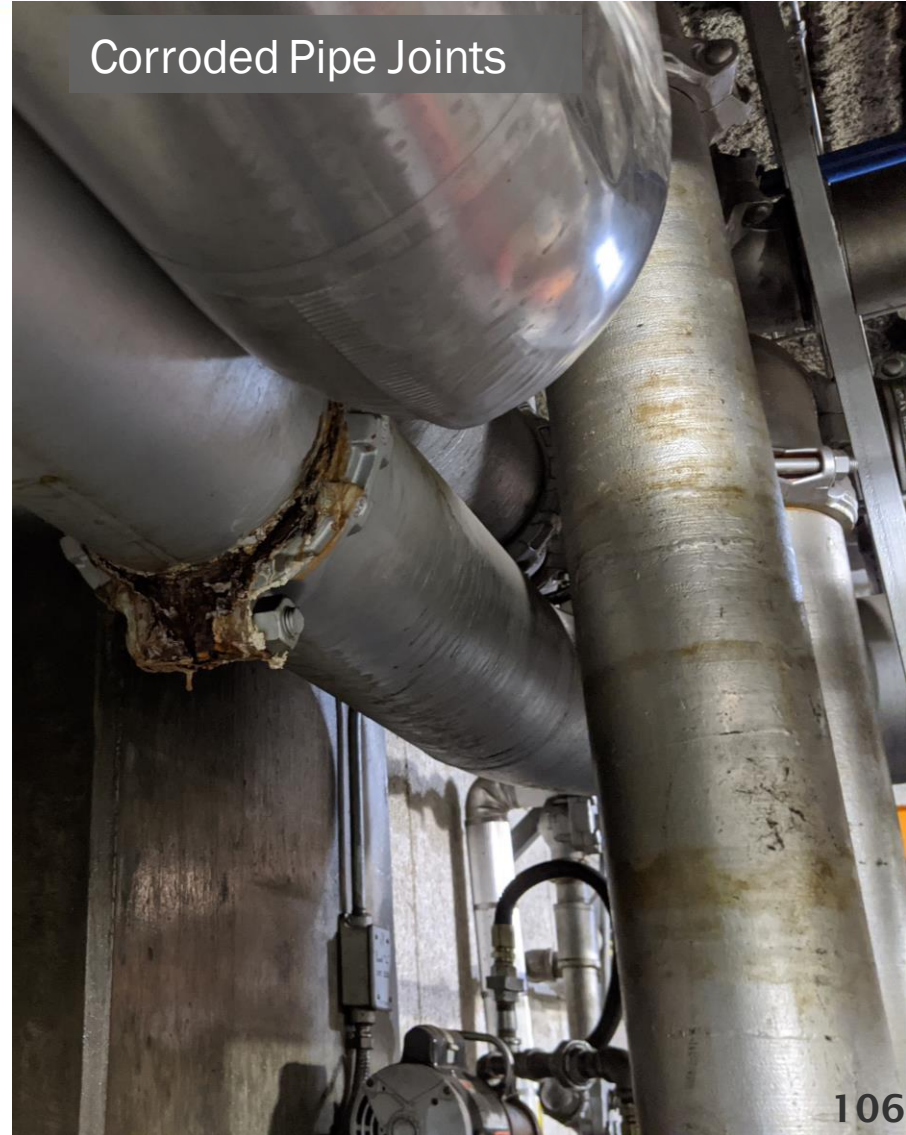


Power Generation Station

Temporary Pipe Repair



Corroded Pipe Joints



Portable Fans for Ventilation of Leaking Gas



An aerial photograph of a large industrial facility, likely a wastewater treatment plant. The central area is dominated by several large, circular clarifiers arranged in a grid-like pattern. Each clarifier has a central mechanical structure. Surrounding these are rectangular aeration tanks. In the foreground, there is a large, circular building and a parking lot. The background shows more industrial structures and a highway. The word "ELECTRICAL" is overlaid in large, blue, sans-serif capital letters across the center of the image.

ELECTRICAL



Sonja

Associate Electrical Engineer

Hired: 2008

“

Replacing aging electrical equipment is an investment in the safety of our personnel. It is also an investment in the reliability of our system that will always outweigh an unexpected outage due to equipment failure. ”

Motor Control Centers



KEY TAKEAWAY

- 1 Old electrical equipment is obsolete, and finding replacement parts is a challenge.

