Clackamas River Water

# What's Next? Planning the Future of CRW's WTP

## PNWS-AWWA

April 28, 2022

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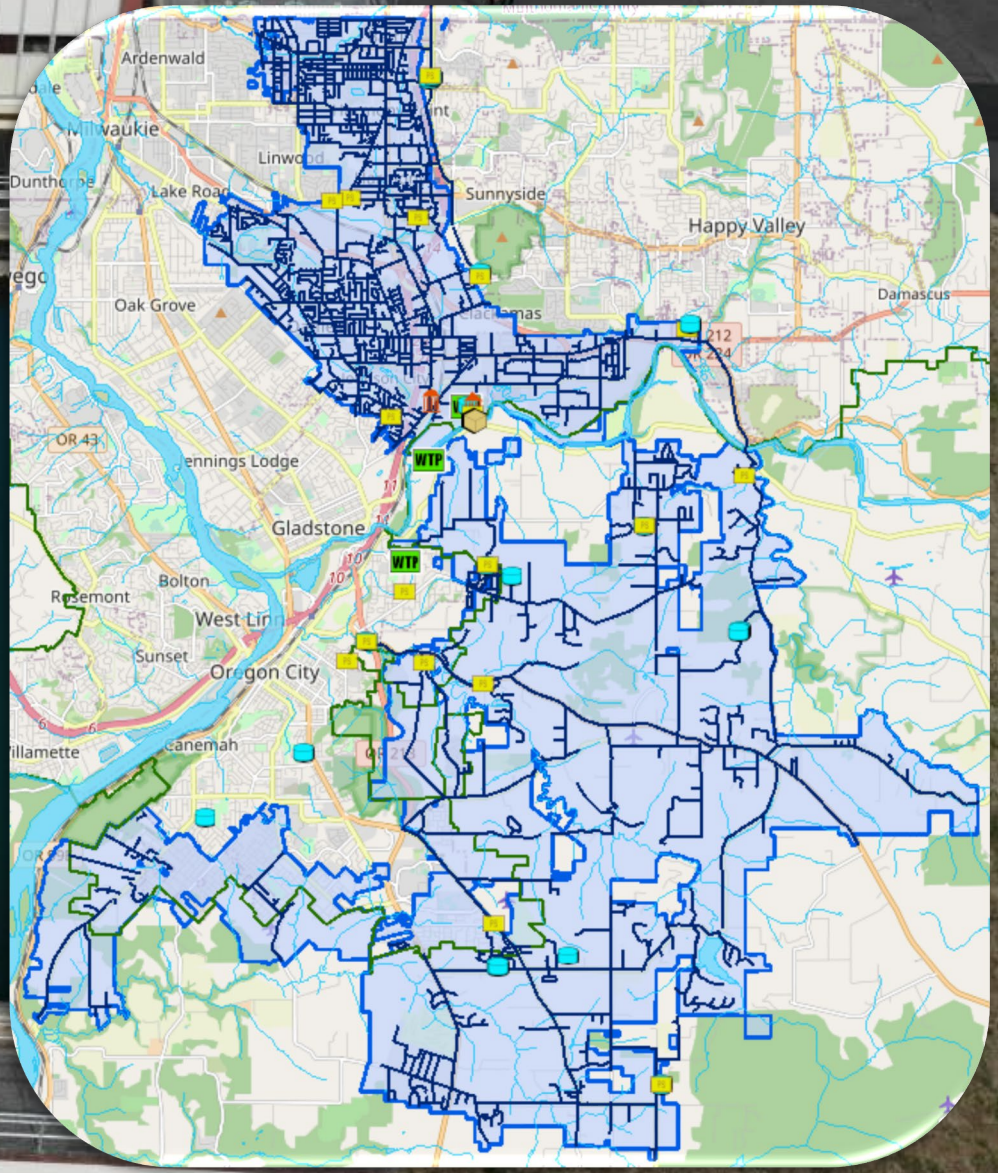
# Agenda

- Background and Goals
- Existing WTP
- Identified Needs
- Options
- Fitting into CRW's overall CIP

# Background

- Recognizing age and other factors, and recommendations from the WSMP, CRW decided to create a facility plan for its WTP
- Selected Carollo to assist; plan was initiated in summer 2019

