

2023 PNWS-AWWA SPRING CONFERENCE

Setting the Standard: City of Lacey pH Treatment Projects

Presented by:

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Key Points



**City of Lacey Program
for Systemwide
Corrosion Control**



**Benefits of
Standardizing
Similar Facilities**



**Examples of
Customizing
Standard Designs**

Agenda

01 Background

02 Common Design Features

03 Westside Wells Highlights

04 Madrona Wells Highlights

05 Project Status and Closing

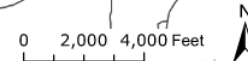
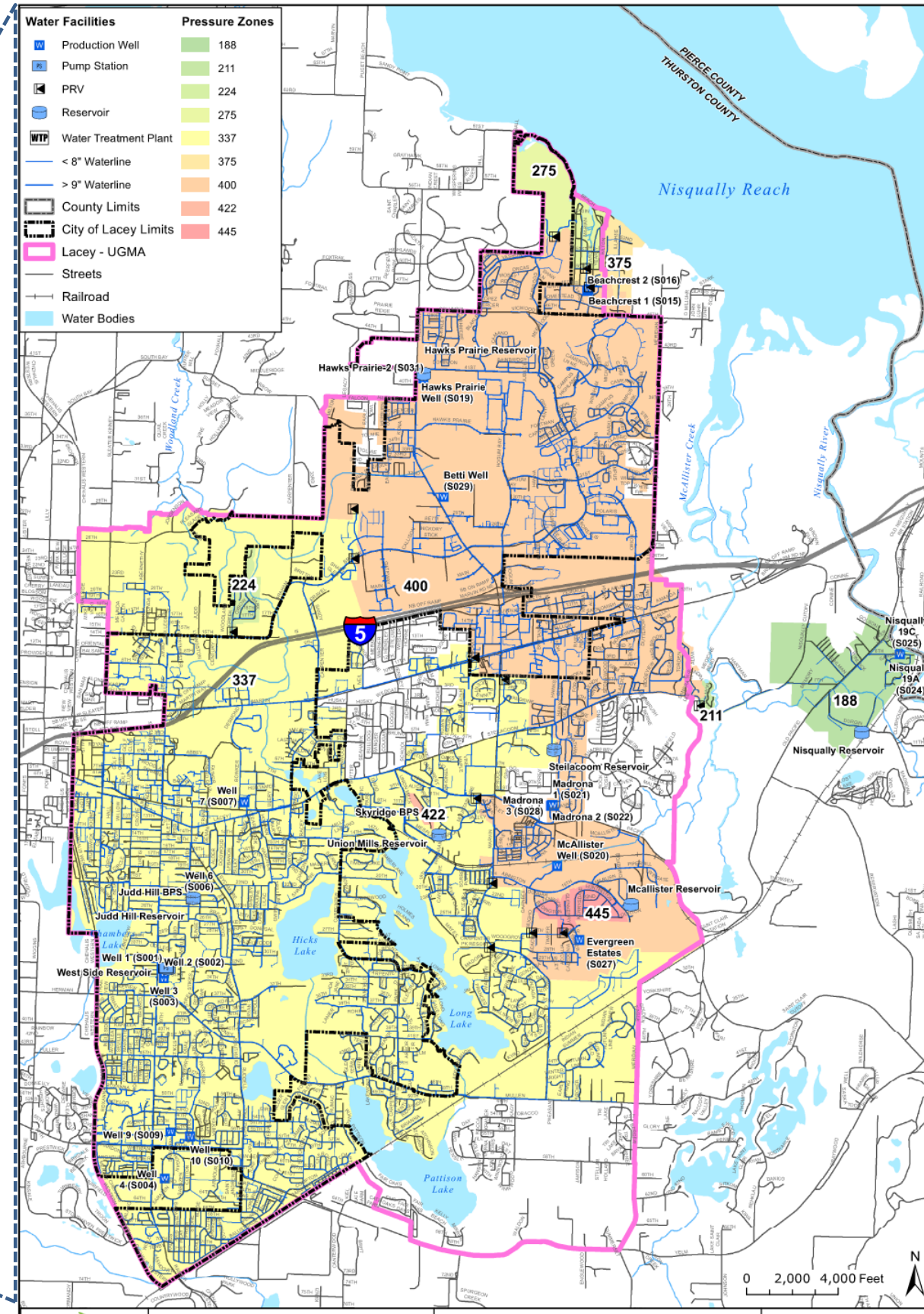
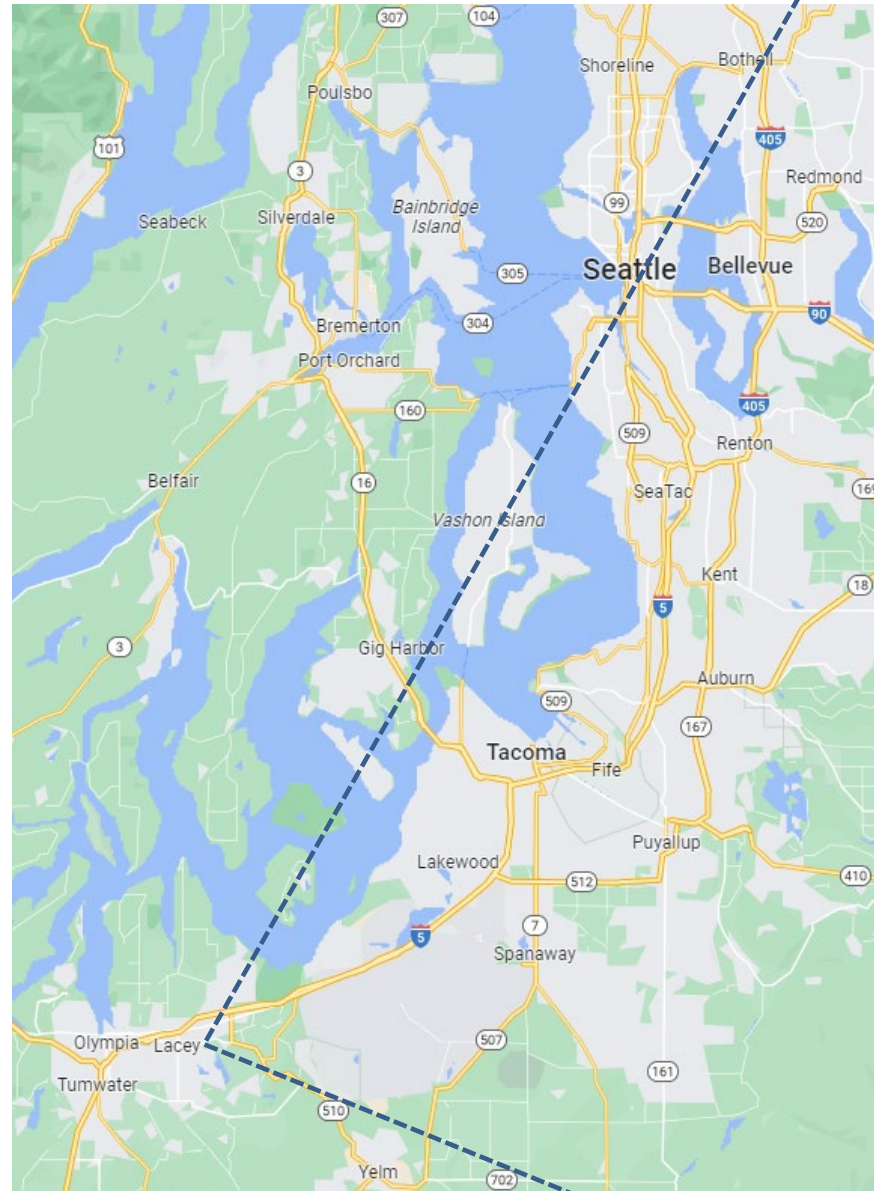
06 Q&A



