

# Making the Most of your WTP: Increasing Capacity at the MWC Duff WTP

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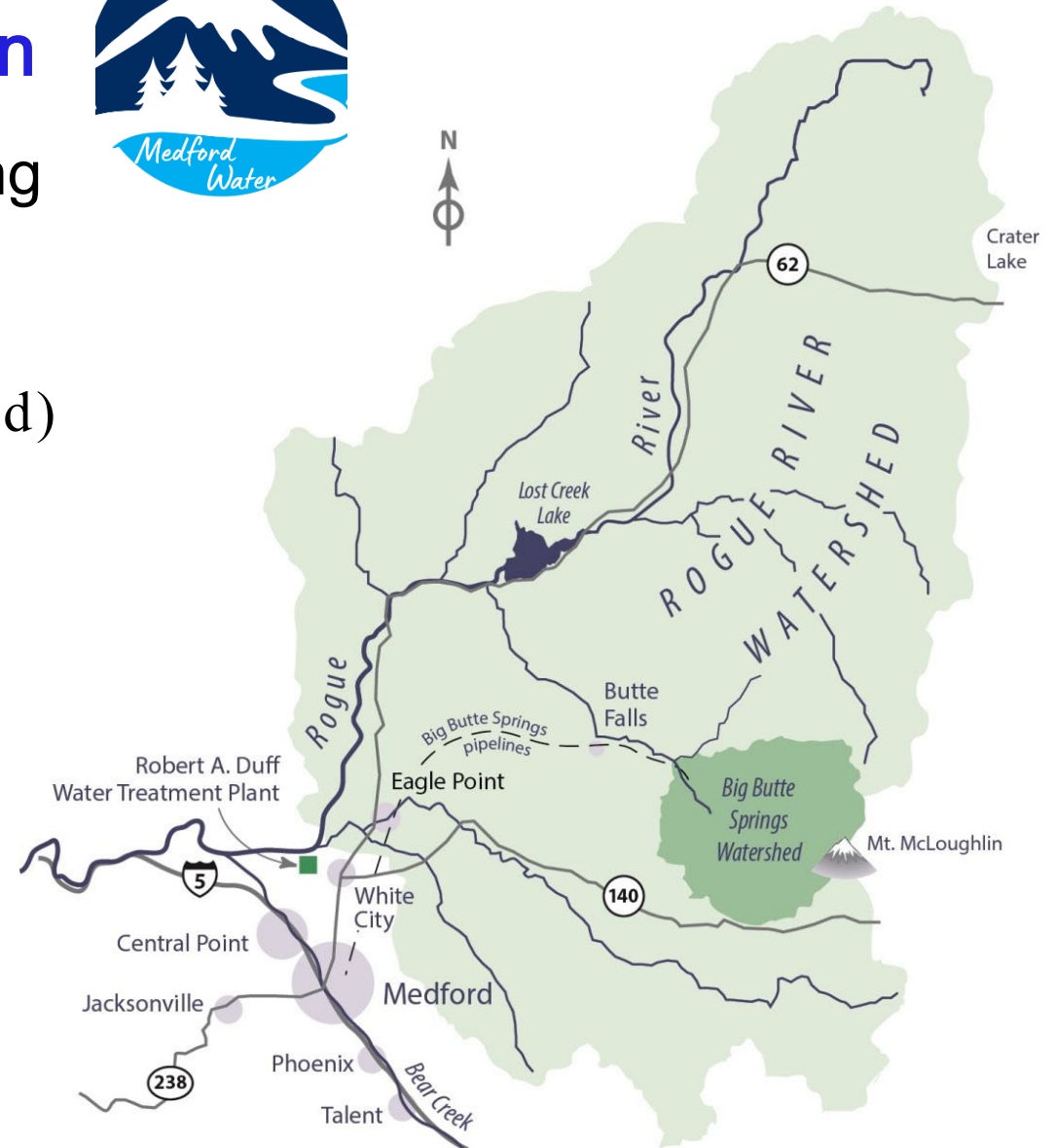
# Agenda

- Project overview
- Problem statement
- Facility planning and prioritization
- Implementation and results
- The future of the Duff WTP

# Project Overview

# Background - Medford Water Commission

- 140,000 customers in Medford and surrounding communities
- Two sources:
  - Duff Water Treatment Plant, Rogue River (45 mgd)
  - Big Butte Springs (26.4 mgd)
- Capacity: 71.4 mgd nominal