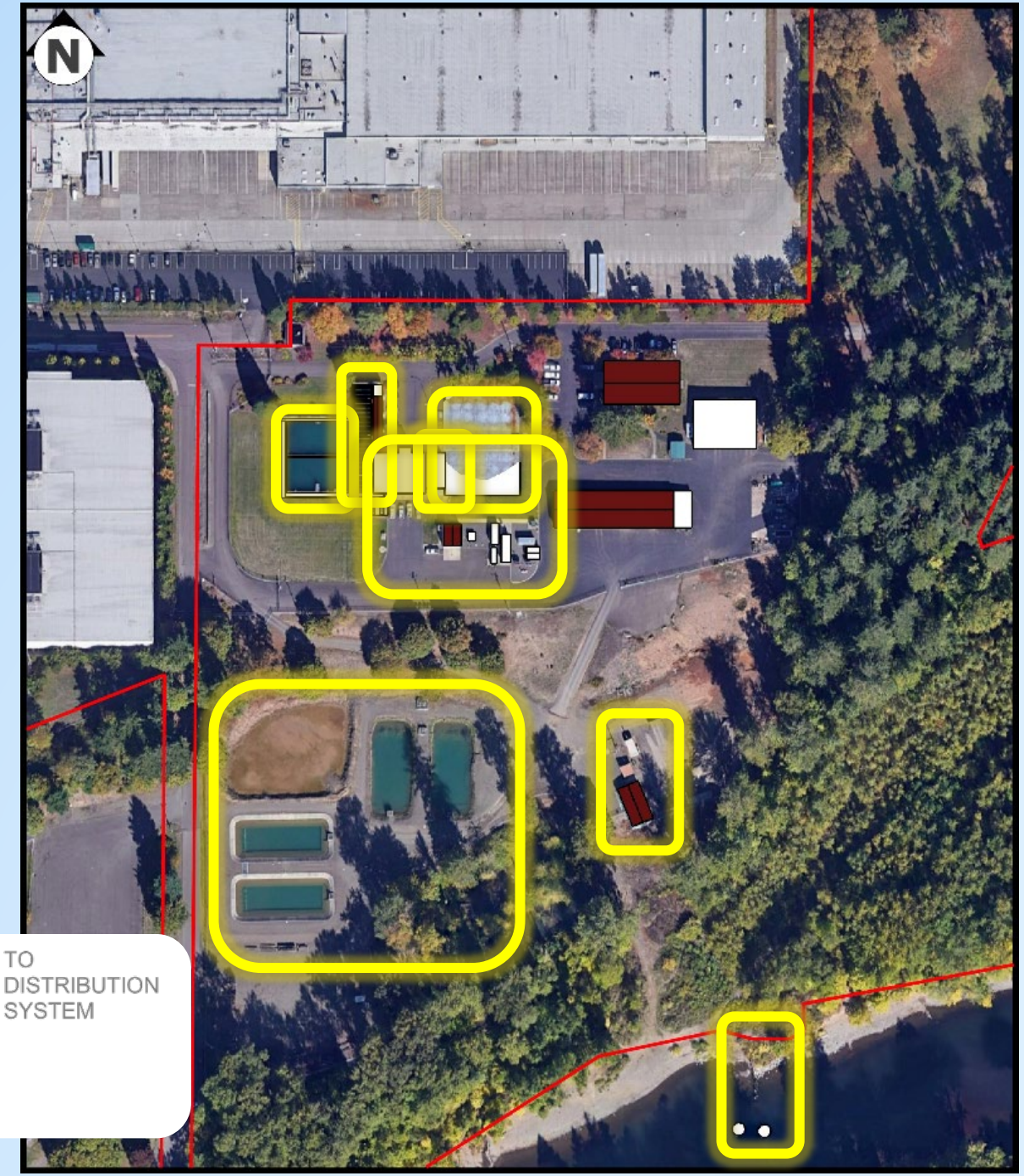


# Plan Goals

- **Evaluate WTP treatment capacity (current and future demands)**
- **Identify potential deficiencies**
- **Recommend improvements**

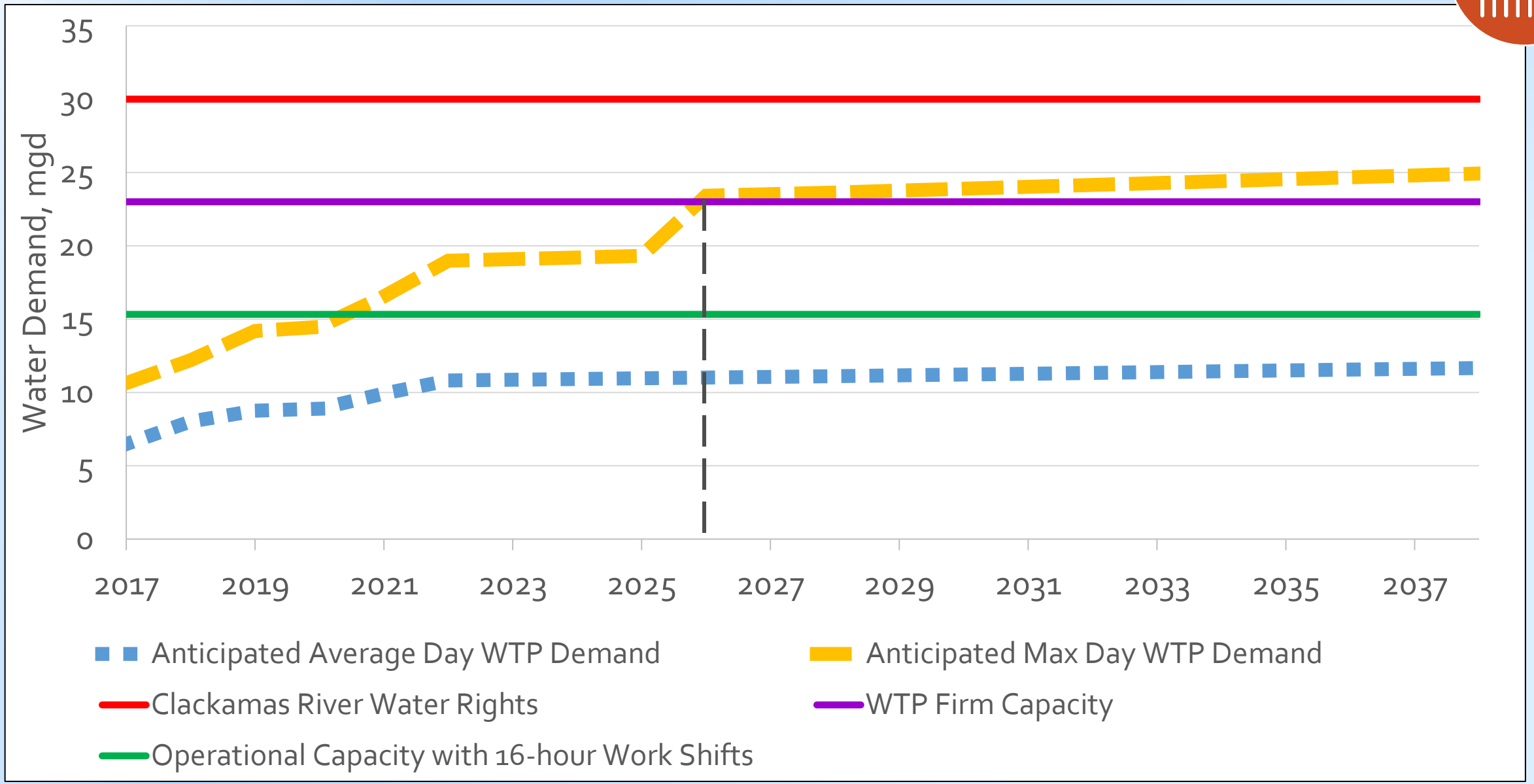
# Overview of the CRW WTP

- Raw Water Intake
- Low-Lift Pump Station
- Contact Basins
- Filters
- Clearwell (disinfection)
- High-Lift Pump Station
- Solids Handling
- Supporting Infrastructure
  (operations, controls, chemicals, power, etc.)