01

Background - The Drive to Standardize

City Overview



Citywide Corrosion Control Needs

History

**CITY OF LACEY
CORROSION CONTROL EVALUATION
Final Report**

March 2014



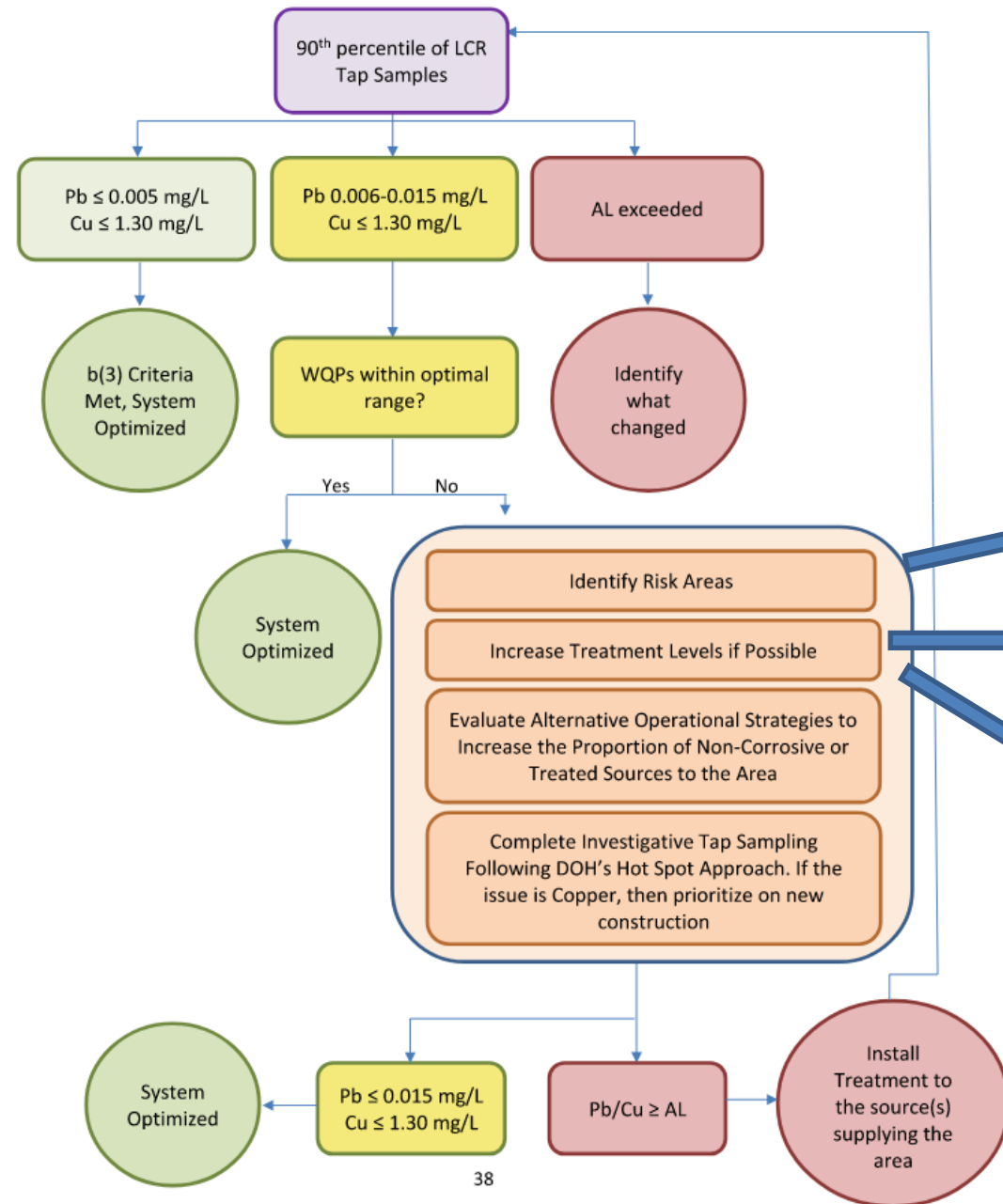
Prepared by

City of Lacey
Water Resources

- Under 1991 Lead and Copper Rule: as a Large System, City must conduct a corrosion control study to determine if system is optimized for corrosion control, even though sampling below Action Levels.
- **2014 Corrosion Control Study**
 - Concluded system optimized at the time based upon planned improvements
 - Follow up sampling
- **2019 Corrosion Control Study**
 - Changes to planned supply from Olympia
 - Recommended pH treatment to raise pH at three additional wellfields
 - Further evaluation after project completion and based upon Revised Lead and Copper Rule.



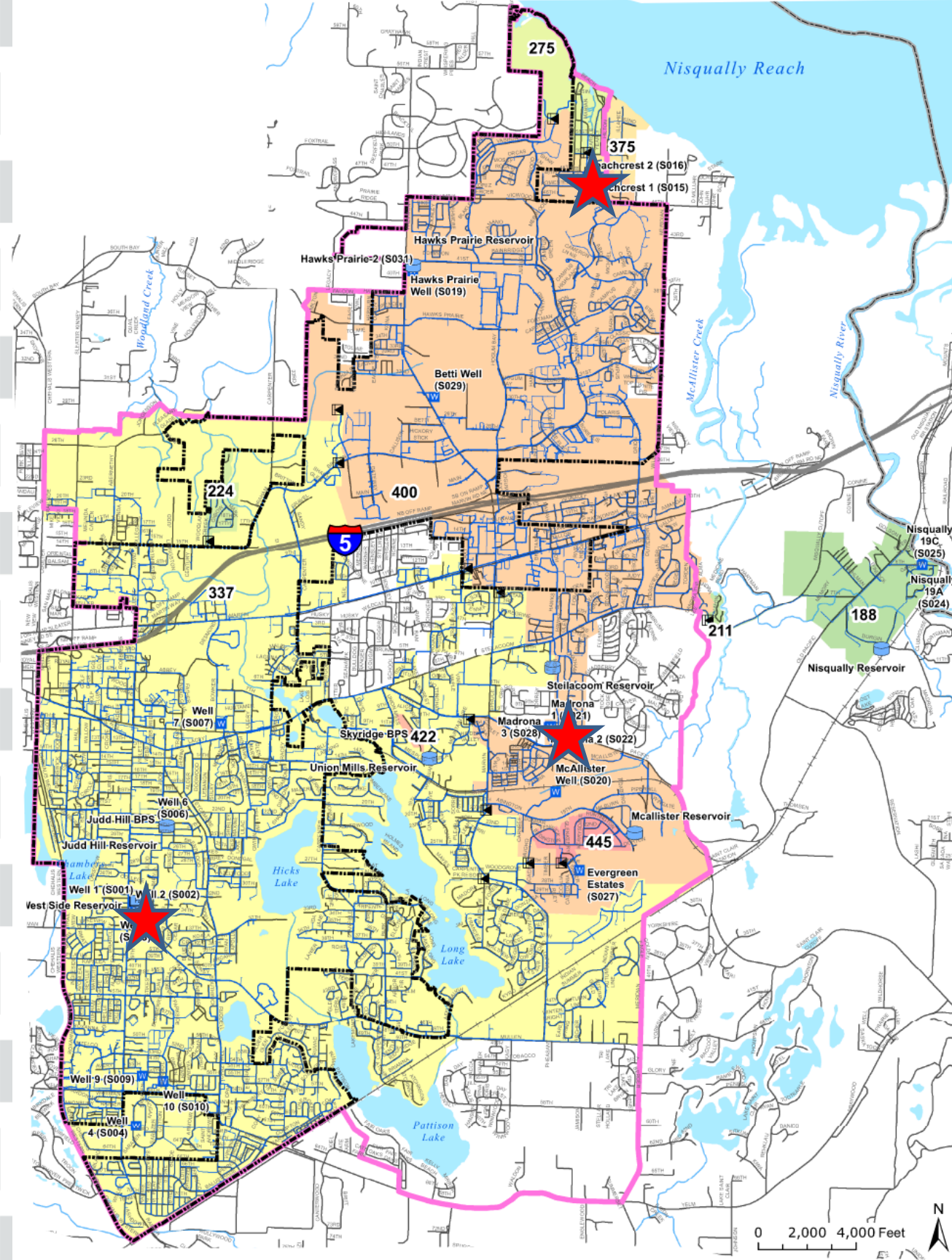
Citywide Corrosion Control Optimization



The Path Forward:

- Optimize Systemwide pH
- Sites selected for three pH adjustment facilities
- Adjusted existing pH treatment facility

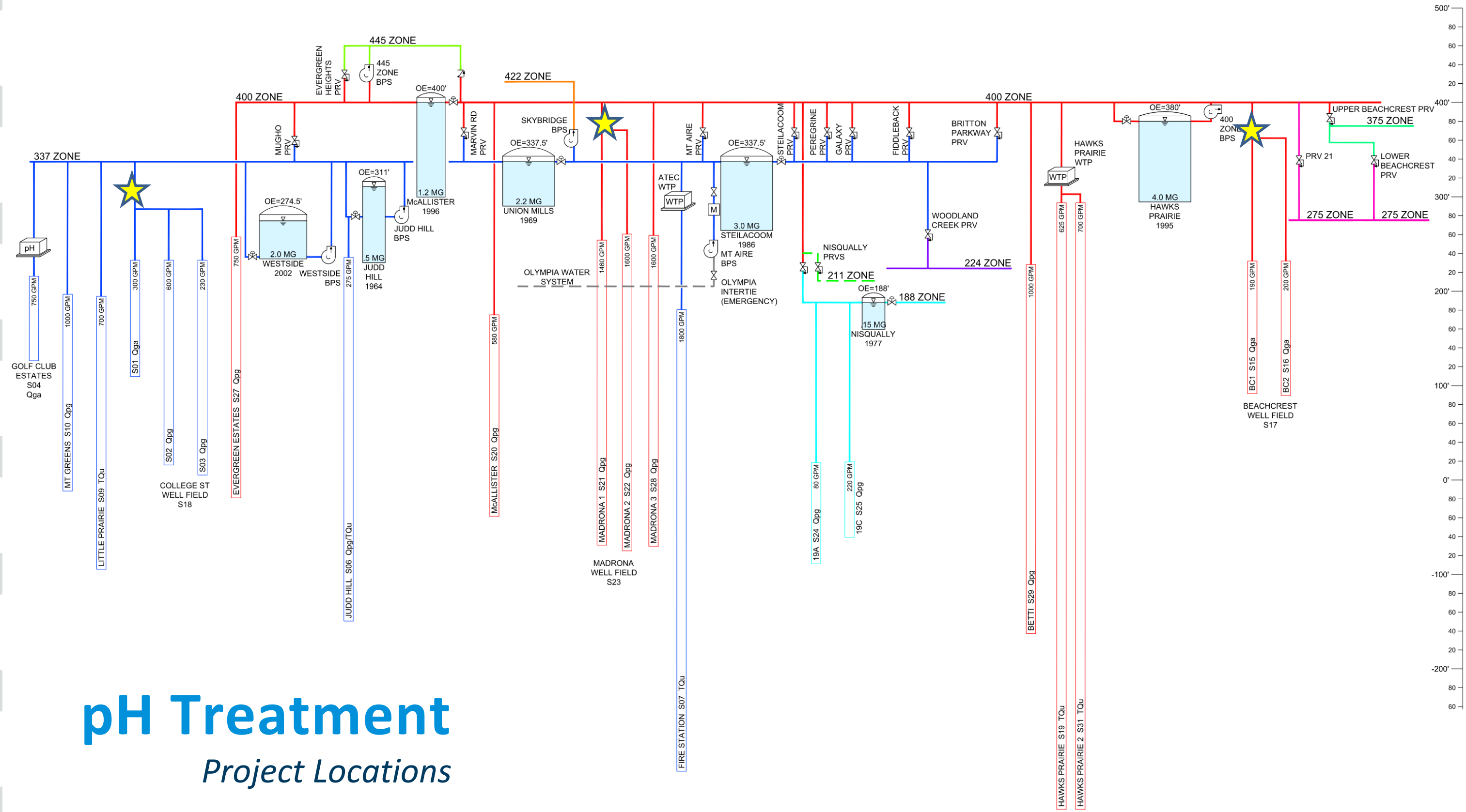
pH Treatment Project Locations



- Beachcrest Wells
- Madrona Wells
- Westside Wells



pH Treatment Project Locations



Existing Madrona Site



- Small site in residential neighborhood
- City's largest capacity source
- Three wells
- Sodium hypochlorite generation facility
- "Vacant" parcel at east side of site

