



# West County Wastewater Clean & Green Upgrading to the Future

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Guyton Durnin, PE, CCM, Construction Manager, HDR INC

# Introductions



**Keith Reynolds Jr., PMP**  
Senior Project Manager



**Guyton Durnin, PE, CCM**  
Construction Manager



# Outline

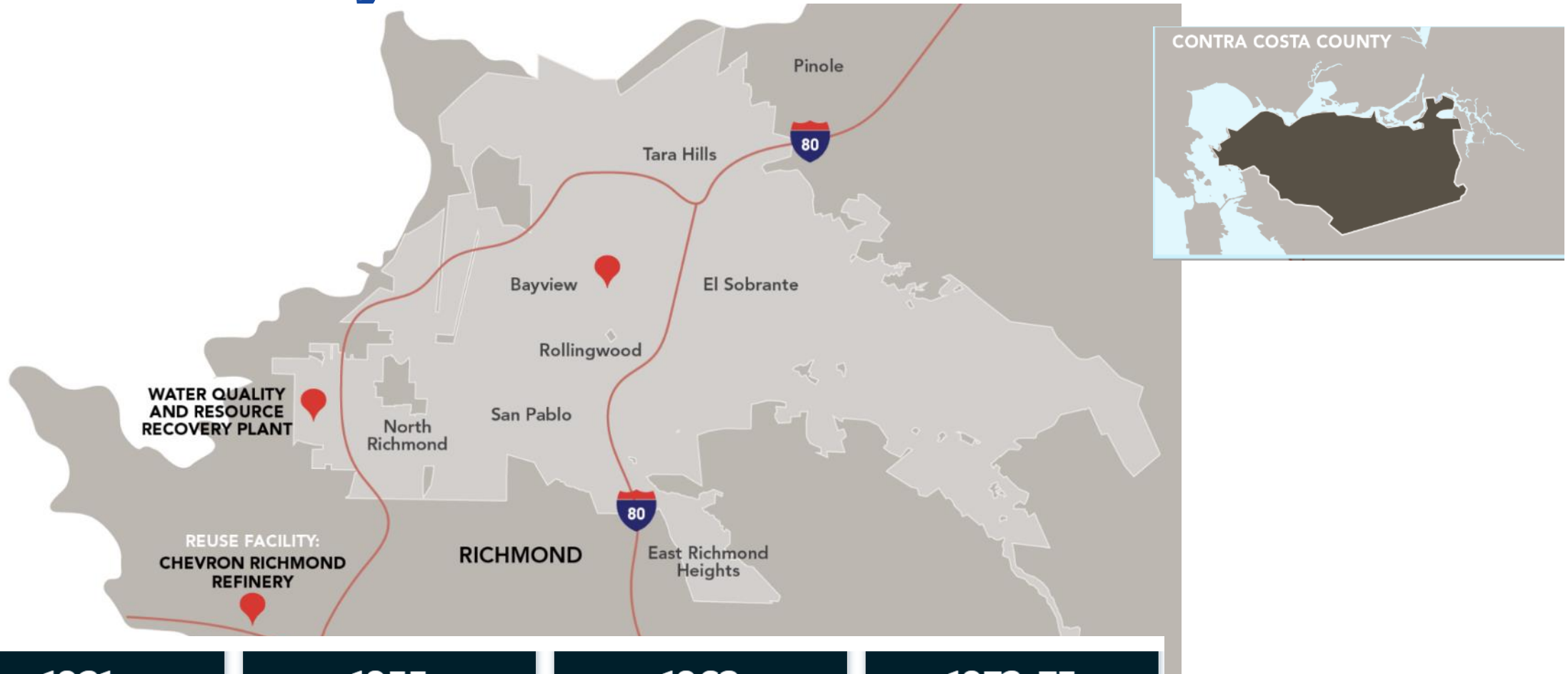
- I. West County Wastewater Clean & Green Project
- II. Progressive Design Build Contract Considerations
- III. AWWA D110 Type I Prestressed Concrete Digesters
- IV. Q&A