Miscellaneous Electrical

Obsolete Electrical Drive



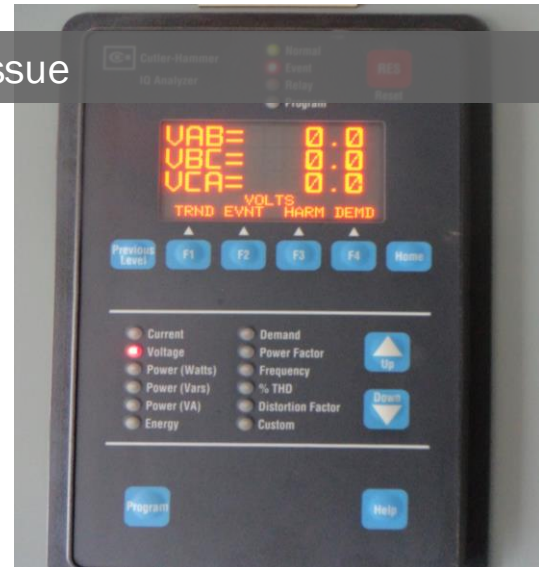
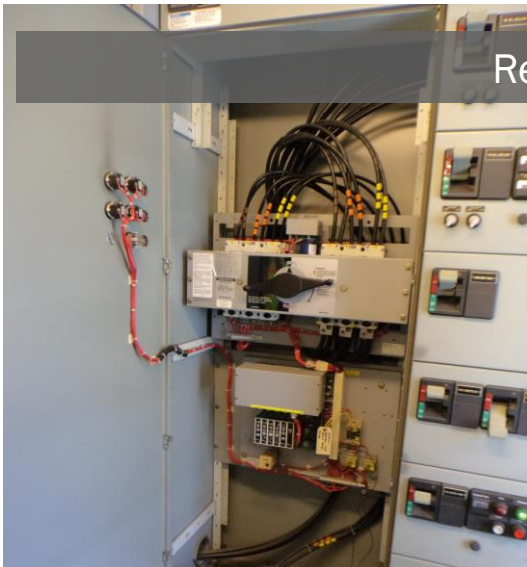
Antiquated PA System



Needs Security Upgrade



Requires Upgrading Due to Safety Issue



An aerial photograph of a large industrial facility, likely a wastewater treatment plant. The central area is dominated by several large, circular clarifiers arranged in a grid-like pattern. Each clarifier has a central mechanical structure. Surrounding these are numerous rectangular aeration tanks. In the foreground, there is a large, circular building with a flat roof, possibly a control building or a storage tank. To the left, there are more circular structures, some with domed roofs. The background shows a highway with multiple lanes and some trees. The overall scene is a complex of industrial infrastructure.