Existing Westside Site

- Large mostly forested site
- Three wells
- Planned Well 1 replacement
- Sodium hypochlorite generation facility
- Booster pump station
- Reservoir





02

Common Design Features

pH Adjustment Alternatives

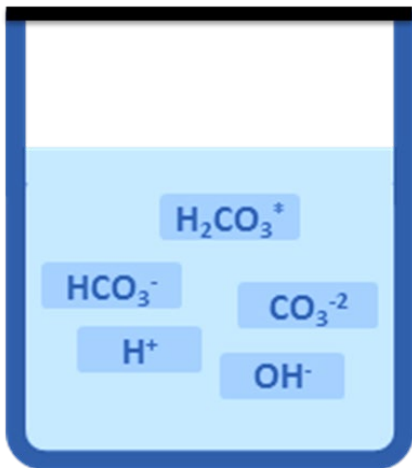
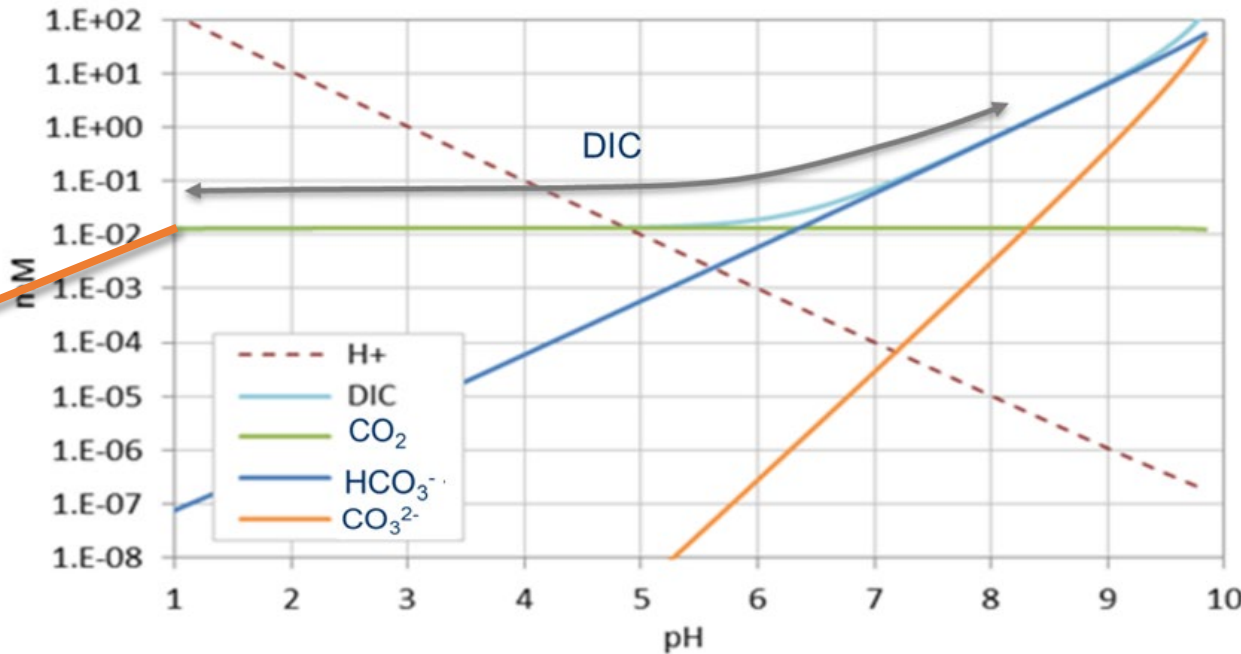
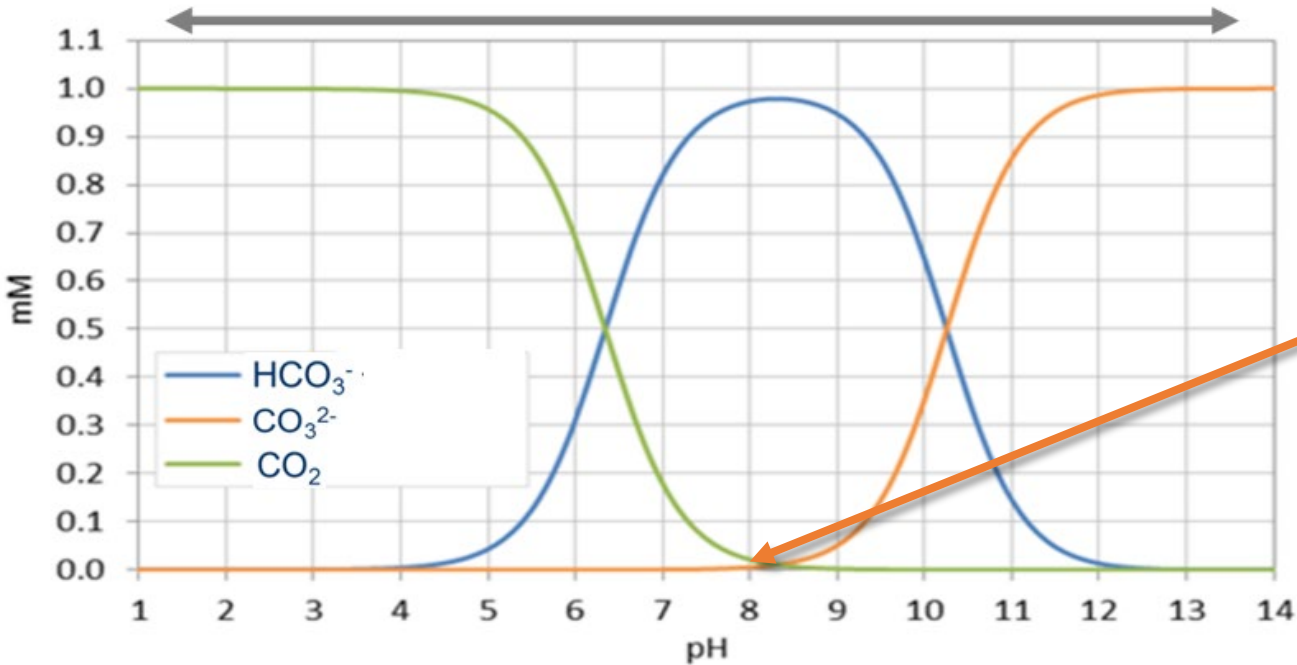
Based upon 2014 /2019 Study the City considered:

- Caustic soda addition
 - Used by City at Source 4
- Aeration
 - Used by neighboring water systems
- Operator safety is key
 - Aeration selected as preferred