# CRW's Drivers for Plant Improvements

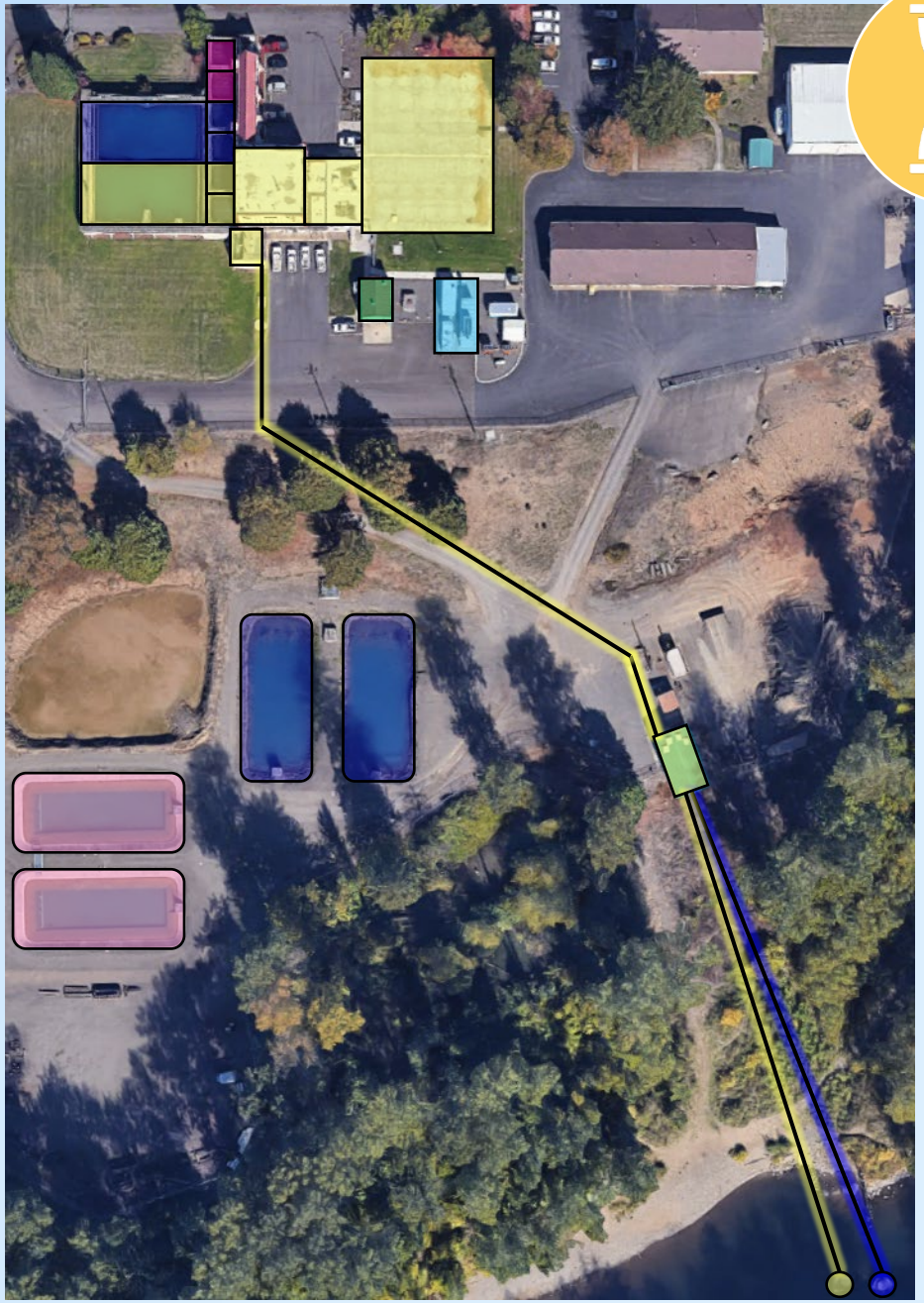
# Capacity Driver



# Aging Infrastructure at the Existing Plant

Install Date/Age

- 1964 (55 years)
- 1974 (45 years)
- 1992 (27 years)
- 1999 (20 years)
- 2004 (15 years)
- 2014 (5 years)

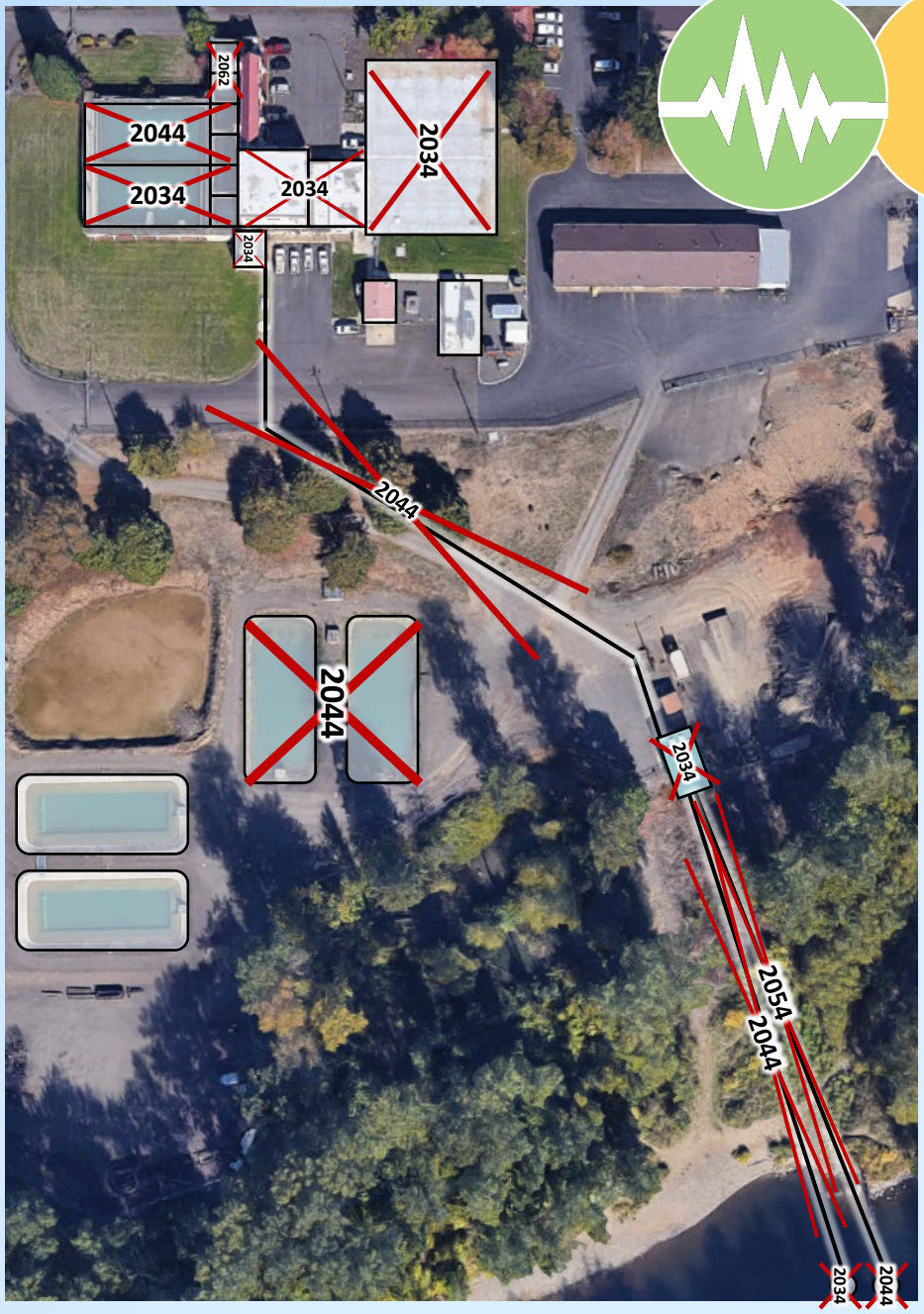


*Structures and Equipment have been well maintained since their initial installation, but not replaced.*