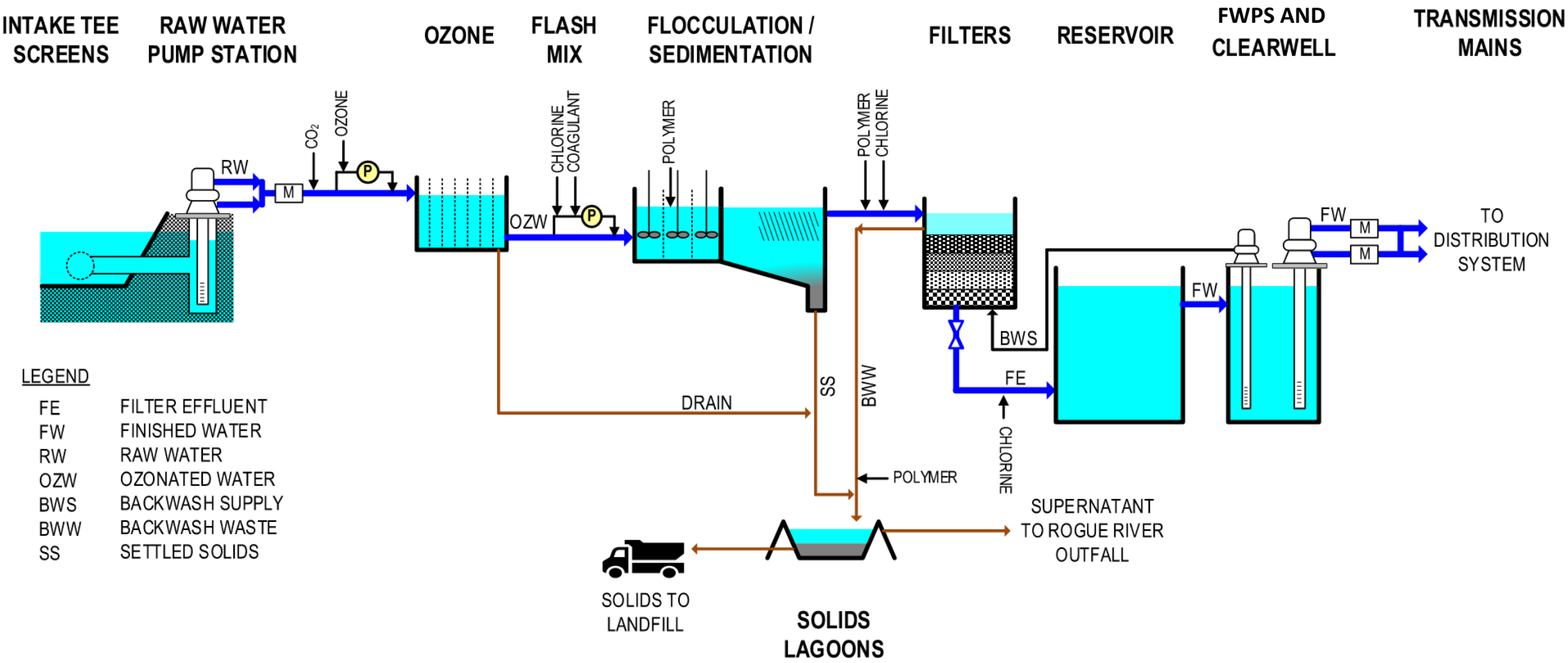


# Background - Duff Water Treatment

- History and capacity:
  - Originally constructed in 1968 for 15 mgd
  - Expanded to 30 mgd in 1964
  - Expanded to 45 mgd in 1999
  - Expansion to 65 mgd began in 2017