# West County Wastewater Clean & Green Project

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# West County Wastewater



**1921**

West County Wastewater District formed to serve 15,000 residents in San Pablo and North Richmond. 24-inch outfall to Castro Creek

**1955**

Constructed a 6 million gallon-per-day (mgd) primary treatment plant

**1963**

Sludge drying lagoon and other improvements

**1972-75**

Secondary treatment expansion to 12.5 mgd



# Past/Current Operations

- ▶ Old Digesters red tagged; WCW lost the opportunity to create biogas for cogeneration
- ▶ Old DAFT technology



# Past/Current Operations

- ▶ \$2-\$6M/year in excess belt press contractor fees & landfill disposal
- ▶ Use of drying beds means methane escapes to atmosphere



# Resiliency and Outages

- ▶ Power Outages are on the rise (From 2018 – 2019):
  - Black out events increased 23%
  - Utility customers impacted by outages increased by 50%
  - Public Safety Power Shutoffs (PSPS) also increased
- ▶ Communities under pressure to adapt
- ▶ Funding for energy resiliency is available
  - Self-Generation Incentive Program (SGIP)
  - Inflation Reduction Act (IRA)

TOTAL BLACKOUTS

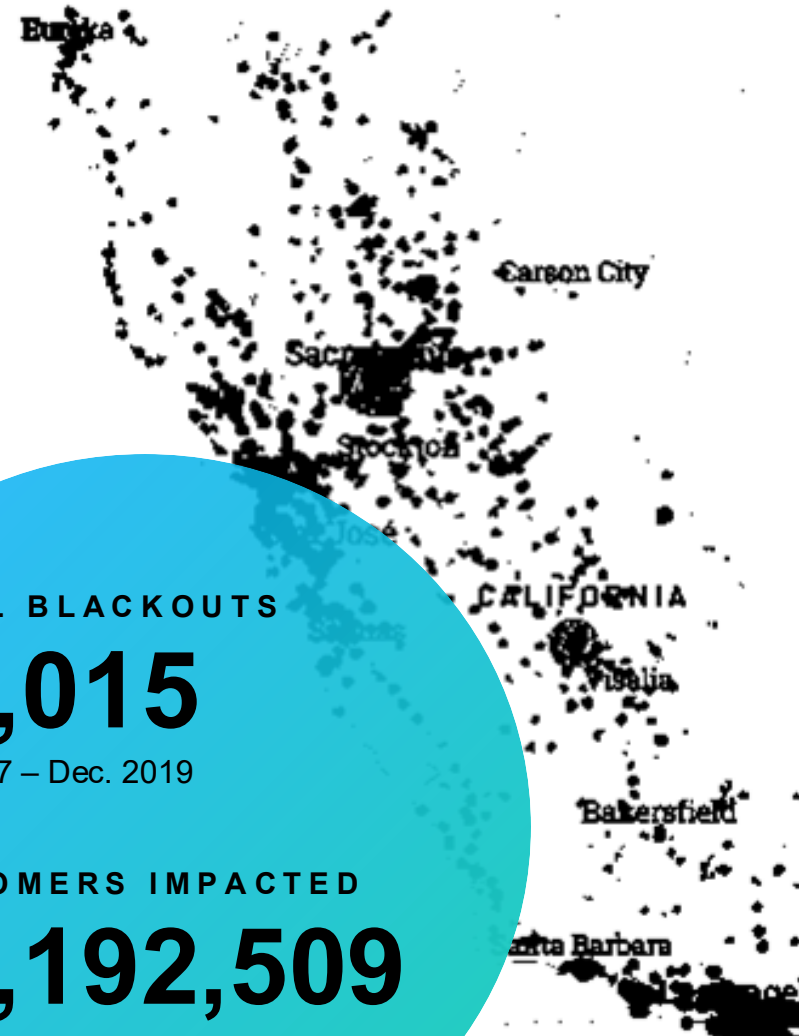
**50,015**

Oct. 2017 – Dec. 2019

CUSTOMERS IMPACTED

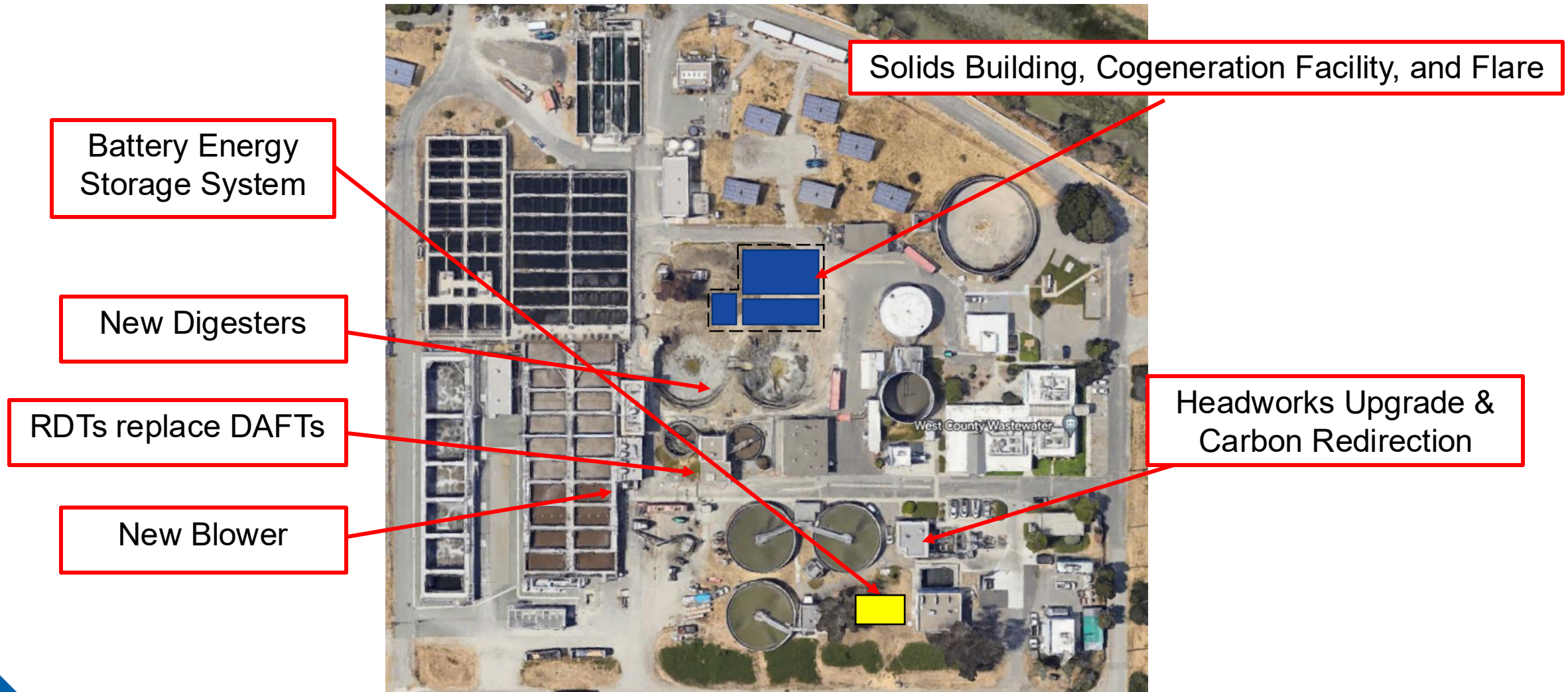
**51,192,509**

Oct. 2017 – Dec. 2019





# Clean & Green Project



# Clean & Green WCW Team



WEST COUNTY  
WASTEWATER

CLEAN & GREEN PROJECT



WEST COUNTY  
WASTEWATER



BEI  
CONSTRUCTION, INC.