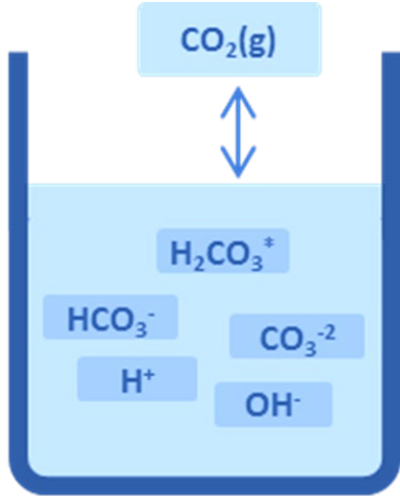
Aeration for pH Adjustment

The Science

THE CARBONATE SYSTEM



closed system



open system

SOURCE:
<https://www.aqion.de>



Aeration System Technology

Two alternatives considered

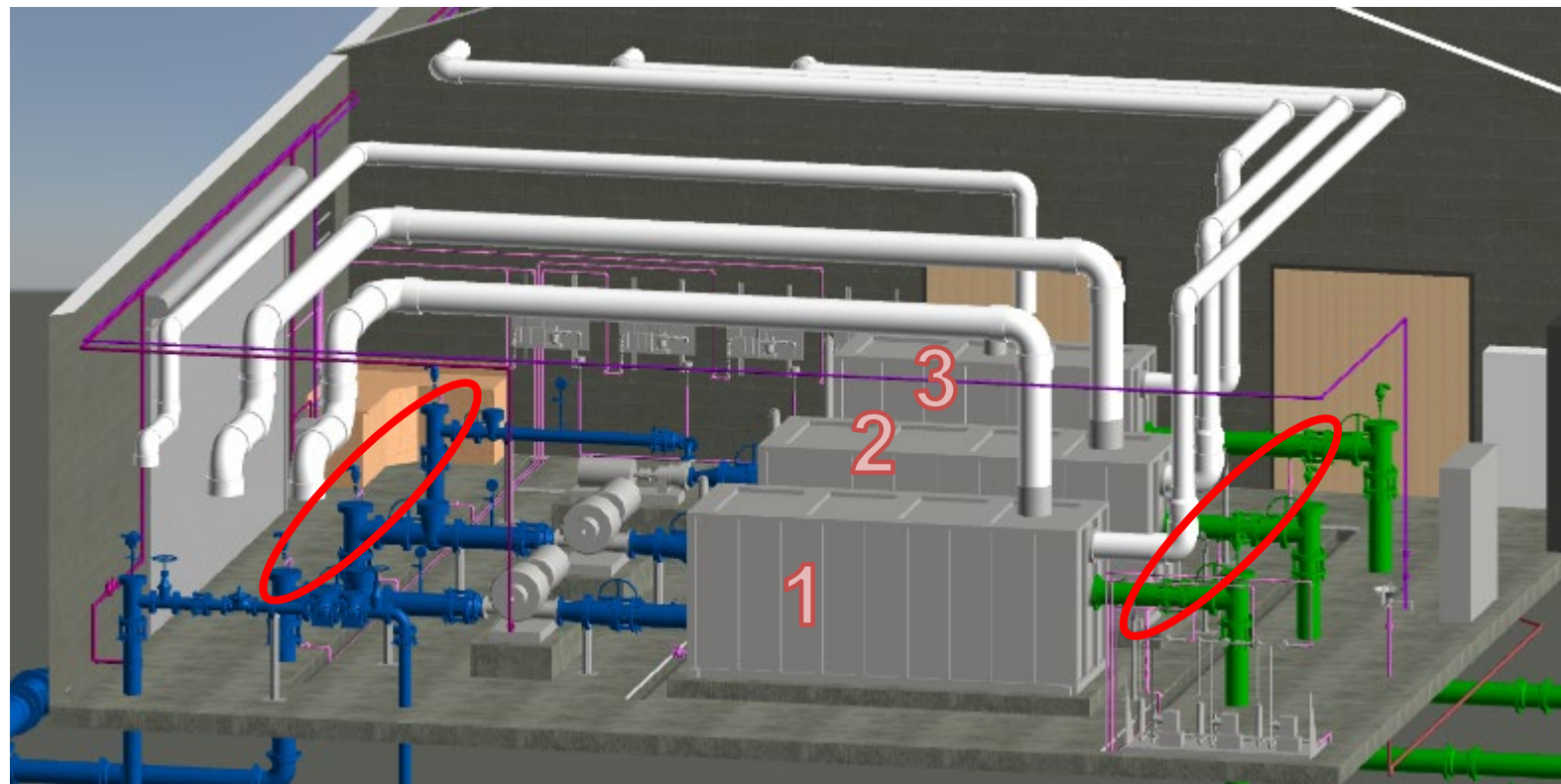
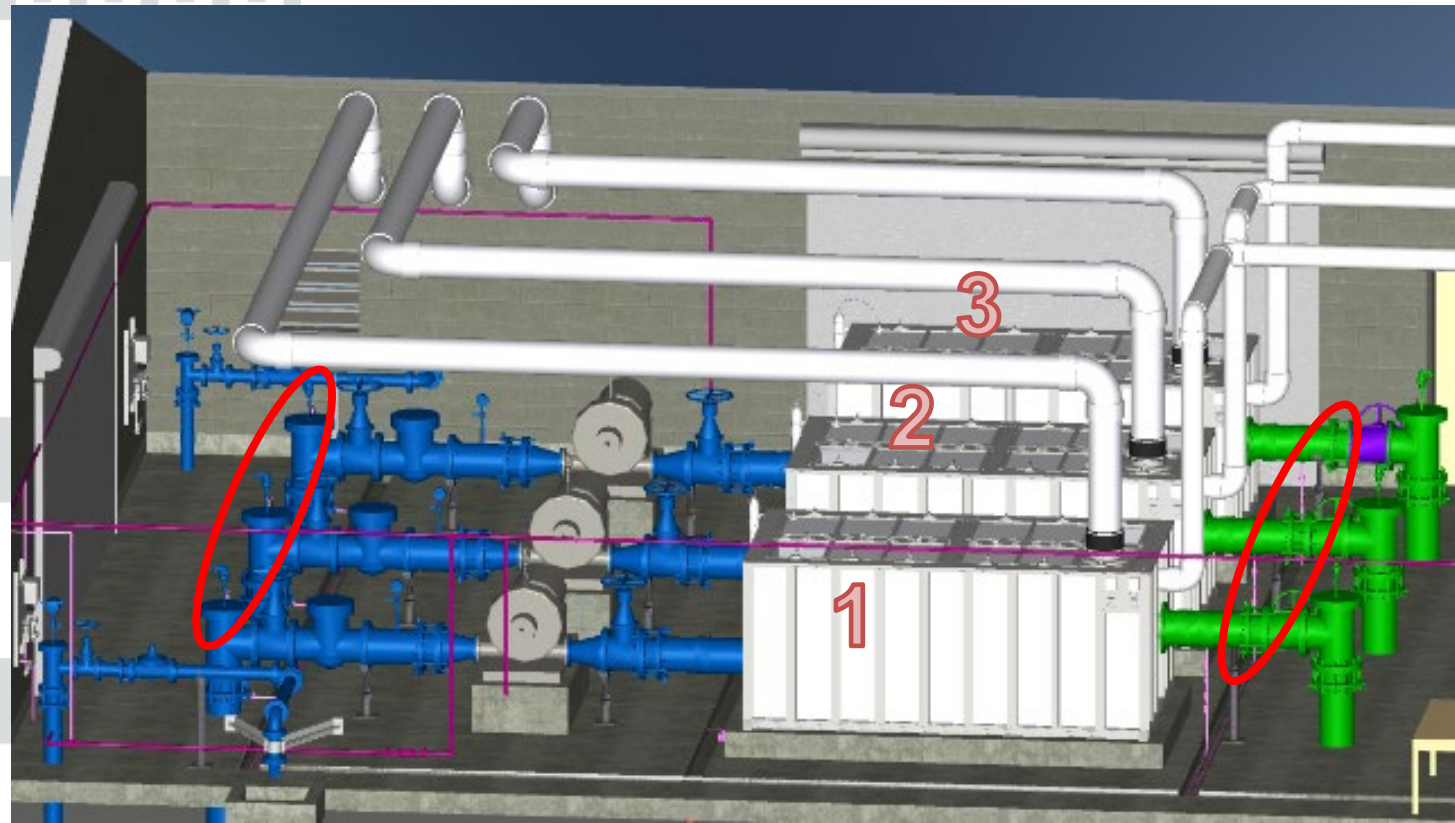
- Packaged Aeration System
 - Multi-stage diffused bubble
- Packed Tower system



Aeration System Technology

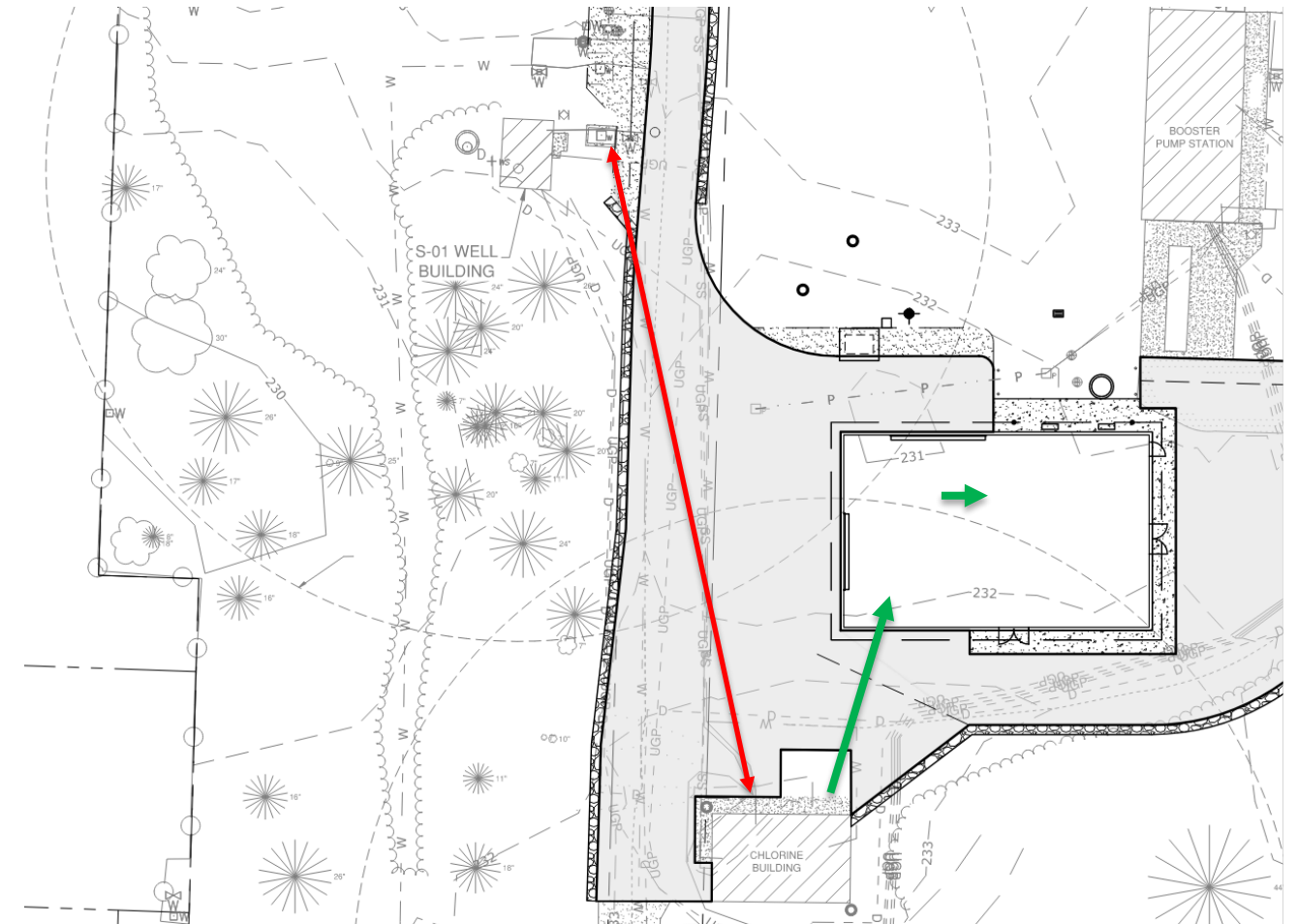
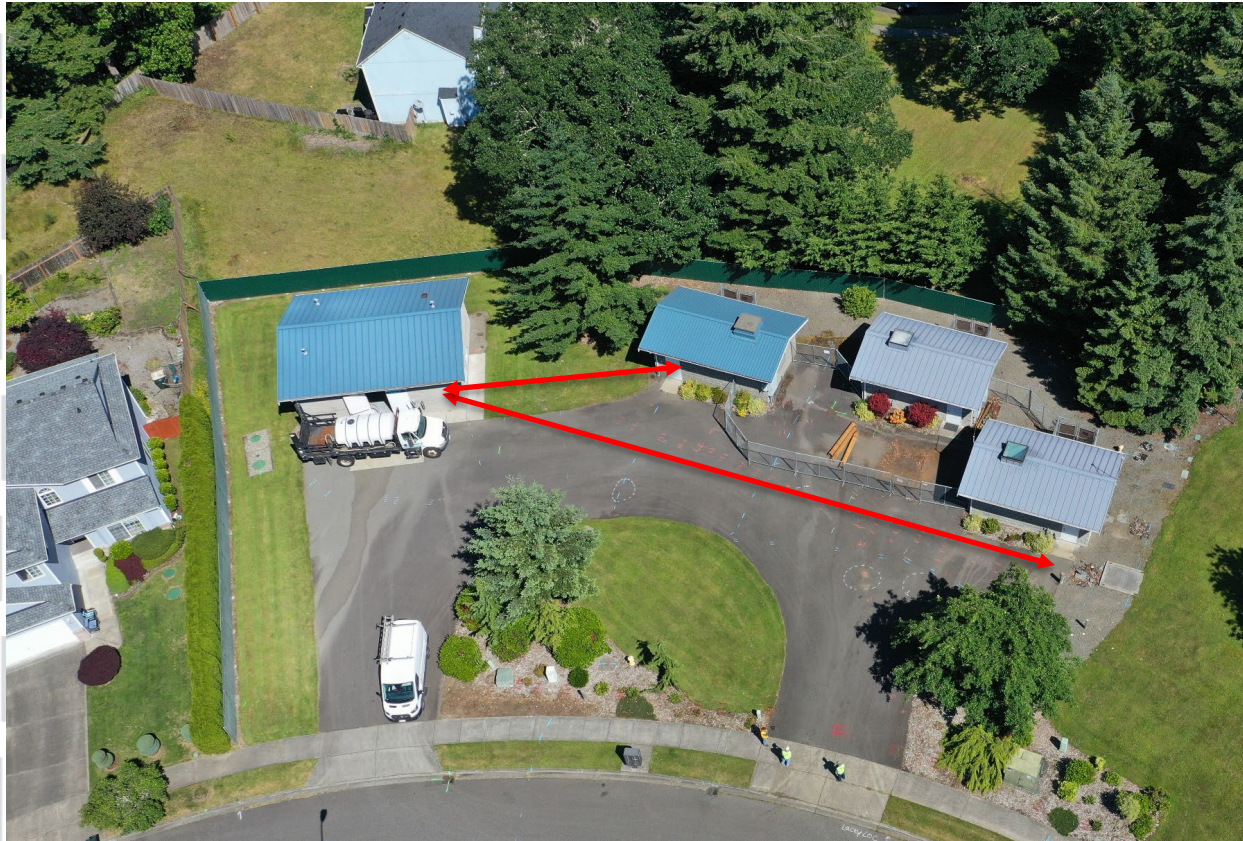