# Seismic Resilience by 2063 (Oregon Resilience Plan)

## Achieve seismic resiliency in parallel with useful life:

- Concrete Structures ~ 70 years
- Pipes ~ 80 yrs
- Mechanical Equipment ~ 25 yrs

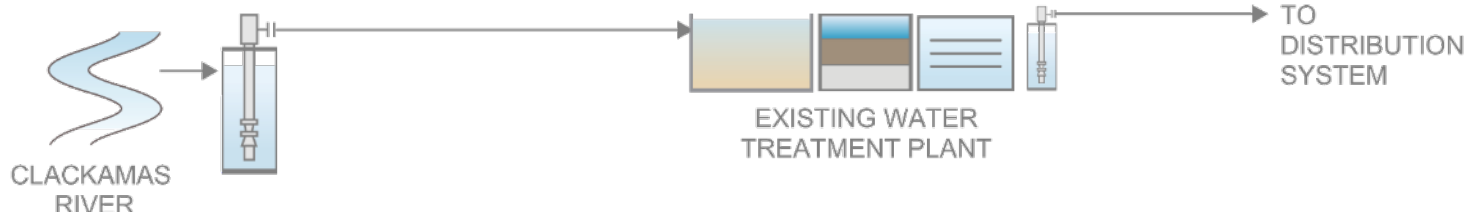




*Refurbishment can increase the useful life of WTP structures and equipment, but has diminishing returns.*

# Addressing Water Quality

**Contaminants of Focus:**

- High Turbidity
- Algal Toxins and Taste & Odor (T&O)
- Elevated Total Organic Carbon (TOC) and resulting disinfection byproducts
- Pharmaceuticals and Personal Care Products (PPCPs)




| | *High Turbidity* | *Algal Toxins and T&O* | *Elevated TOC* | *PPCPs* |
|---|---|---|---|---|
| |  |  |  |  |
| **Risk:** | **Seasonal, during storms** | **Potentially spring through fall** | **After a watershed fire** | **Upstream wastewater discharges** |

LEGEND:

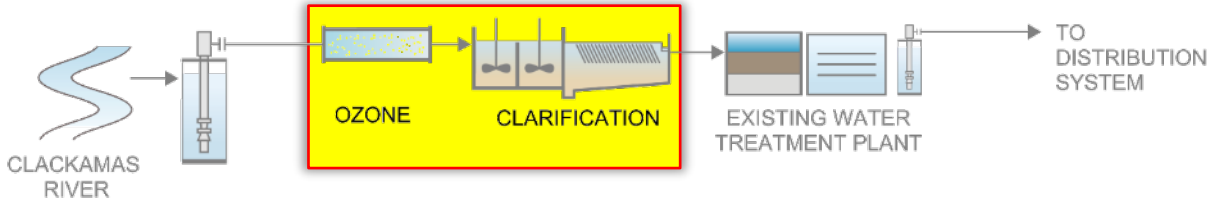
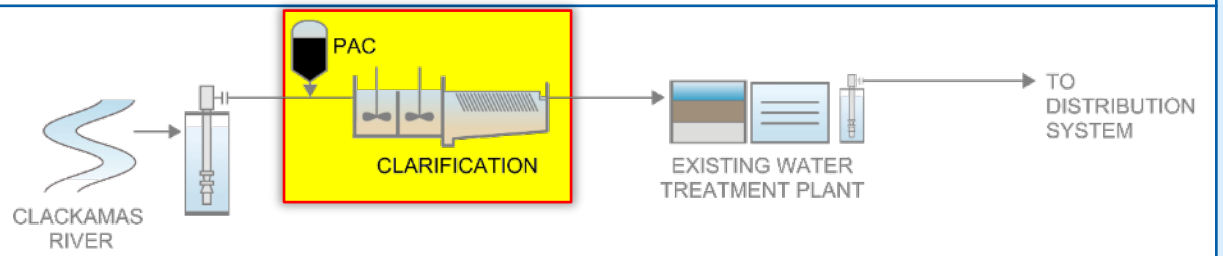

RISK OF DEGRADED WATER QUALITY


LITTLE OR NO TREATMENT PROVIDED


SOME TREATMENT PROVIDED WITH LIMITATIONS


ROBUST TREATMENT PROVIDED

# Addressing Water Quality

| Treatment Process | *High Turbidity* | *Algal Toxins and T&O* | *Elevated TOC* | *PPCPs* | Process Implementation |
|---|---|---|---|---|---|
| **Ozone and Clarification** | | | | |   |
| **Powdered Activated Carbon and Clarification** | | | | |   |

LEGEND:

- RISK OF DEGRADED WATER QUALITY
- LITTLE OR NO TREATMENT PROVIDED
- SOME TREATMENT PROVIDED WITH LIMITATIONS
- ROBUST TREATMENT PROVIDED

# Key Findings


| | Deficiencies | | | |
|---|---|---|---|---|
| Plant Element | Capacity | WQ | Age | Hazards |
| Raw Water Intake and Pipeline | | | X | |
| Low-Lift Pump Station and Raw Water Pipe | X | | X | X |
| Flash Mix | | | X | X |
| Pre-Treatment (Exiting Contactors) | | X | X | X |
| Filters | X | | X | X |
| Clearwell | X | | X | X |
| High-Lift Pump Station | X | | X | X |
| Residuals Handling (lagoons) | X | | X | X |
| Control Building | | | X | X |
| Chemical Storage | | | X | X |
| Plant Electrical | | | X | X |
| ANTICIPATED TIMEFRAME | 2028 | 2031-2040* | 2034-2074 | By 2063 |