FACILITIES

Seismic Risk



Administration/Lab Building Roof



Air Chiller



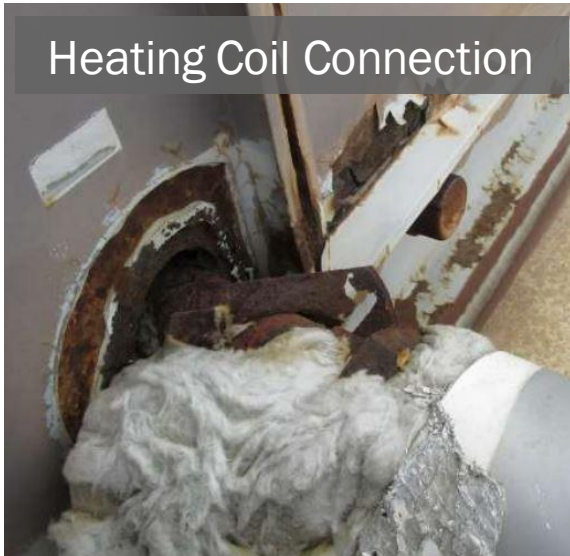
Air Handling Unit



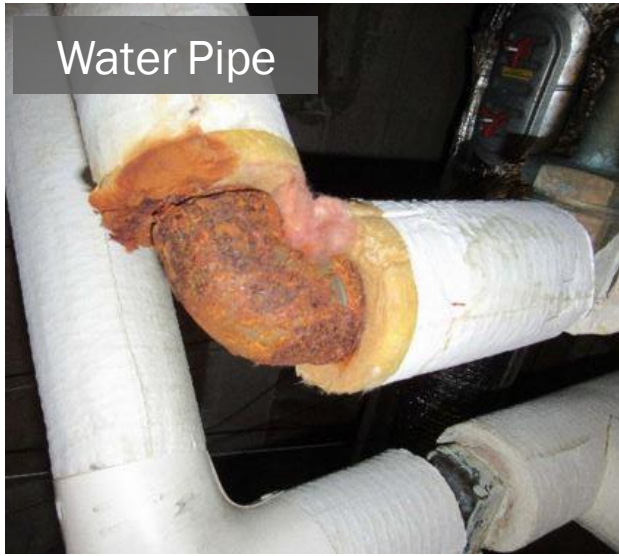
Air Handling Unit



Heating Coil Connection

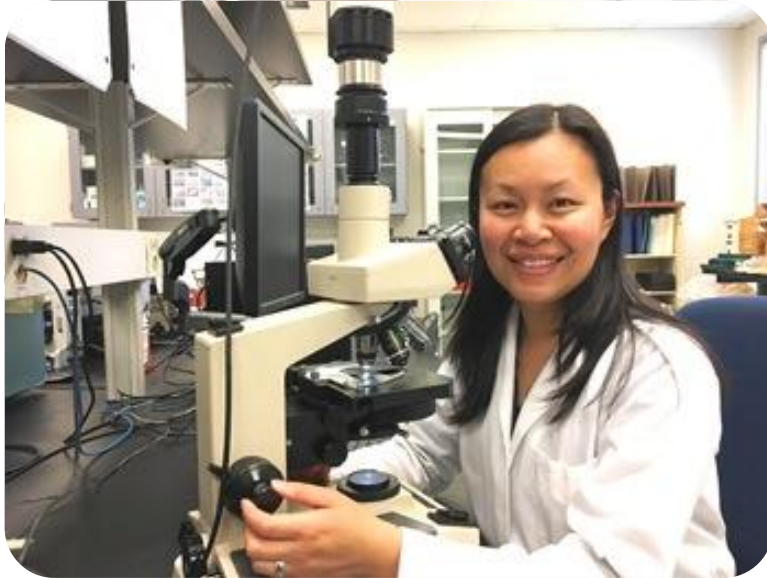


Water Pipe



Coil Module Reducer





Irene

Laboratory Supervisor

Hired: 2006

“

With the current HVAC system, we frequently aren't able to maintain a stable room temperature for a regulatory compliance laboratory analysis that requires a narrow band of temperature. ”