Common Process Features



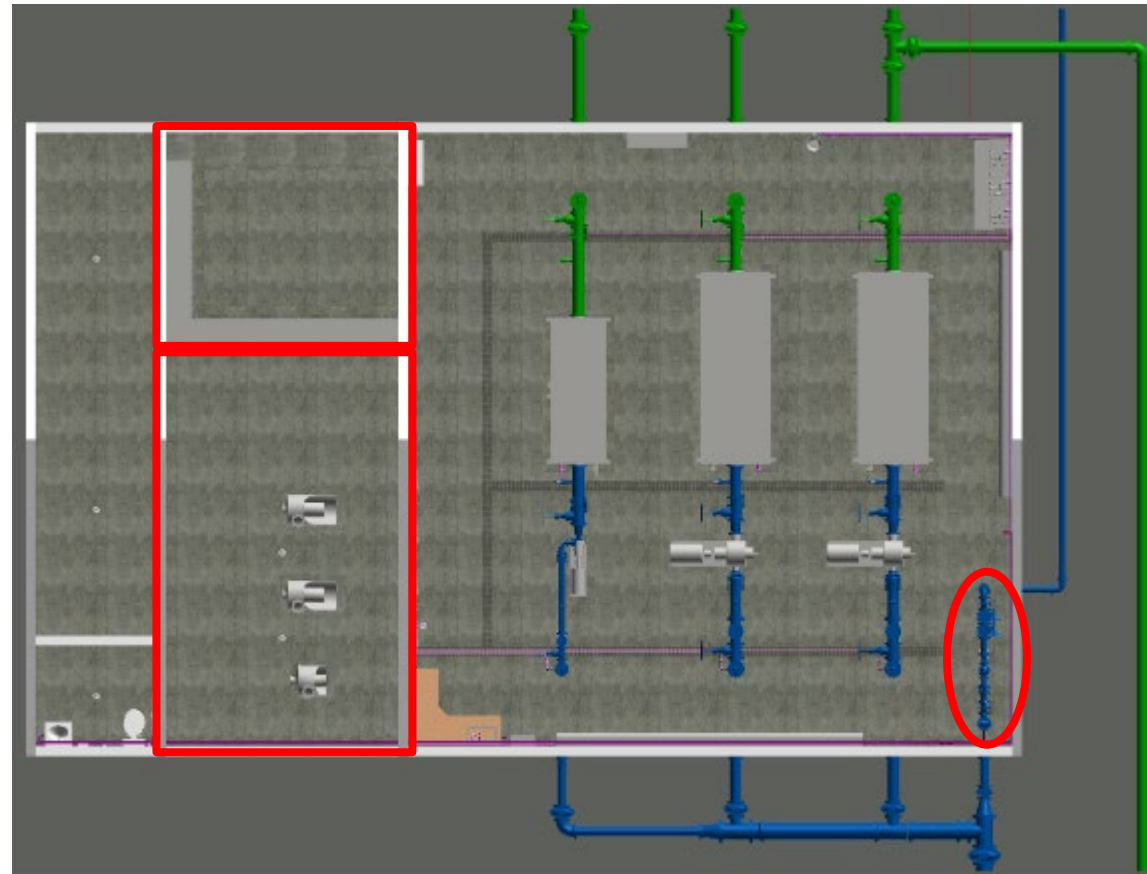
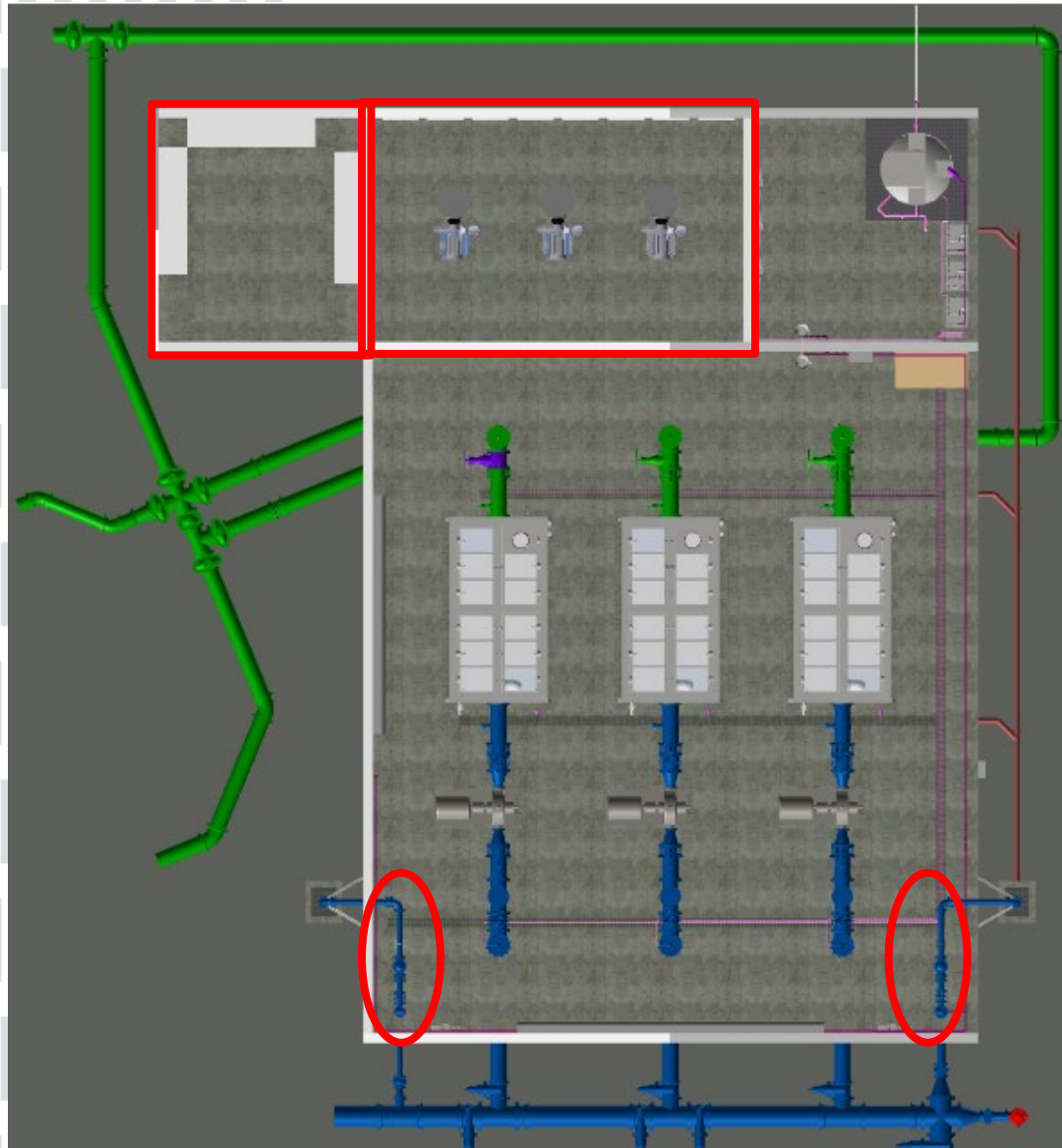
- Chlorine Injection Location
- Chlorine Sampling Location
- 1:1 Well to Aeration Unit
- Reduced Chlorine sampling / injection latency

Common Process Features



- Chlorine Injection Location
- Chlorine Sampling Location
- 1:1 Well to Aeration Unit
- Reduced Chlorine sampling / injection latency