OPTERRA  
ENERGY SERVICES



BLMYER  
ENGINEERS



PACE  
Advanced Water Engineering



DN  
TANKS



CONSTRUCTION



LEE+RO  
WATER INFRASTRUCTURE ENGINEERS

KENWOOD ENERGY

The Process Group



WATER  
ENGINEERS



Oct 9, 2023 at 2:45:49 PM  
Richmond CA 94801  
United States



# Project Benefits

- ▶ Increased power resiliency and reliability during planned/unplanned utility power outages
  - Uninterrupted plant operations
  - Less disruption for WCW O&M staff
  - Enables cogeneration and solar PV systems to operate during a power outage
- ▶ Reduction in GHG emissions (93% total reduction)
- ▶ Reduction of annual utility power cost (4.2M kWh/yr and \$83M project savings)
  - Battery will be used as energy source during peak PG&E hours to reduce PG&E energy usage/cost
- ▶ Be a community leader for sustainability and resiliency



# Why is WCW Doing this?

- ▶ WCW's Comprehensive Climate Resiliency Upgrade Plan
  - Installation of linear sewer pipe to combat I&I the reducing the amount of influent at the WQRRP. (Commitment of 2 miles replaced annually)
  - Construction of the Clean and Green Project (roughly a 80-million-dollar investment into WQRRP Improvements)
  - Design, Collaboration, and Construction of the North Richmond Living Levee Project to protect the investments of WCW and its ratepayers.





# New Aeration Blower Successfully Started-Up

- ▶ Increased power resiliency and reliability during planned/unplanned utility power
- ▶ New high-efficiency aeration blower:
  - Installed: 2/21/2023
  - O&M Staff Training Completed: 3/1 and 3/8/2023
  - Beneficial use: 4/19/2023
- ▶ WCW/ENGIE coordinated closely to have seamless operations during shut-downs and start-ups required
- ▶ New blower has reduced aeration energy demand by roughly 75%- \$75k/yr



Starting the blower for the first time

# EQ Basin



Construction of New EQ Basin started in Oct 2022



EQ Basin Completed Oct 2023 due to heavy rains



# Digesters and Solids Building



New Digesters and Solids building.



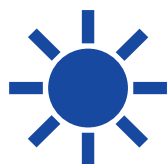
Aerial photo of Digester excavation area.

# Planned Resiliency and PV



## Planned resiliency facilities include:

Battery Energy Storage System (BESS)  
Microgrid controller  
Transformer



## Proposed facilities would provide backup power to major energy facilities at the WQRRP:

New cogeneration system  
New solar photovoltaic (PV)  
Existing solar (PV)  
Existing diesel generator



Planned Tesla Battery that will provide backup power to WQRRP facilities.