Operations Center



Roof Replacement



18B - Roof #2

Functional & Aesthetic Improvements



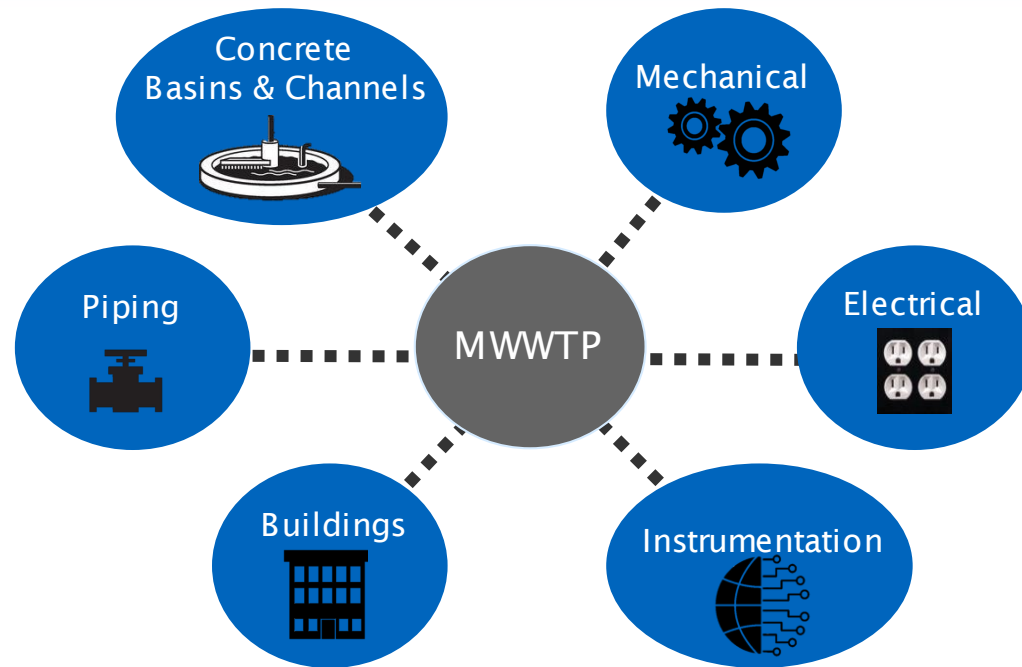


CONCLUSIONS & NEXT STEPS

Conclusions



Key Takeaways

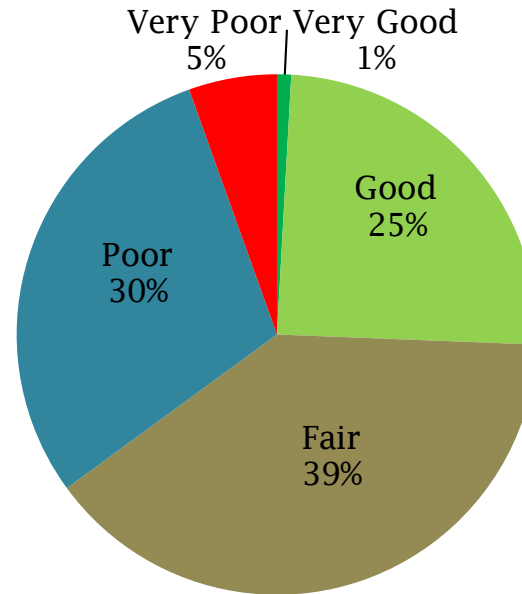


KEY TAKEAWAYS

- 1 Wastewater treatment involves many types of infrastructure.
- 2 Each type of infrastructure has different needs, vulnerabilities, & life expectancy.

Key Takeaways

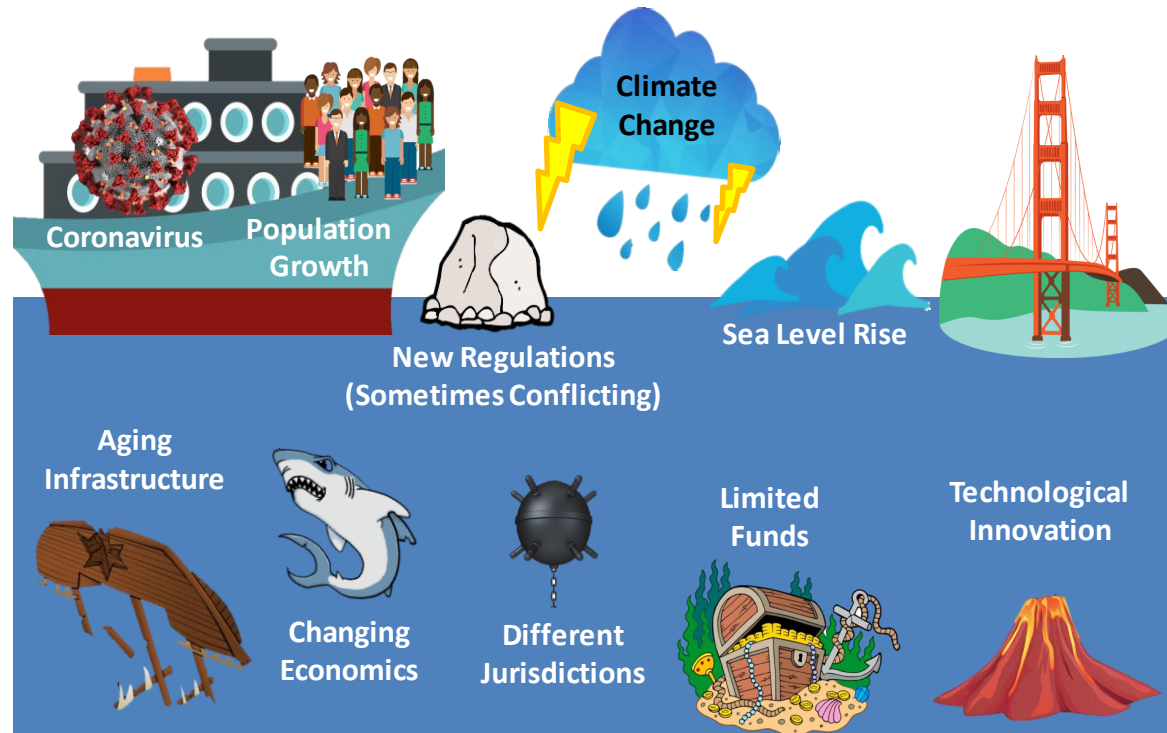
Condition Distribution
(By Monetary Value)



KEY TAKEAWAYS

- 1 Infrastructure is aging & deteriorating.
- 2 Repairing infrastructure will always be a core component to ensuring 24/7 wastewater treatment.