Common Design Features



- Dedicated Blower Room
- Dedicated Electrical Room
- Pressure relief valves inside building
- Flow Meter Vaults Outside Building



03

Westside Design Features

Existing Westside Site - Unique Drivers

- Existing Reservoir and Pump Station Operation
- Restroom Needs
- Storage in Existing Booster Pump Station
- Future Well Development / Existing Undersized Well Casing



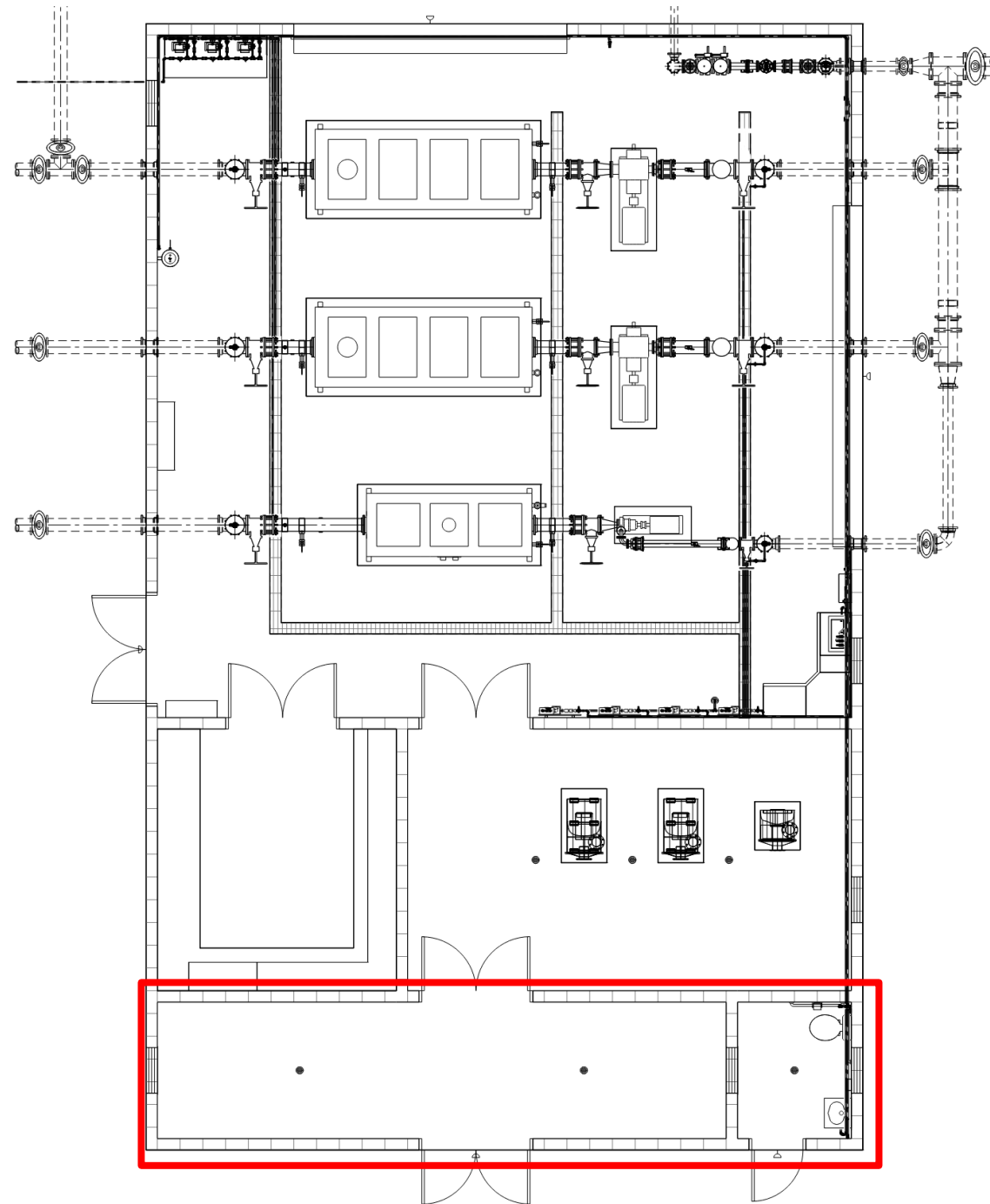
Westside Site- Unique Features

- Bathroom
- Storage Room
- Control Valve Vault
- Retaining Lineshaft Well Pump /
Provisions for Connection to Future
Well



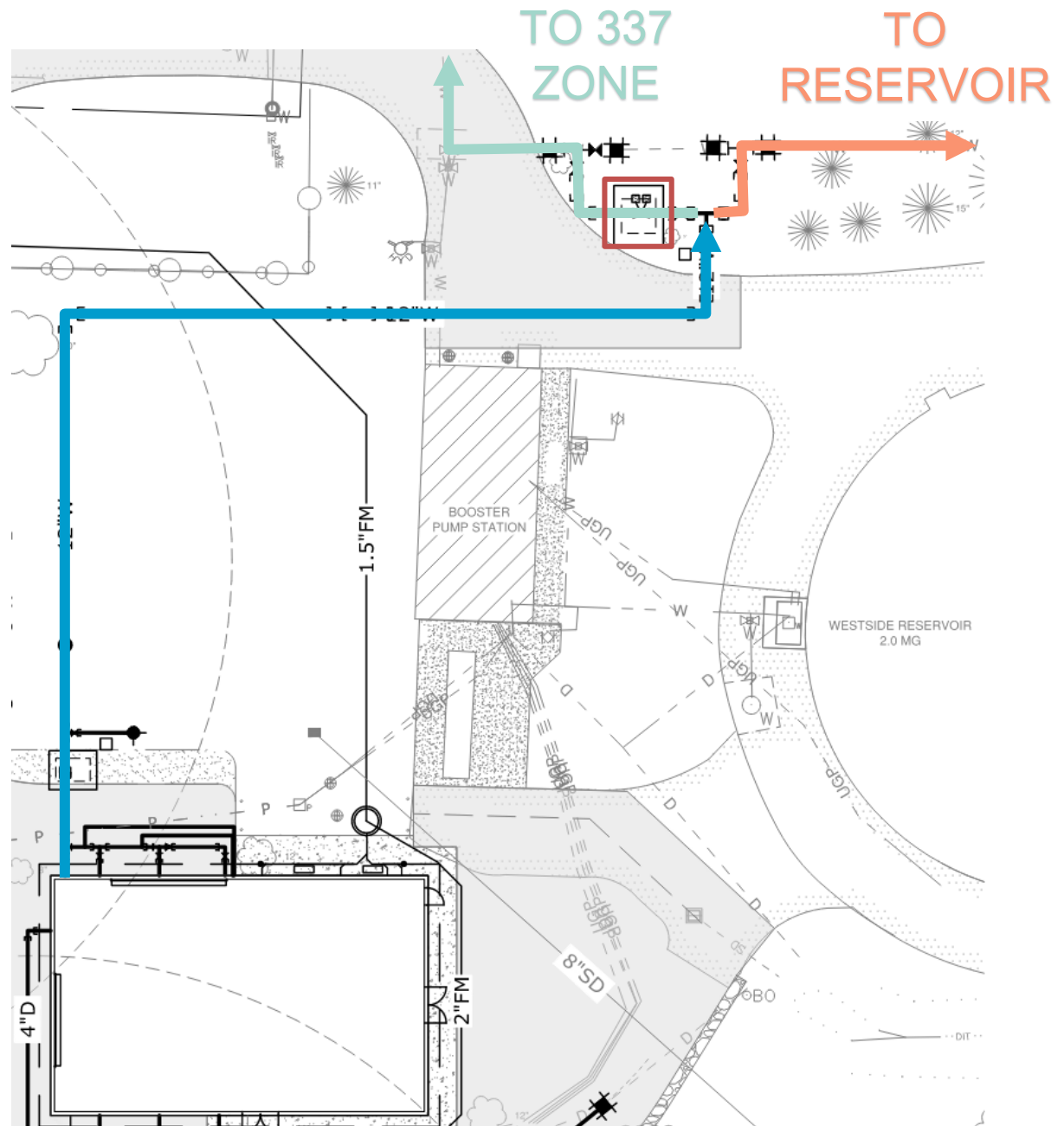
Westside Site- Bathroom and Storage

- Bathroom
- Storage Room
- Control Valve Vault
- Retaining Lineshaft Well Pump / Provisions for Connection to Future Well