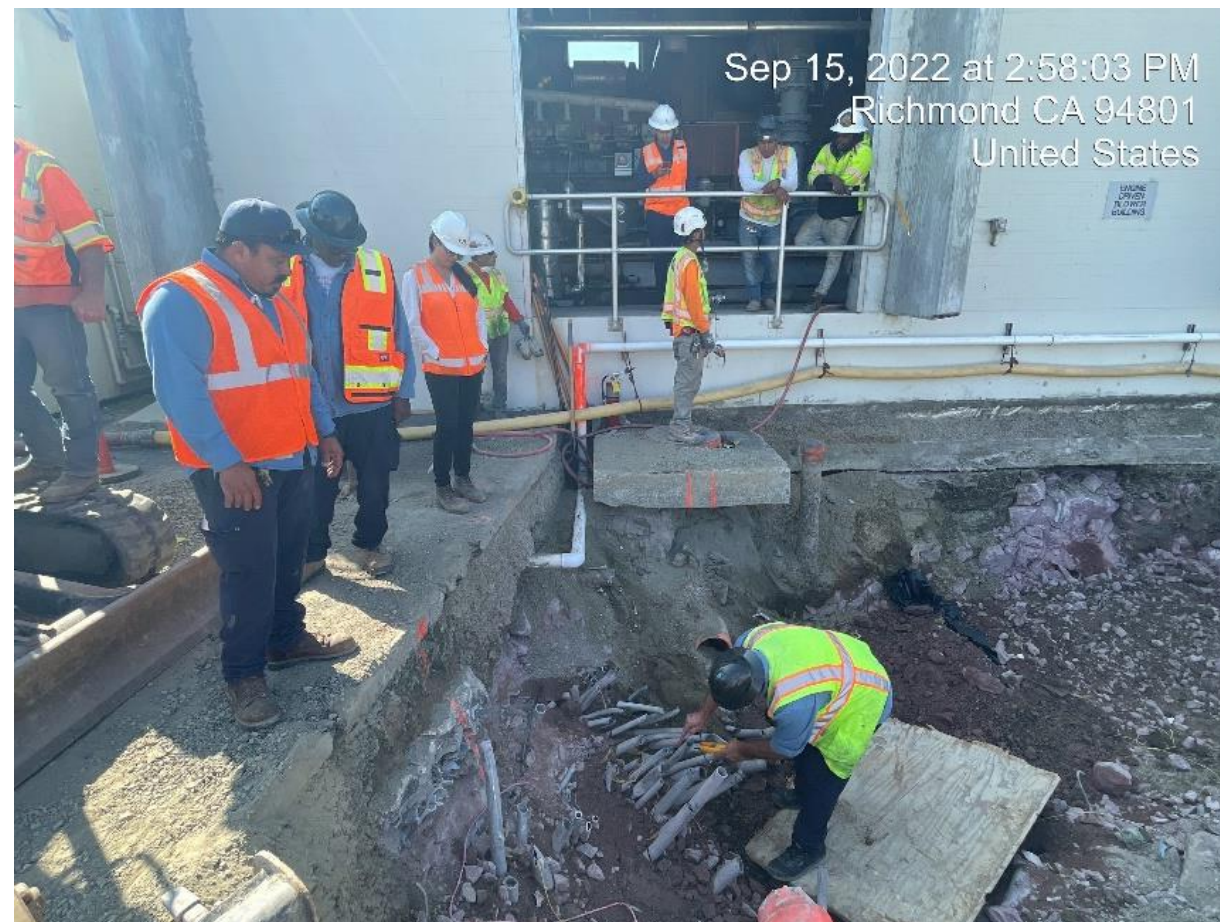
# Progressive Design Build Contract Considerations

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# Challenges on Clean and Green Project

- ▶ Design Build with an ESCO – moving quickly
- ▶ Some construction staff have never been at wastewater treatment plant before
- ▶ Facility has many constraints including it must stay operational- maximum 12 hr shutdown coupled with 100+ year storms
- ▶ Facility has had construction for almost 70 years, so many unlabeled, abandoned and still operational pipes in the ground with nothing on the as-builts