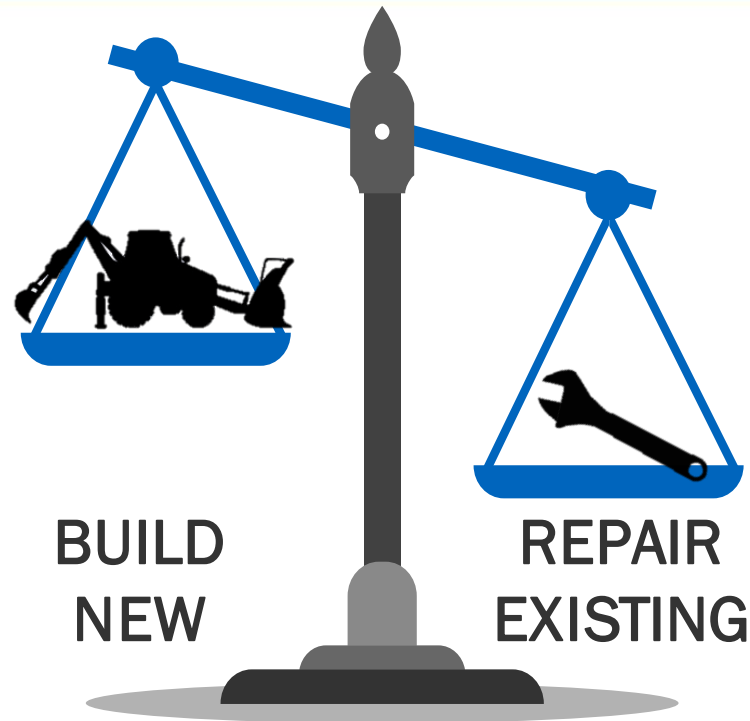
Key Takeaways



KEY TAKEAWAY

- 1 Major investments will be needed to address the other competing priorities besides aging infrastructure.

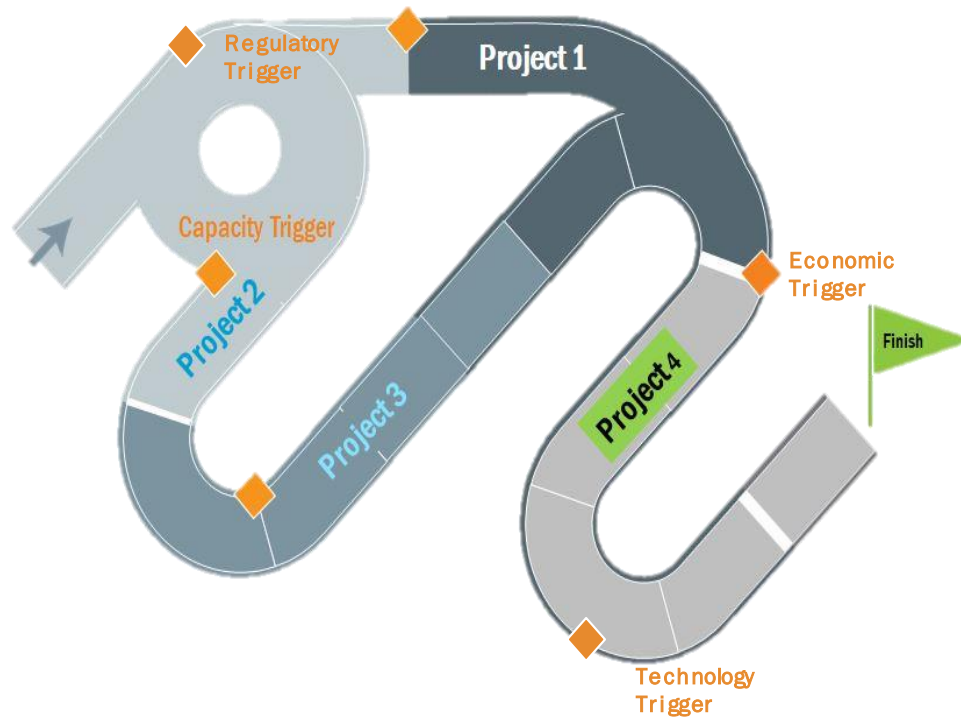
Key Takeaways



KEY TAKEAWAY

- 1 Strategic planning is critical to ensuring that all infrastructure investments are “no regrets.”

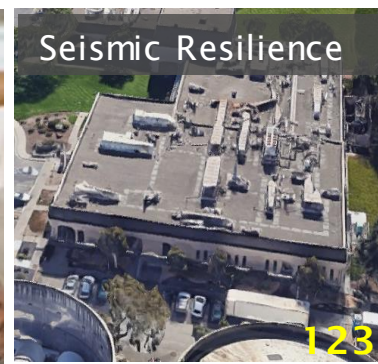
Roadmap



KEY TAKEAWAYS

- 1 Non-linear
- 2 Phased based on triggers
- 3 Adaptable for uncertainties
- 4 Informs CIP & site use

Upcoming Infrastructure Workshop





Thank you!
Any questions?