* May be sooner depending on funding

# Implementation Alternatives

Existing Plant Focus → New Plant Focus

1 2 3

**1** Retrofit and rehab as much as possible

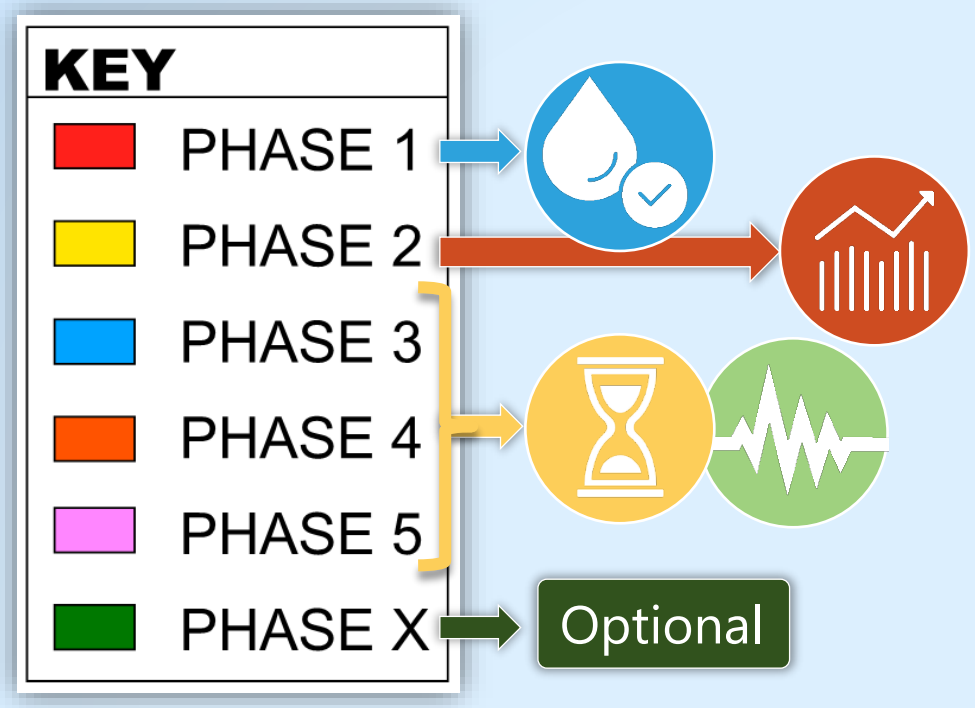
**2** Incremental construction of new infrastructure
- a. Floc/Sed with Plates + PAC