# Unexpected Pipelines and Missing As-Builts



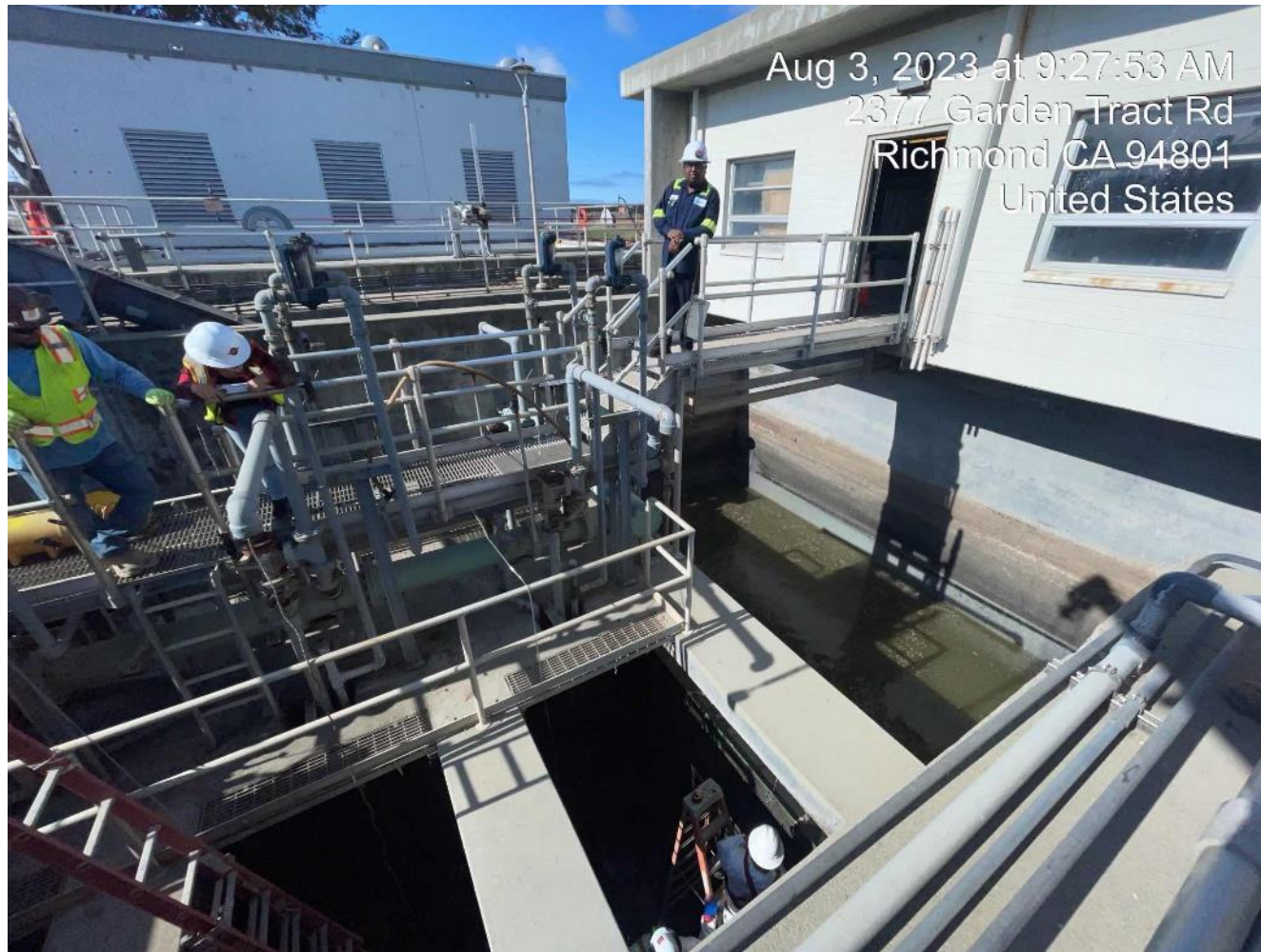


# Storms and Keeping Plant Operational

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