# Background - Duff Water Treatment



# Problem Statement

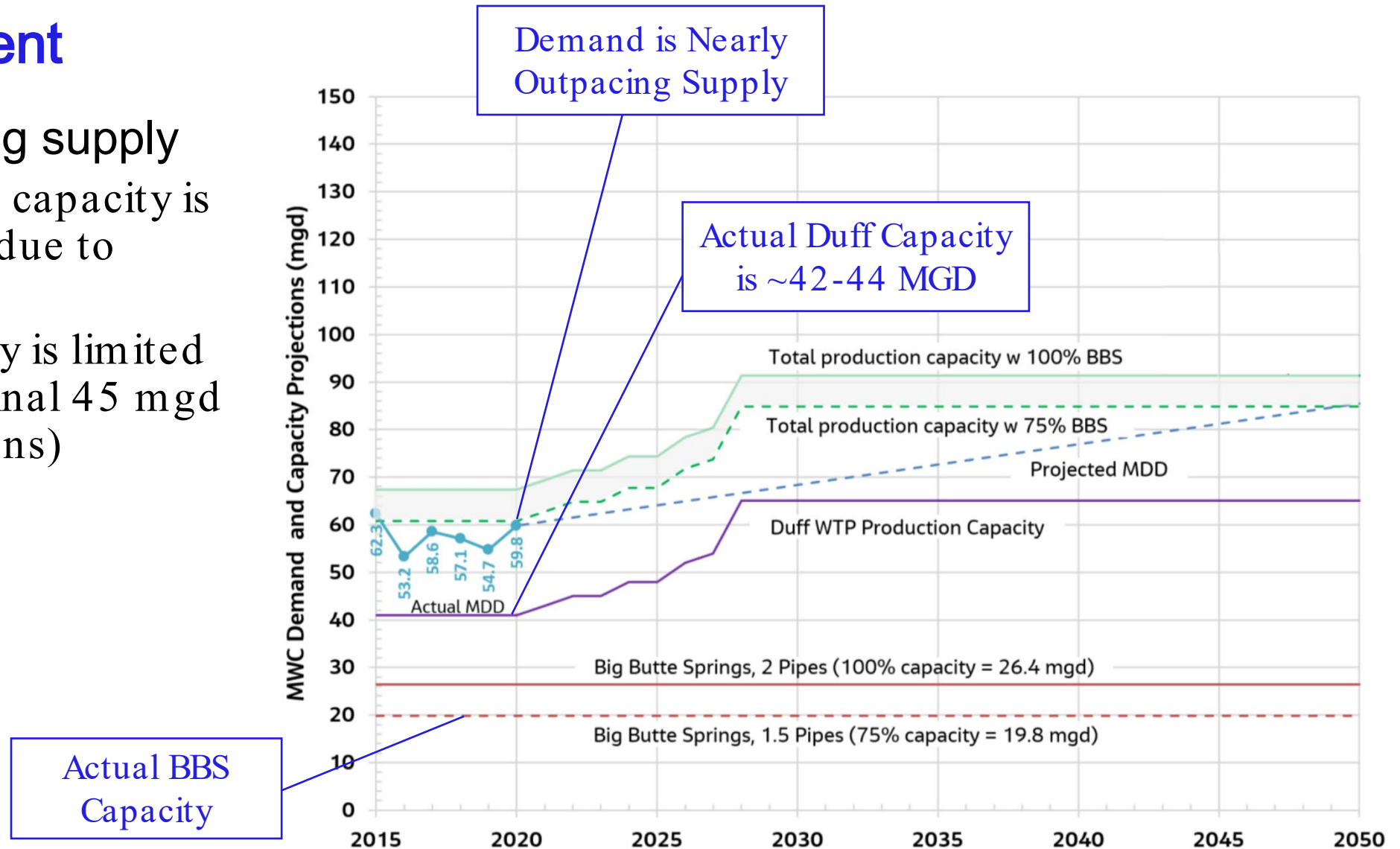
# Problem Statement

- Demand outpacing supply
- Limited equalization storage at WTP



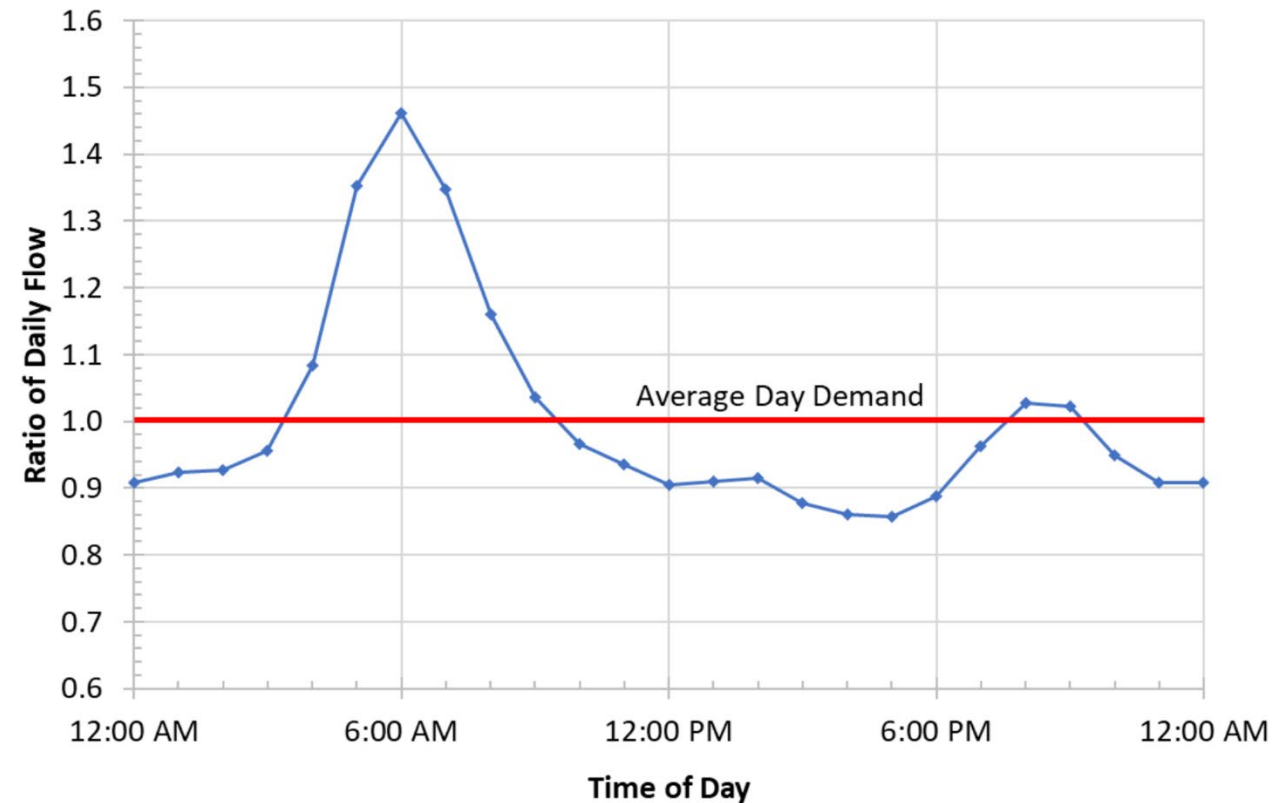
# Problem Statement

- Demand outpacing supply
  - Big Butte Springs capacity is below 26.4 mgd due to drought
  - Duff WTP capacity is limited to less than nominal 45 mgd (for various reasons)



# Problem Statement

- Limited equalization storage at WTP
  - Finished water reservoir has limited baffling ( $T_{10}/T = 0.29$ )
  - Previous tracer study limits operations to between 12-14 ft
  - WTP flow must vary throughout the day to meet peak flow periods