OR
- b. Ozone and Ballasted Floc

**3** Build all new treatment plant
- a. Floc/Sed with Plates + PAC

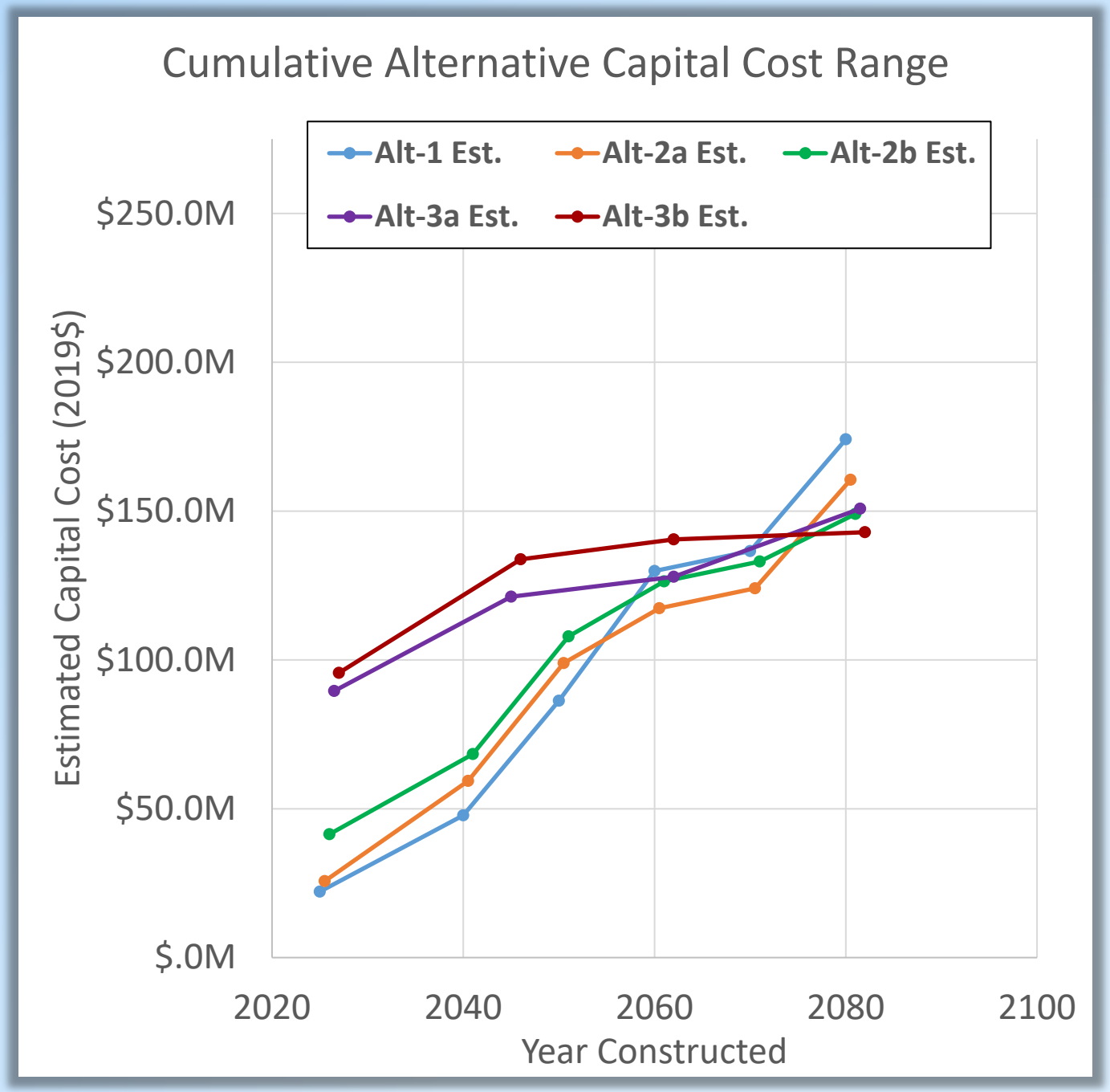
OR
- b. Ozone and Ballasted Floc

**Phases within alternatives:**

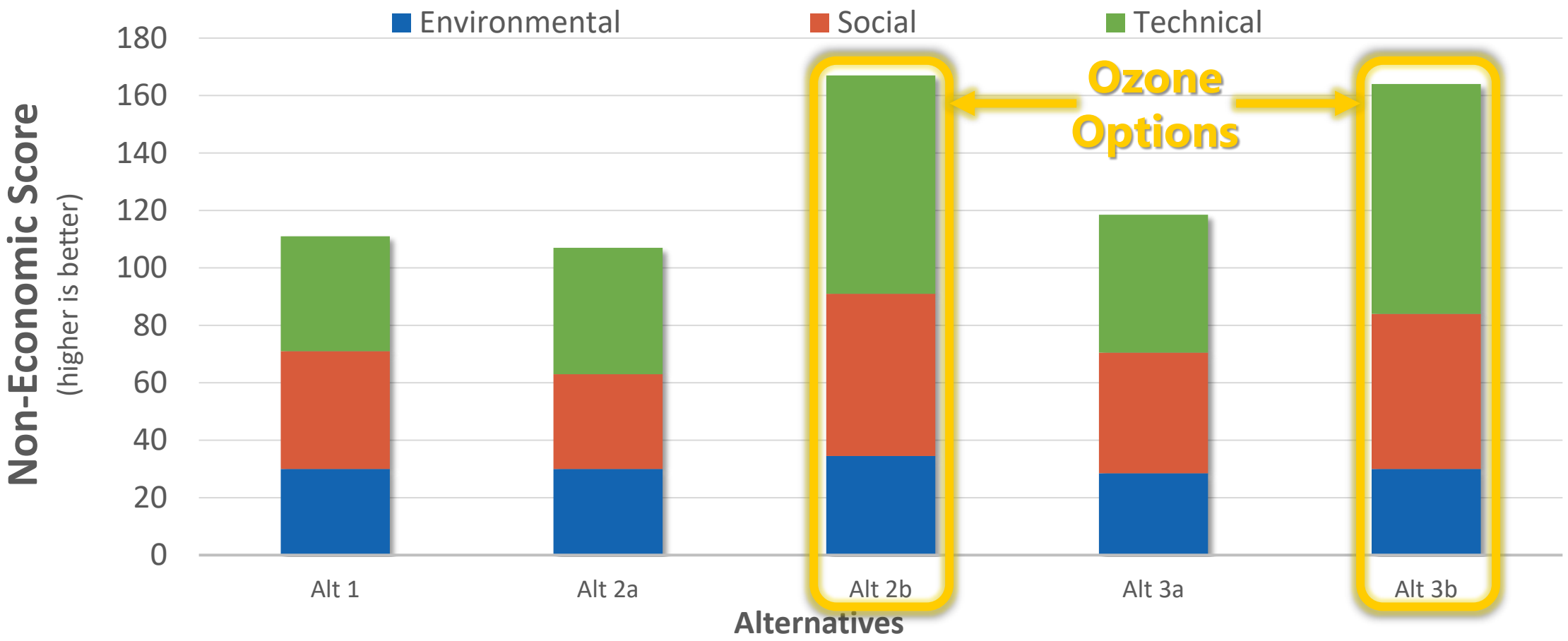


# Long Term Capital Costs

*Lower cost options in the near term invest money in infrastructure that will be replaced over time.*



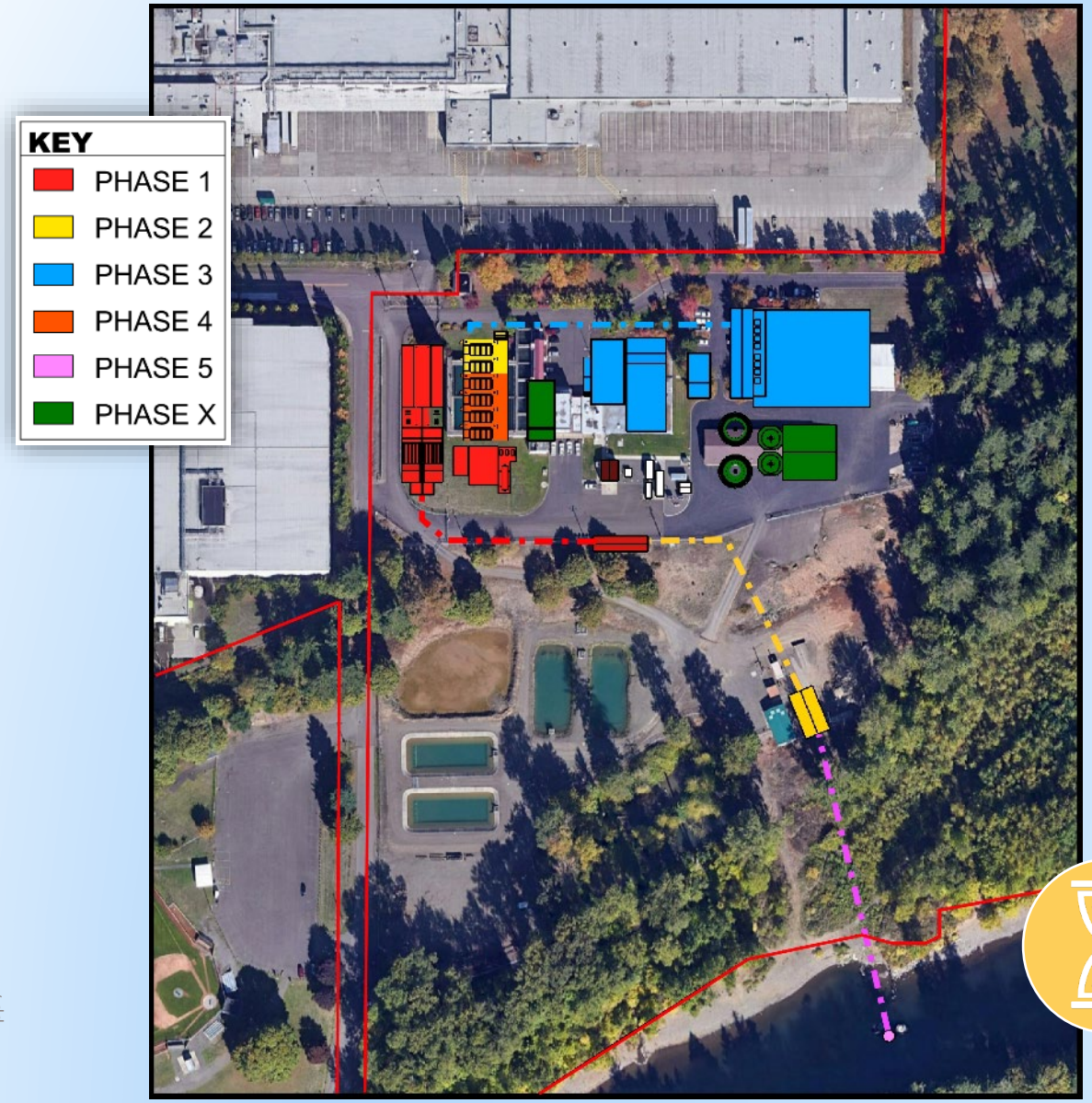
# Non-Economic Evaluation of Alternatives




Alt 1 - Maximize Lifespan of Existing Infrastructure. Floc with Plates + Pac Initially.
Alt 2a - Incrementally Replace Infrastructure; Floc Basins with Plates and PAC.
Alt 2b - Incrementally Replace Infrastructure; Ballasted Floc + Ozone.
Alt 3a - Construct complete new 15 mgd plant; Floc with Plates + PAC initially.
Alt 3b - Construct complete new 15 mgd plant; Ballasted Floc + Ozone.