United States

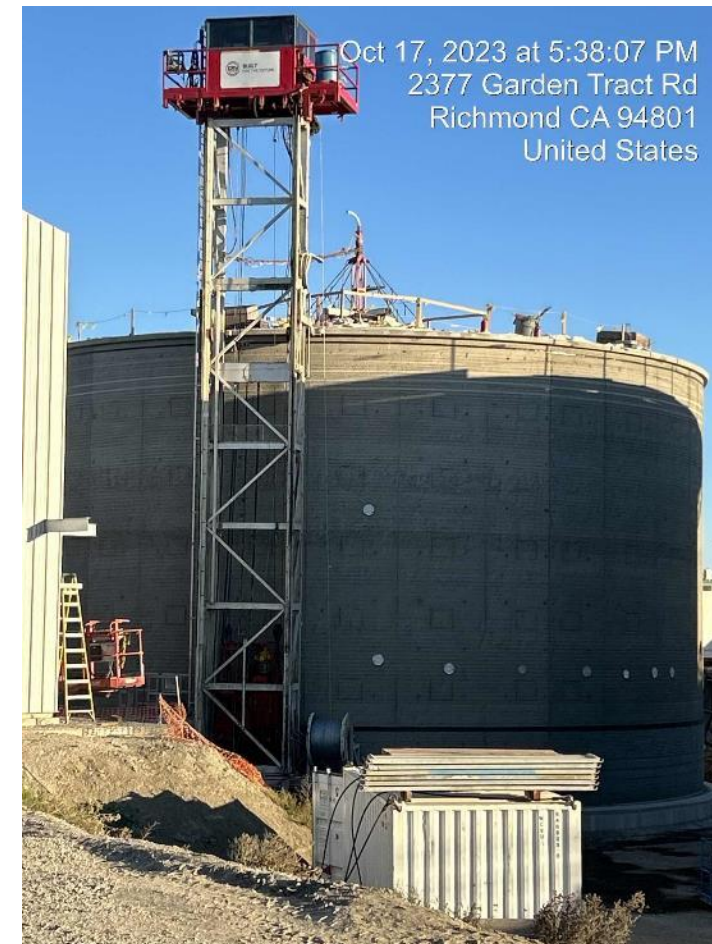
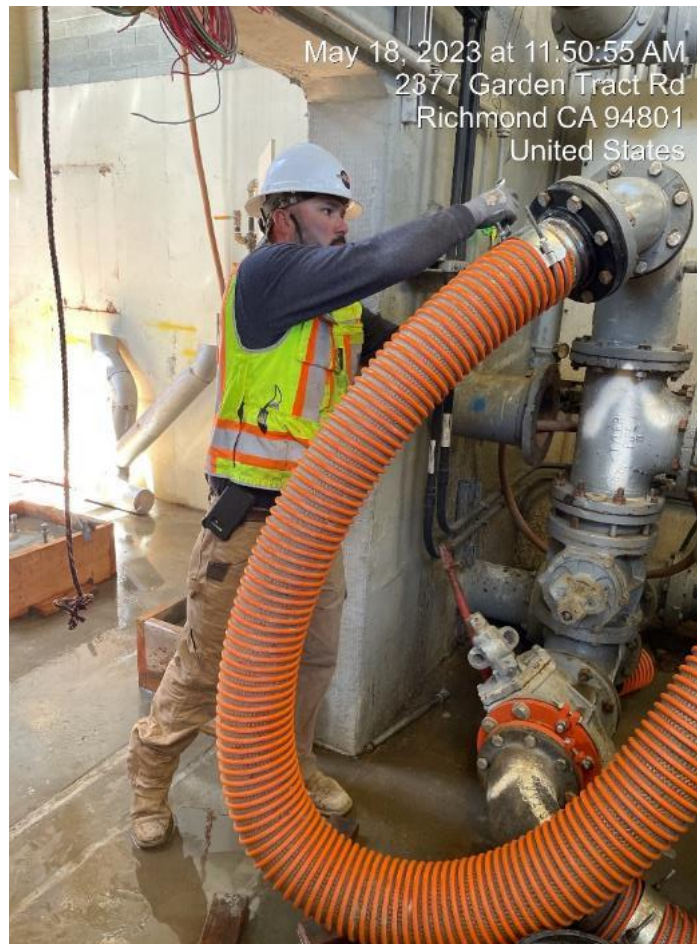
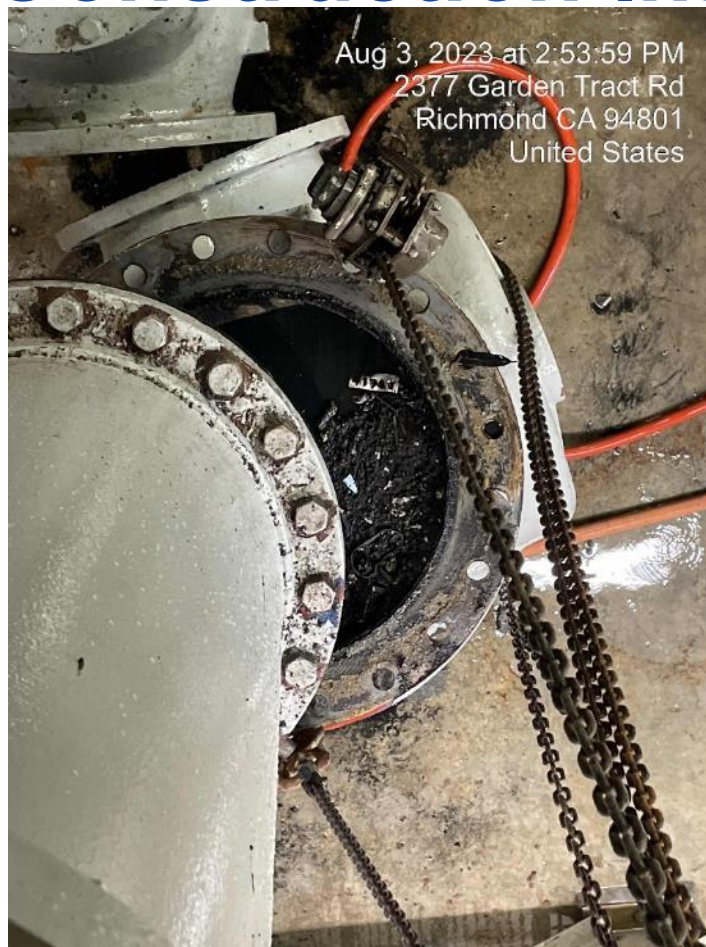