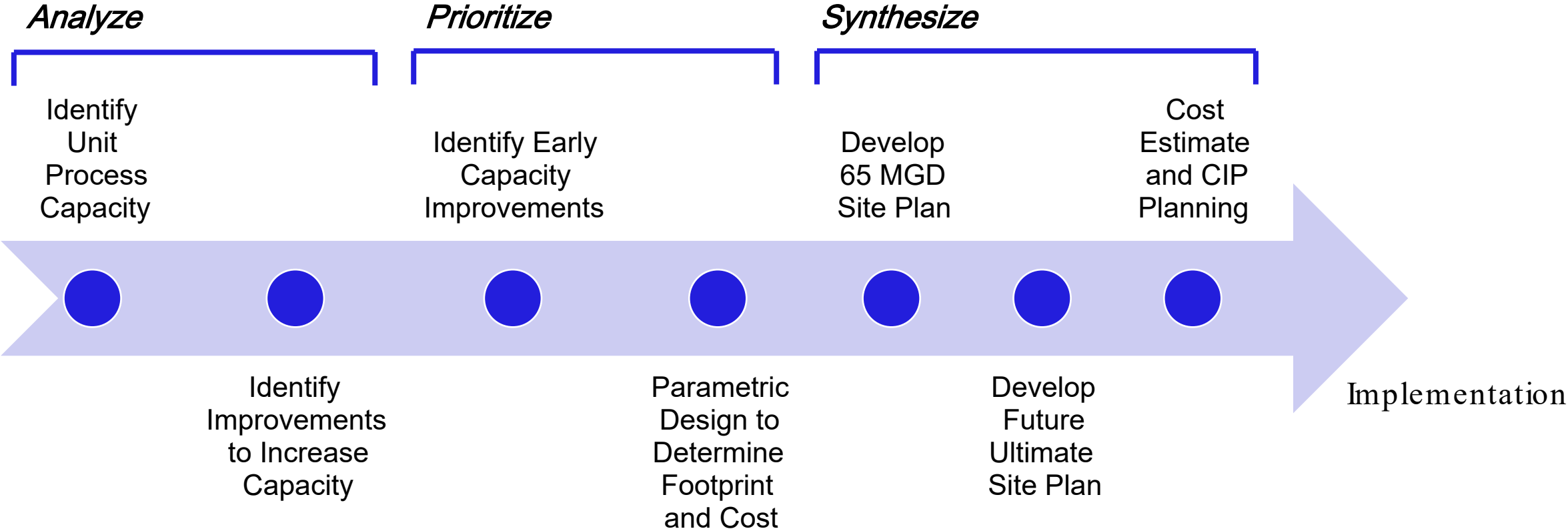
# Objectives

- Define capacity of each unit process, determine which is limiting the WTP capacity
- Identify projects to increase production in short and long term (65 mgd)