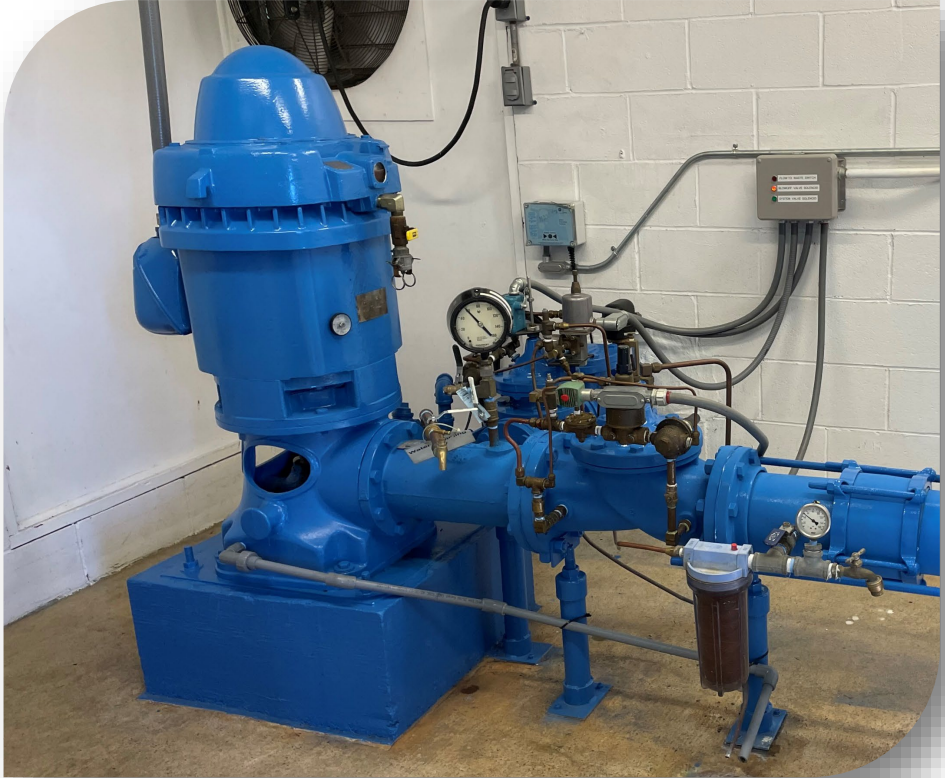
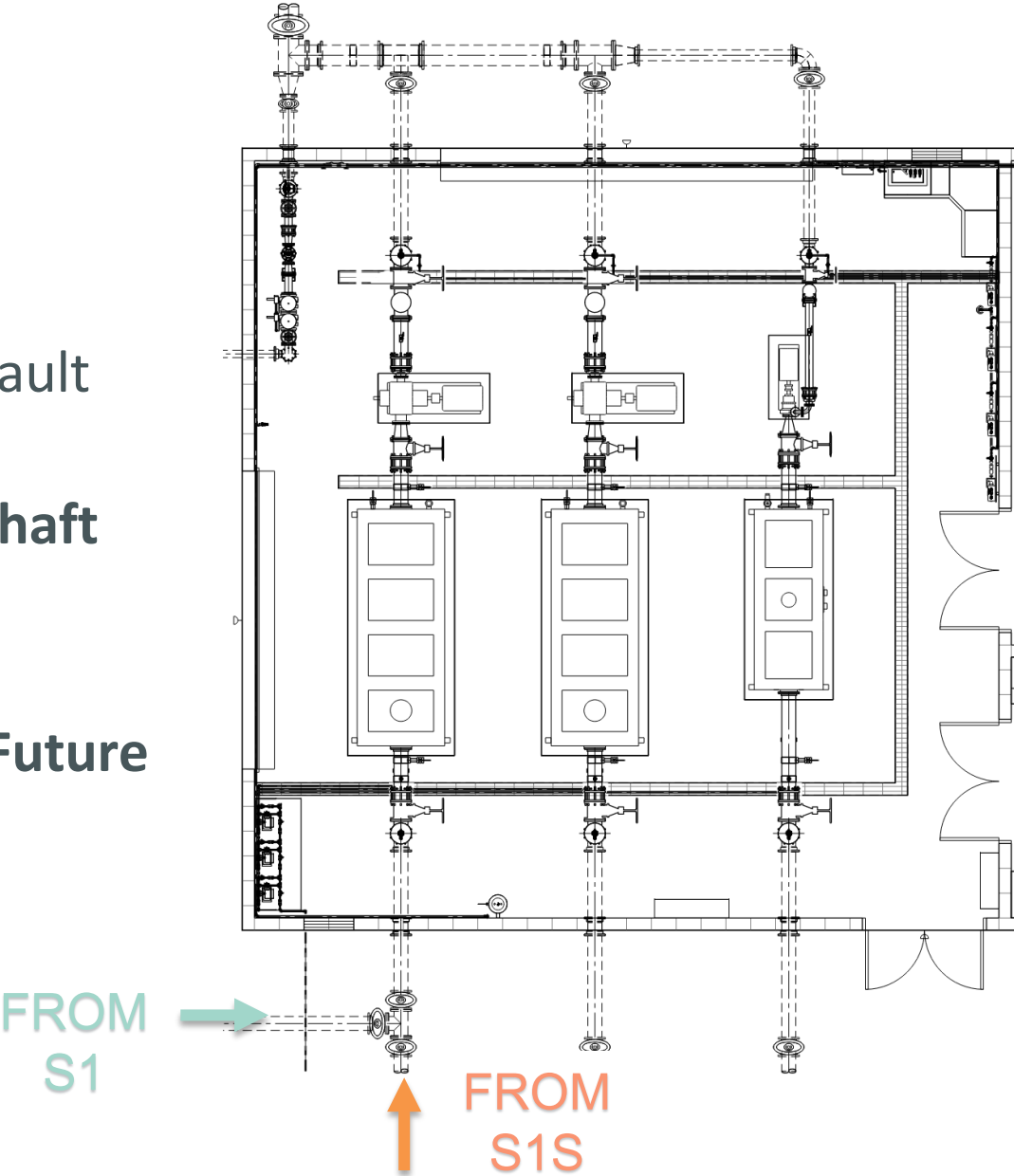
Westside Site - Control Valve Vault

- Bathroom
- Storage Room
- **Control Valve Vault**
 - **Reservoir operation & water quality improvements**
- Retaining Lineshaft Well Pump / Provisions for Connection to Future Well



Westside Site - Well 1 and 1S

- Bathroom
- Storage Room
- Control Valve Vault
- Retaining Lineshaft
Well Pump /
Provisions for
Connection to Future
Well





04

Madrona Design Features

Existing Madrona Site - Unique Drivers

Motivations for Unique Design Components

- City's Largest Capacity Source
- Currently Pumps to 400 Zone, then PRV to 337
- Portable Generator Parked At Site
- Large Distance from Chlorine Building to New building



Madrona Site- Unique Features

- New Generator
- Chlorine Transfer Pump and Hypochlorite Room
- Connection to Multiple Zones / Process Flexibility



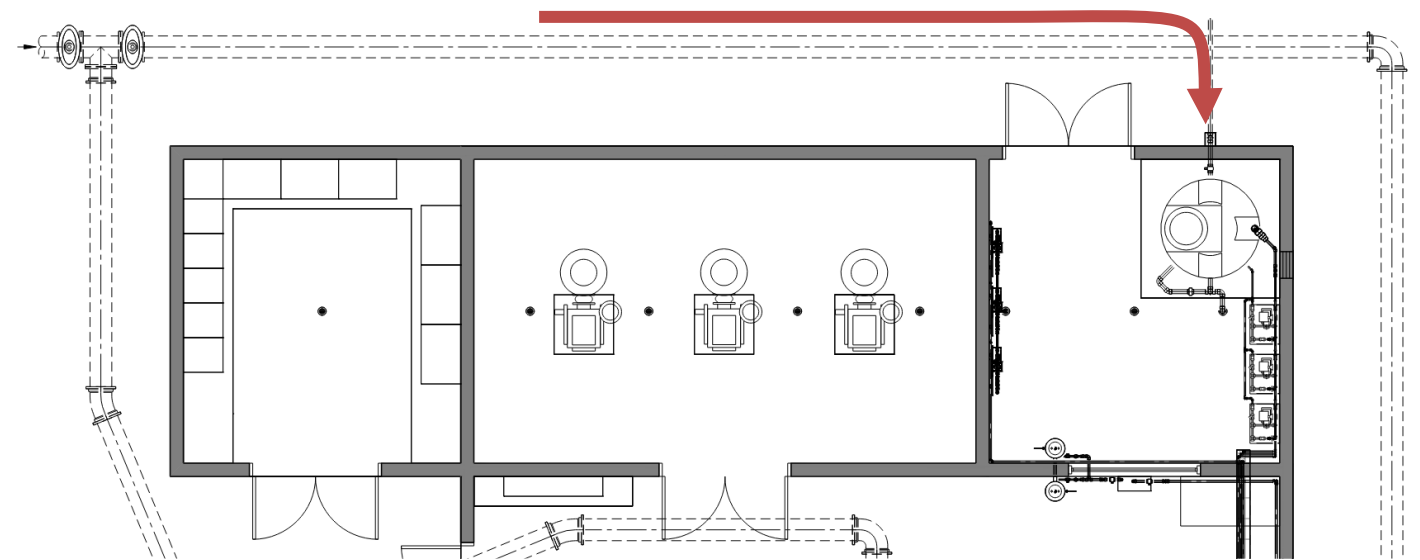
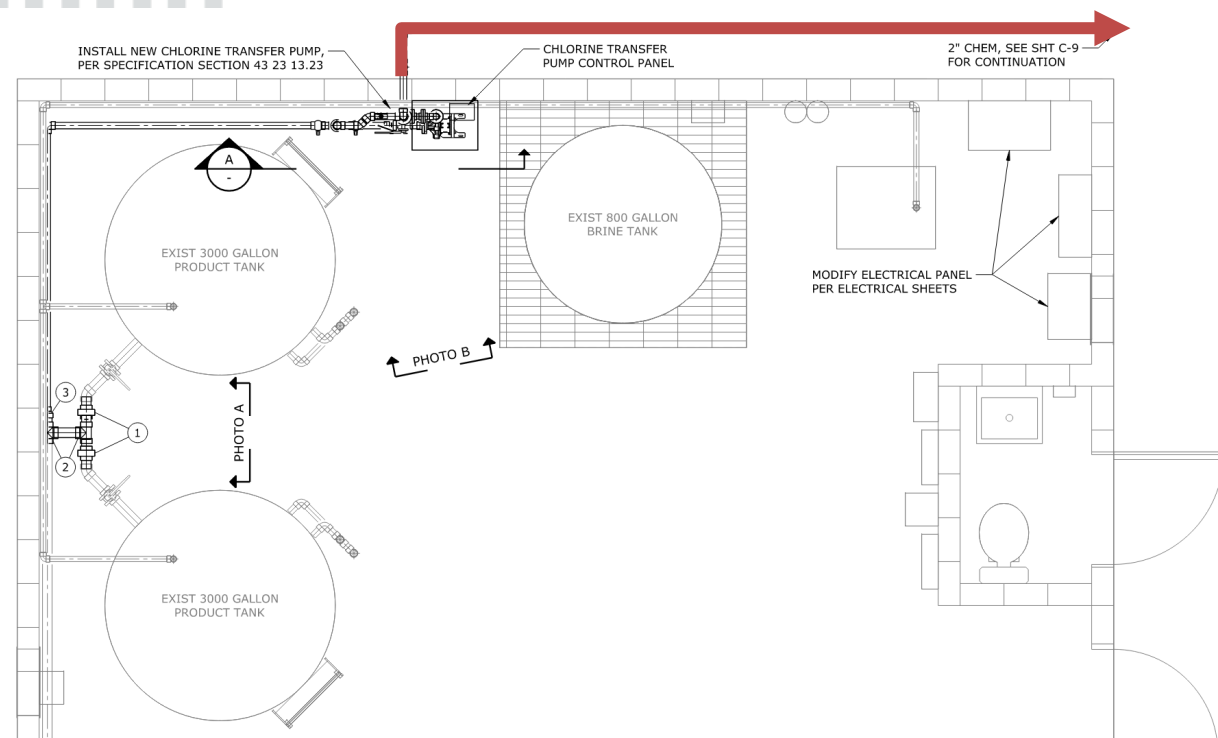
Madrona Site- Generator