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Richmond CA 94801  
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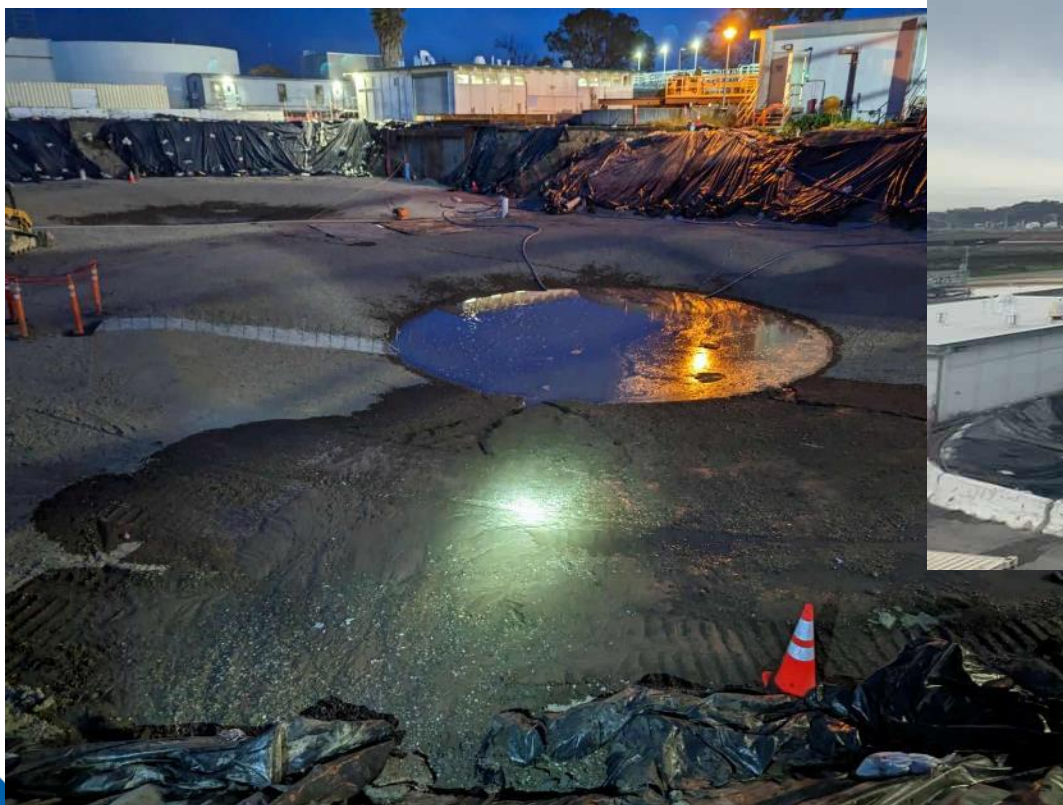
# Construction Impacts Plant Operations





# Plant Operations Impacts Construction

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# Permit Impacts and Outside Agencies

- ▶ BAAQMD
- ▶ PG&E Interconnects





# Communication and Coordination!!



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# Questions & Answers

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