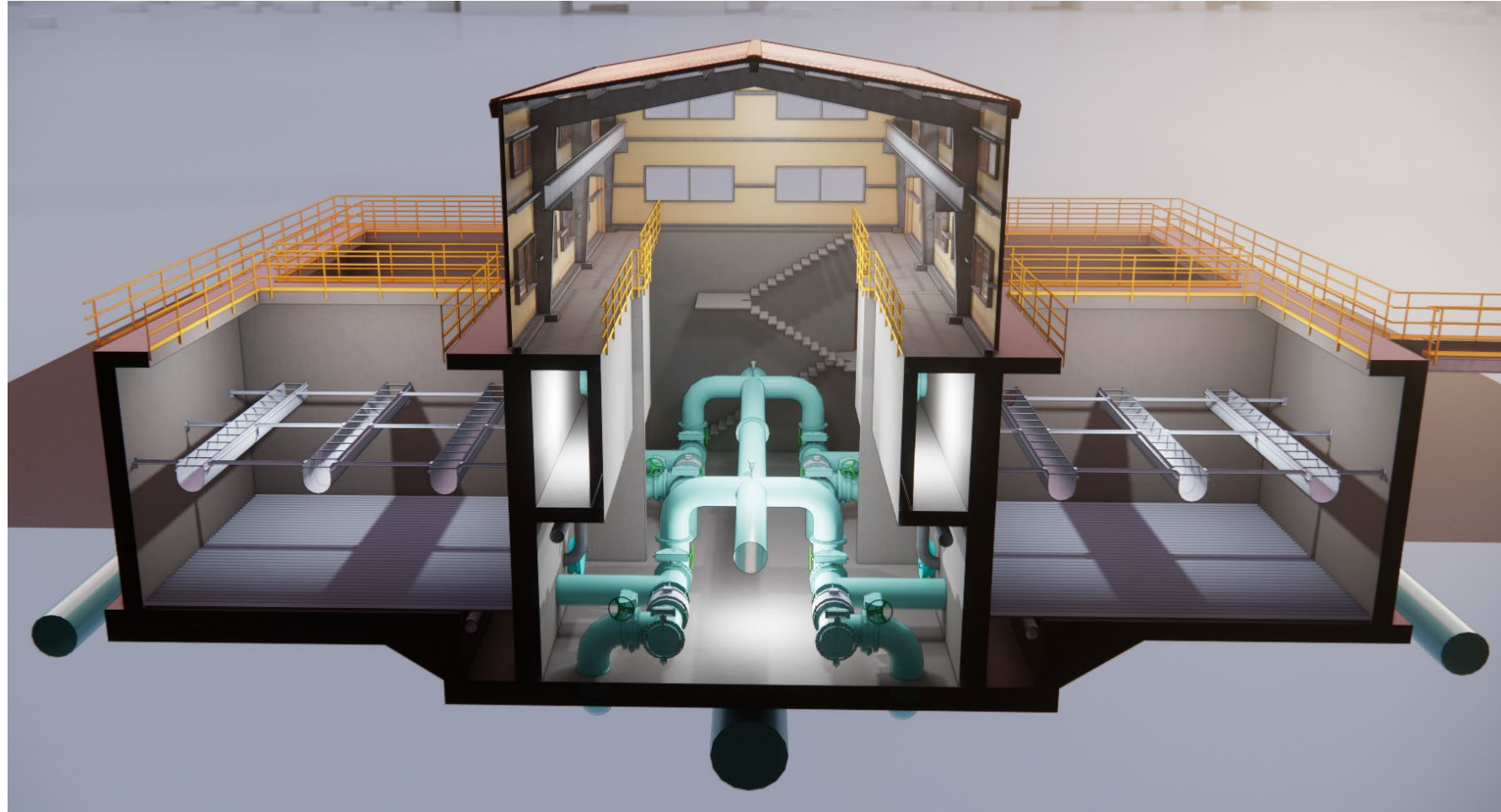


# Facility Planning

# Overview



# Rapid Prototyping for Early Decision Making



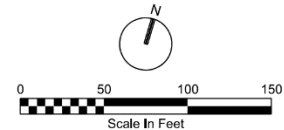
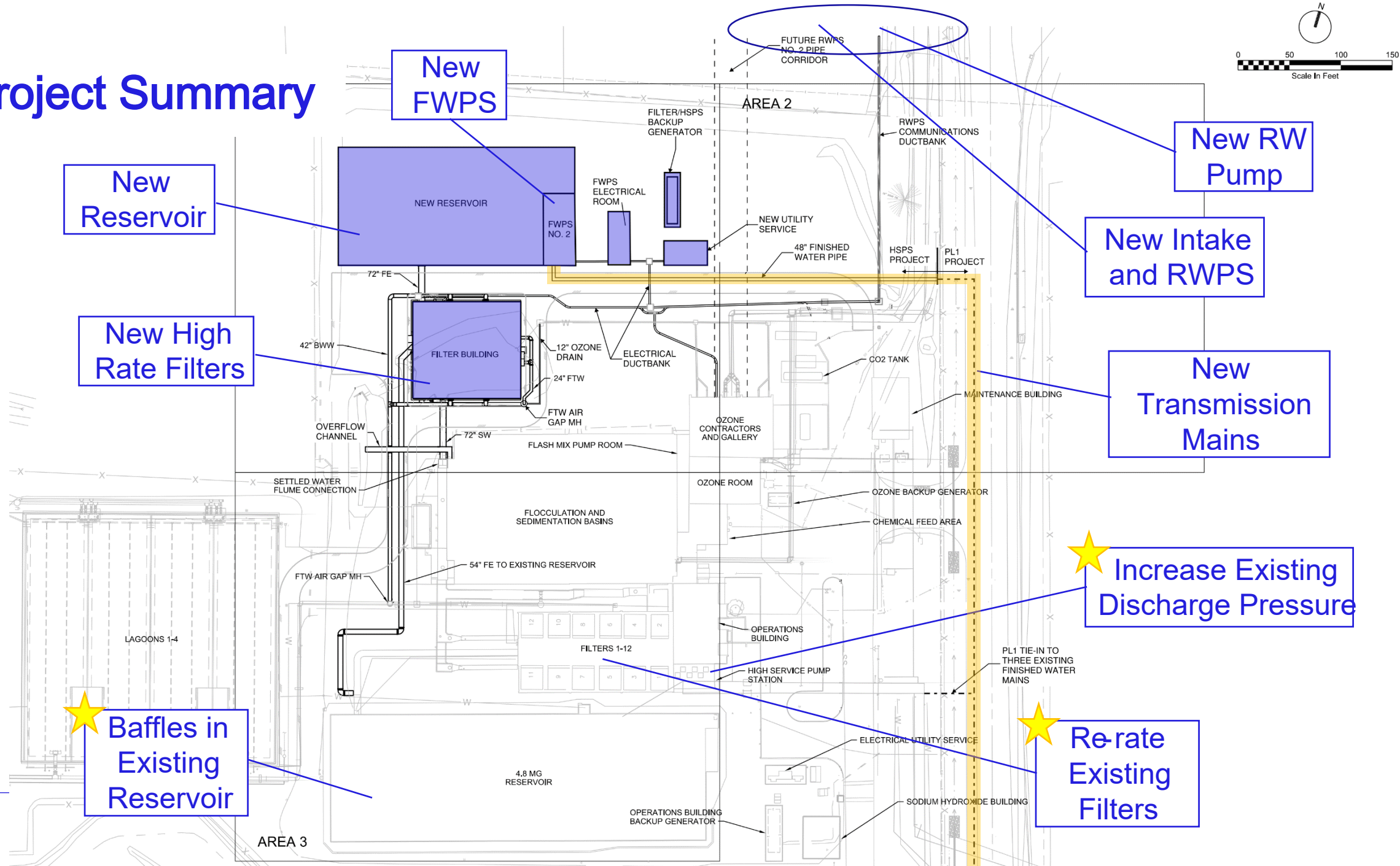
Replica  
Parametric  
Design<sup>1/4</sup>

# Identify Unit Process Capacity

Unit Process	Current Capacity in MGD (2019)	
	Peak	Firm
Raw water pumps	77	54
Ozone	67	67
Flocculation	72	67
Sedimentation	81	67
Filtration	44	42 ★
Reservoirs	45	45 ★
High service pumps	55	45
Transmission and storage	48	43 ★
Chemical systems	67	67
Solids dewatering	67	67



# Project Summary





# Project Prioritization

- Short Term Projects (by 2021)
  - Existing reservoir baffles
  - Re-rate existing filters
  - Increase discharge pressure
- Medium Term Projects (by 2025)
  - Upsize pump in RWPS
  - Install new filters
  - Install new reservoir
  - Install new FWPS
  - Install new transmission mains
- Long Term Projects (timing TBD)
  - Install second intake and pump station