- **New generator**
- Chlorine Transfer Pump and Hypochlorite room
- Connection to Multiple Zones / Process Flexibility

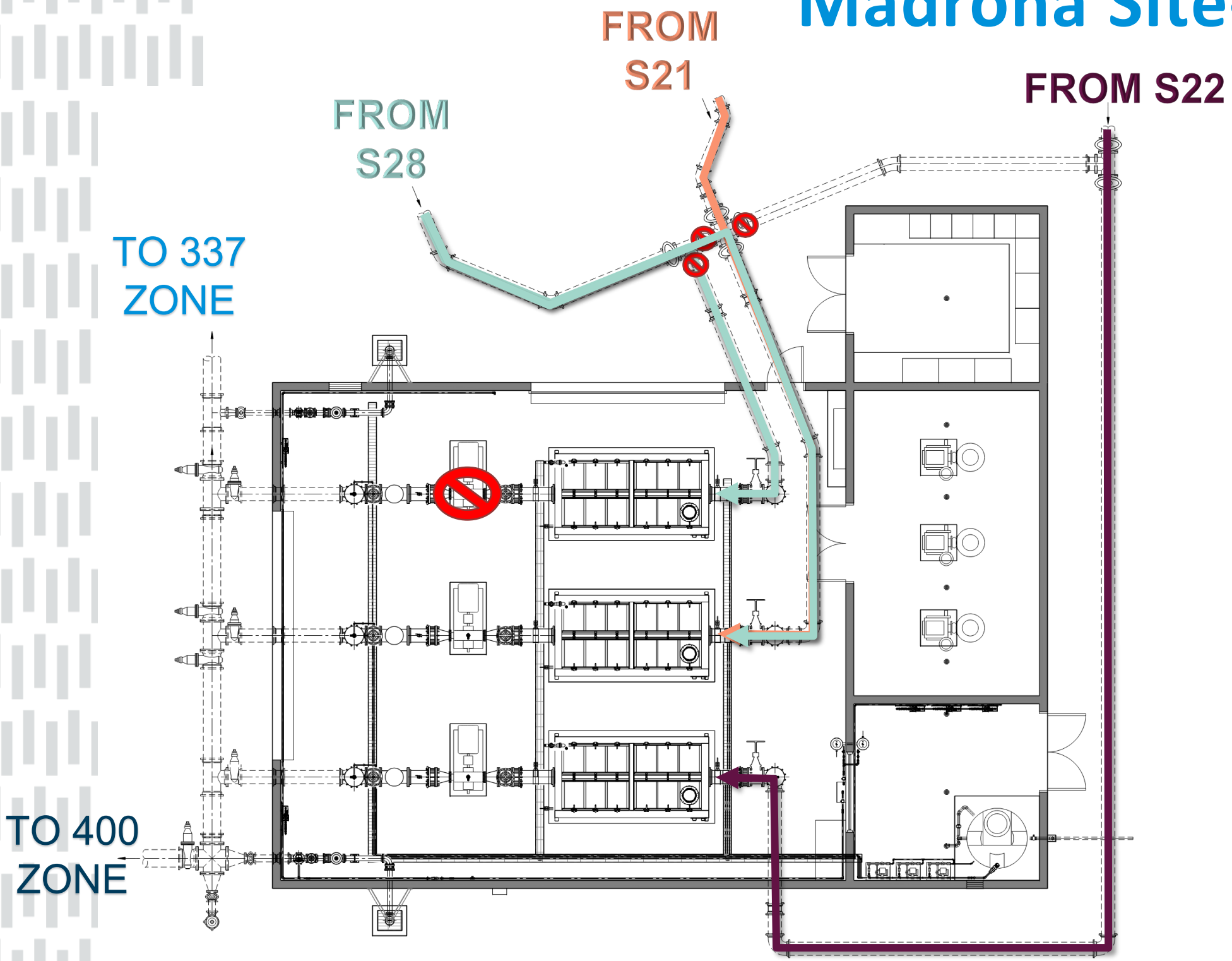


Madrona Site- Hypochlorite Transfer and Storage

- New Generator
- Chlorine Transfer Pump and Hypochlorite Room
- Connection to Multiple Zones/ Process Flexibility



Madrona Site- Process Flexibility



- New Generator
- Chlorine Transfer Pump and Hypochlorite Room
- **Connection to Multiple Zones/ Process Flexibility**

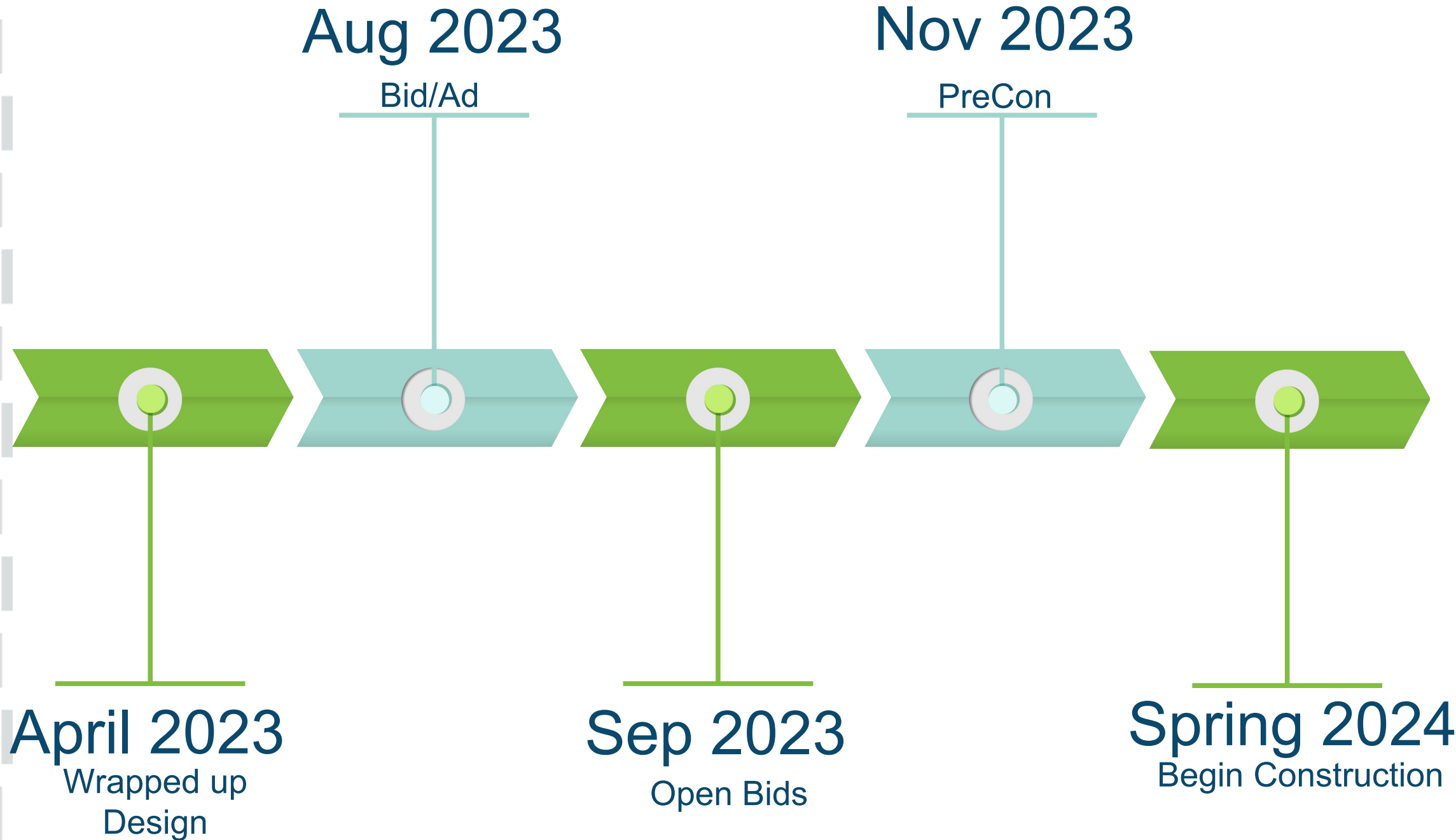




05

Project Status and Closing

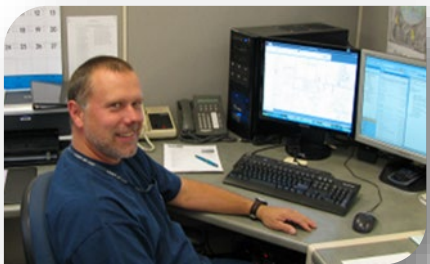
Project Schedule



Project Team – City



- City of Lacey Public Works
- City of Lacey Community and Economic Development



Project Team – Consultant Team

Owner	City of Lacey
Prime Consultant	Conсор
Electrical, Instrumentation & Controls	Industrial Systems, Inc.
Structural Engineer	CG Engineering
Hydrogeologist	Mott MacDonald (PGG)
Geotechnical Engineer	HWA Geosciences, Inc.
Environmental / Permitting	Environmental Science Associates



Key Takeaways



**Aeration Can
Provide a Safe
Alternative for
pH Treatment**



**Standard Design
Components
Ease Operations**



**Remain
Flexible to
Customize for
Site Condition**



06

Q&A

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