# Selected Alternative

(Alternative 2b)



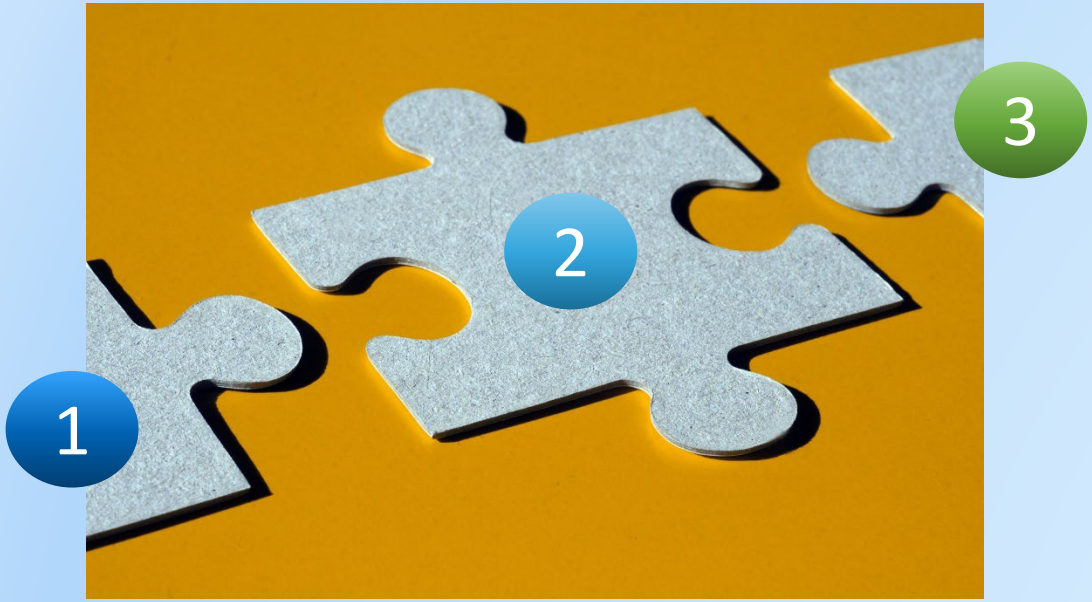

Existing Plant Focus → New Plant Focus

**2b**

## Incrementally Replace Infrastructure

- Water Quality improvements
  - Ozone system
  - Ballasted flocculation basins
  - Upgrade existing filters
- Capacity Improvements
  - Additional filters (as needed)
  - Additional solids handling basins
- Aging infrastructure / resiliency
  - Achieved as facilities are replaced

# Projects within the WTP were prioritized to maximize value




Benefits Include:

- Reduced Risk
- Addressing the Most Drivers
- Meeting short term needs with existing funding reserves while planning for larger long-term projects

- Power
- Footprint
- Process

- Planning with other projects

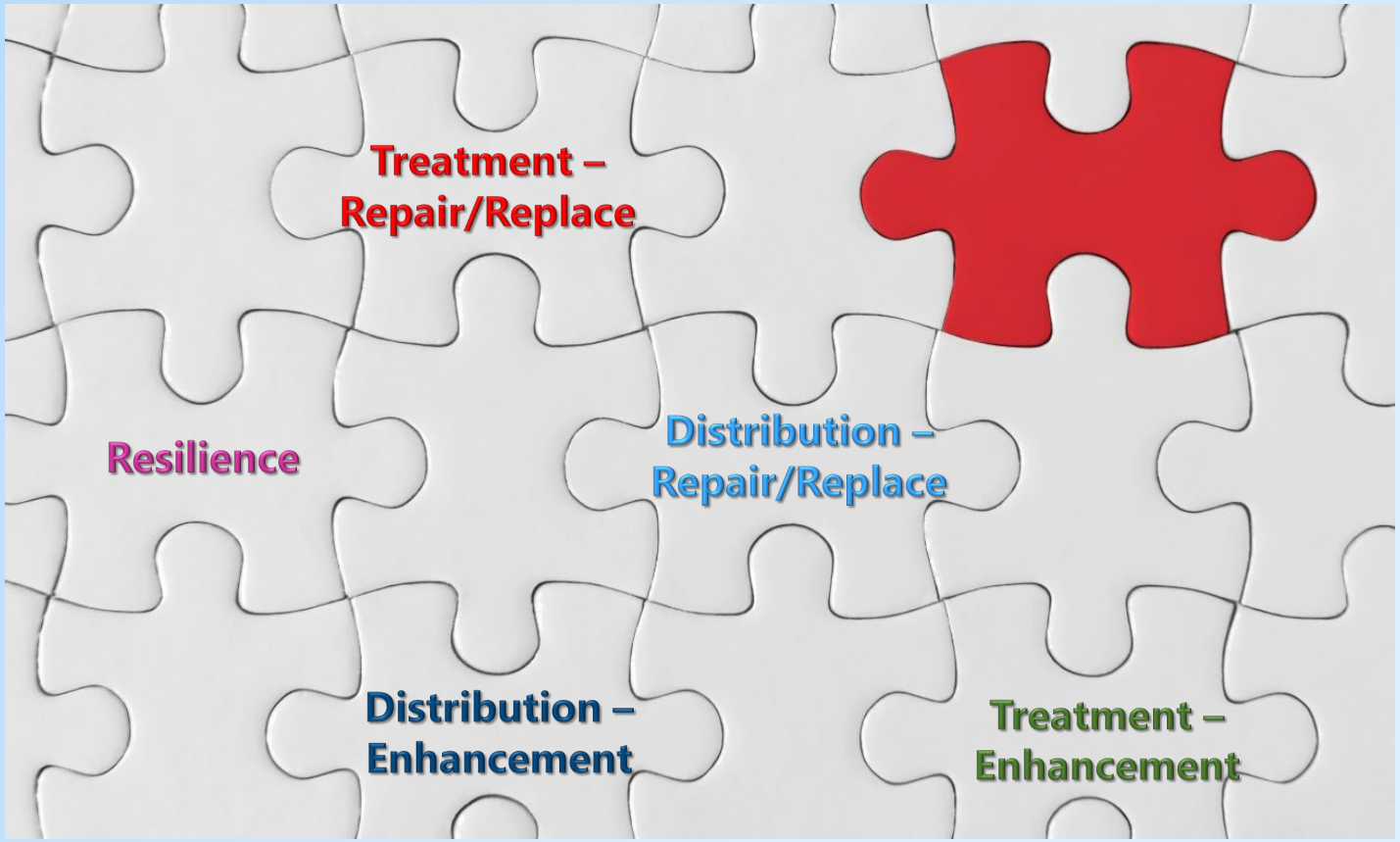
- Maximizing benefits

# But… CRW's infrastructure extends beyond the WTP

The WTP is only one part of the "puzzle" of the District's overall CIP strategy:

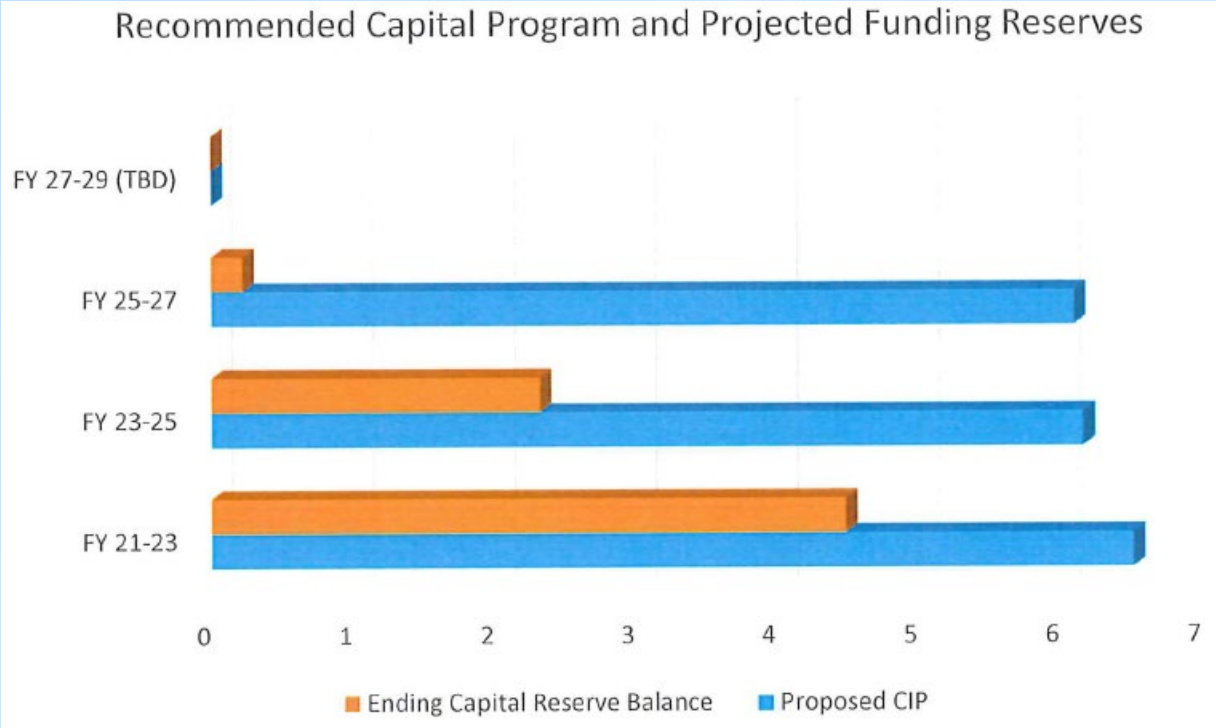
- Repair/Replacement needs of the system
- Enhancement needs of the system
- Resilience of the system

Overall strategy aligns with recommendations made in recent CRW planning efforts (2019 WSMP, 2021 WTPFP, 2021 RRA)



# Coordinating with a bigger CIP

- Proposed 6-year capital improvement plan
- Spends down existing reserves to address more immediate infrastructure needs
- Completion of short-term projects sets stage for larger long-term CIP, including WTP "enhancement" improvements
- Consideration of other funding (grant, bond, loan options) for larger scale improvements while rebuilding cash reserves from rates



# Questions?

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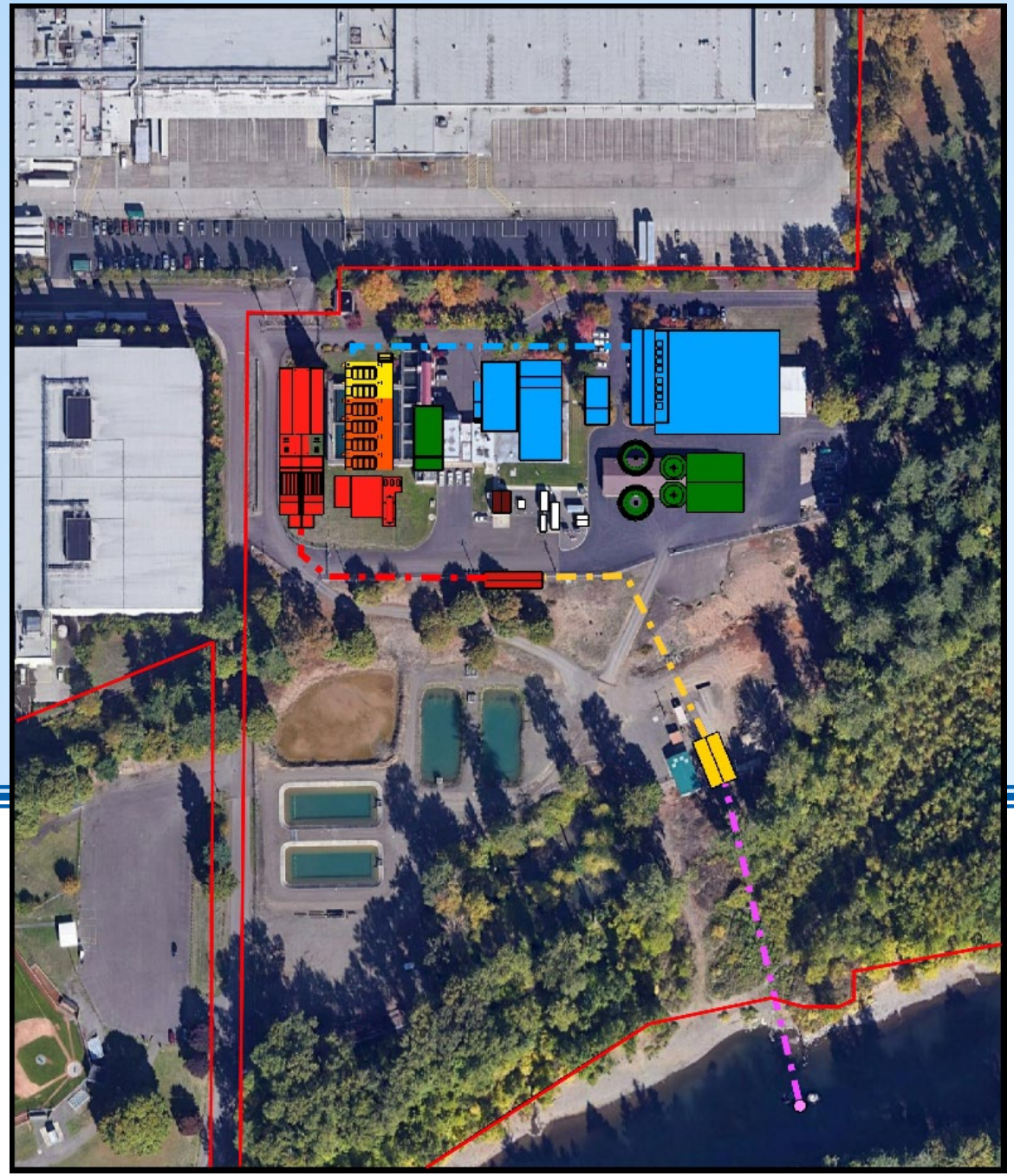

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