# Implementation and Results

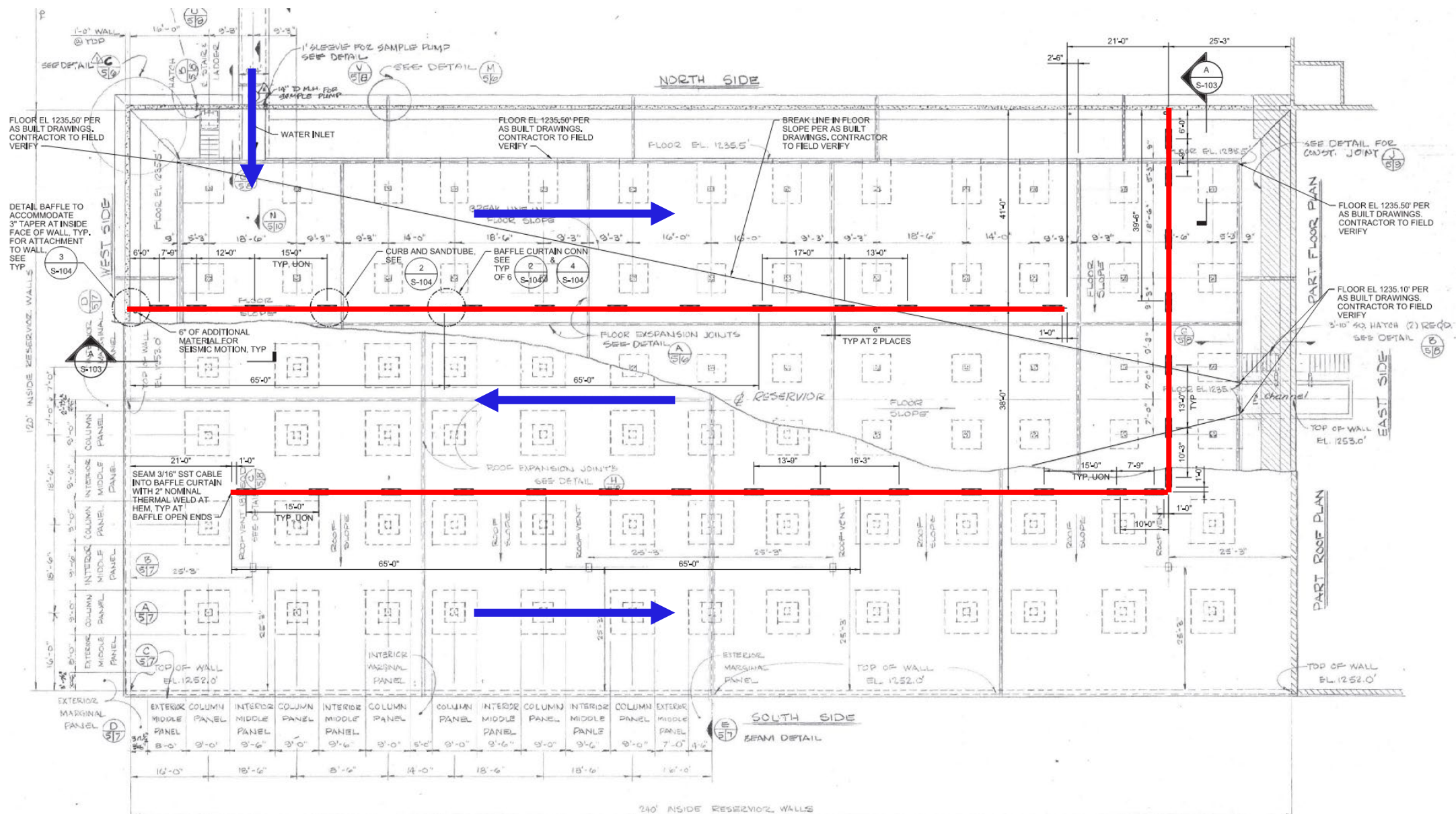
# Reservoir Baffles

- Polyester baffles
- Limit stress on existing old reservoir
- Target  $>0.5$  baffling factor
- Conduct tracer test following installation

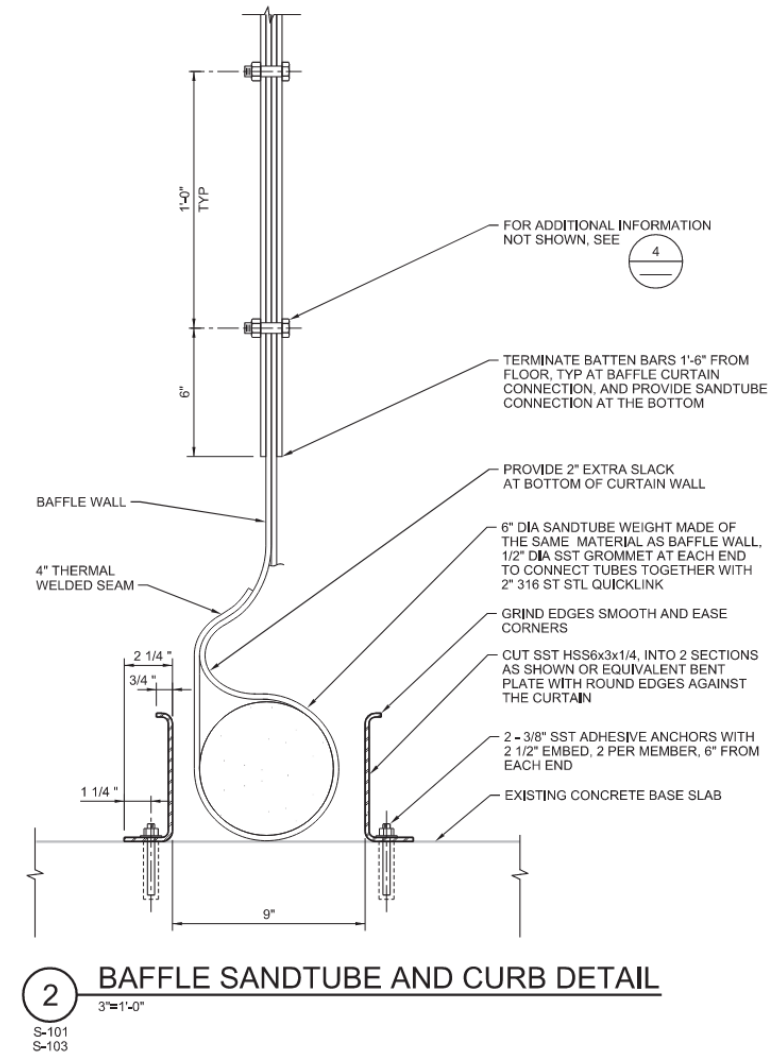




# Reservoir Baffles



# Reservoir Baffles



# Reservoir Baffles – Tracer Study

- Baffling Factor = 0.6
- Maximum Flow = 49.5 mgd
- Operating Level = 7.9-15 ft

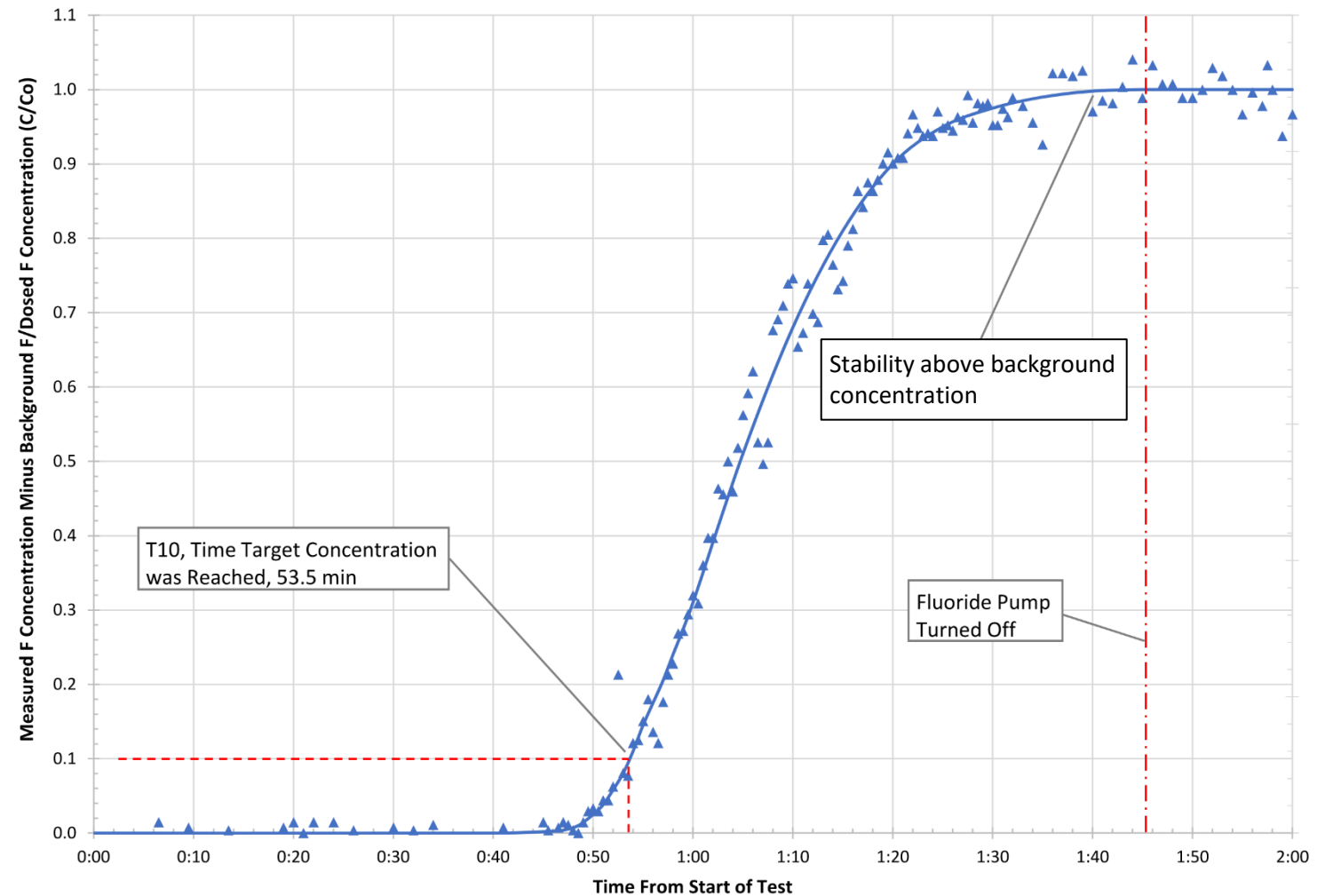


Figure 3: Tracer Test Results Showing Time Target Concentration was Reached (T10)



## Re-Rate Existing Filters

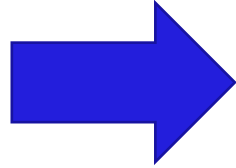
- Perform pilot test to prove performance
- Up-rate from 5.4 gpm/sf to 6.5 gpm/sf
- Existing filter media:
  - 18" 1.0-mm anthracite
  - 9" 0.5-mm sand
  - 3" 0.3-mm garnet



## Re-Rate Existing Filters – Pilot Results

- Increase loading rate via pilot testing

5.4 gpm/sf



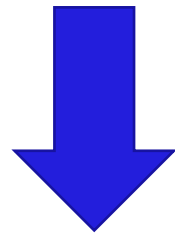
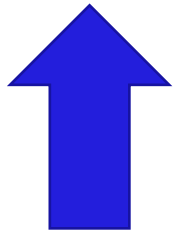
6.5 gpm/sf



# Re-Rate Existing Filters – Pilot Results

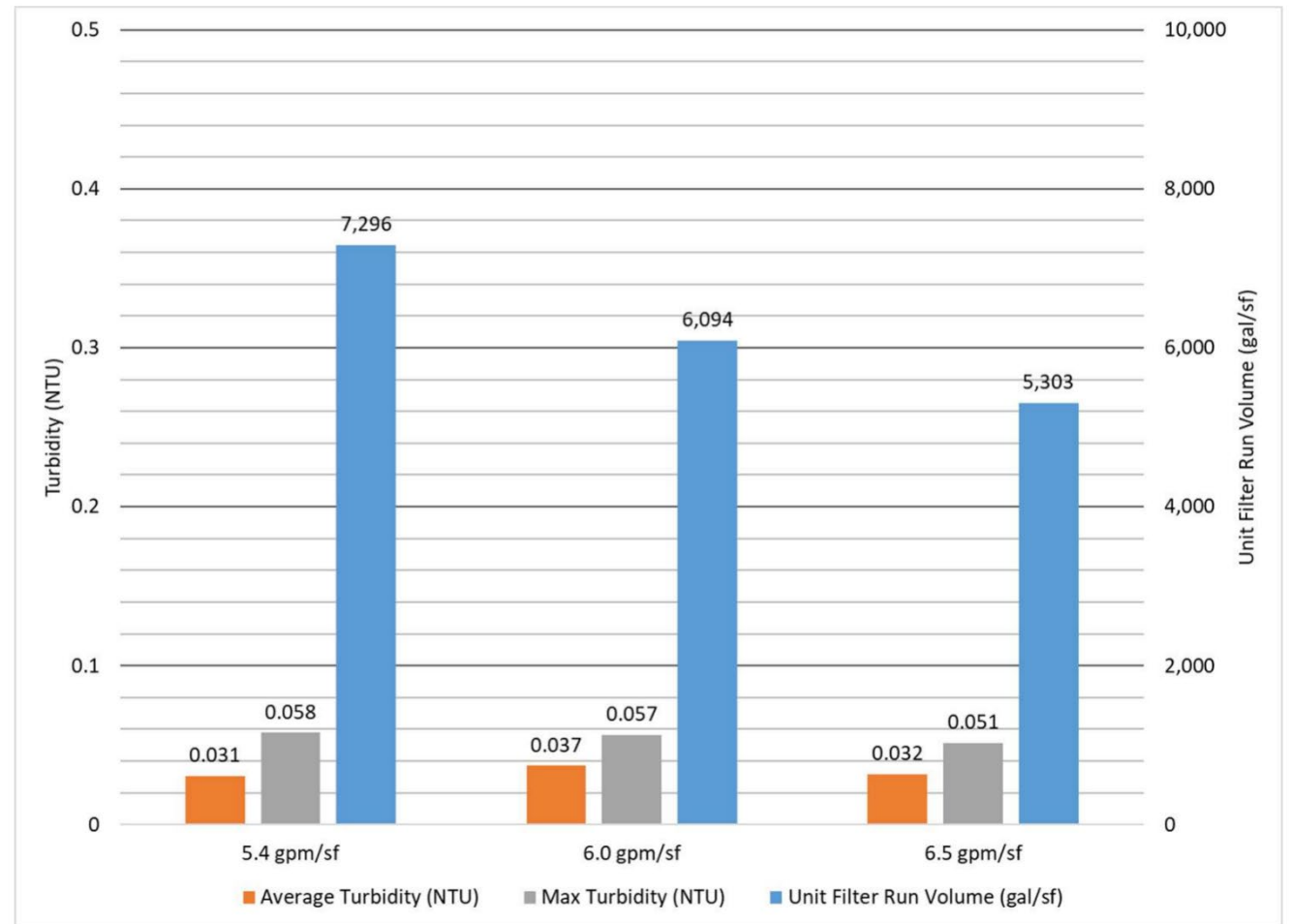
- Treatment performance not impacted by increased loading rate
- Filter efficiency (UFRV) impacted, meaning more frequent backwashes
- Net filtration capacity increased from 42 -44 MGD to 47-50 MGD

Loading Rate  
Backwash Frequency  
Total Production



Filter Run Times  
UFRV (gal/sf)

Figure 4: Pilot Study Filter Loading Rate Comparison



# The Future of the Duff WTP

# Future Work

- 65 MGD Capacity by 2026

New Reservoir and  
Finished Water  
Pump Station

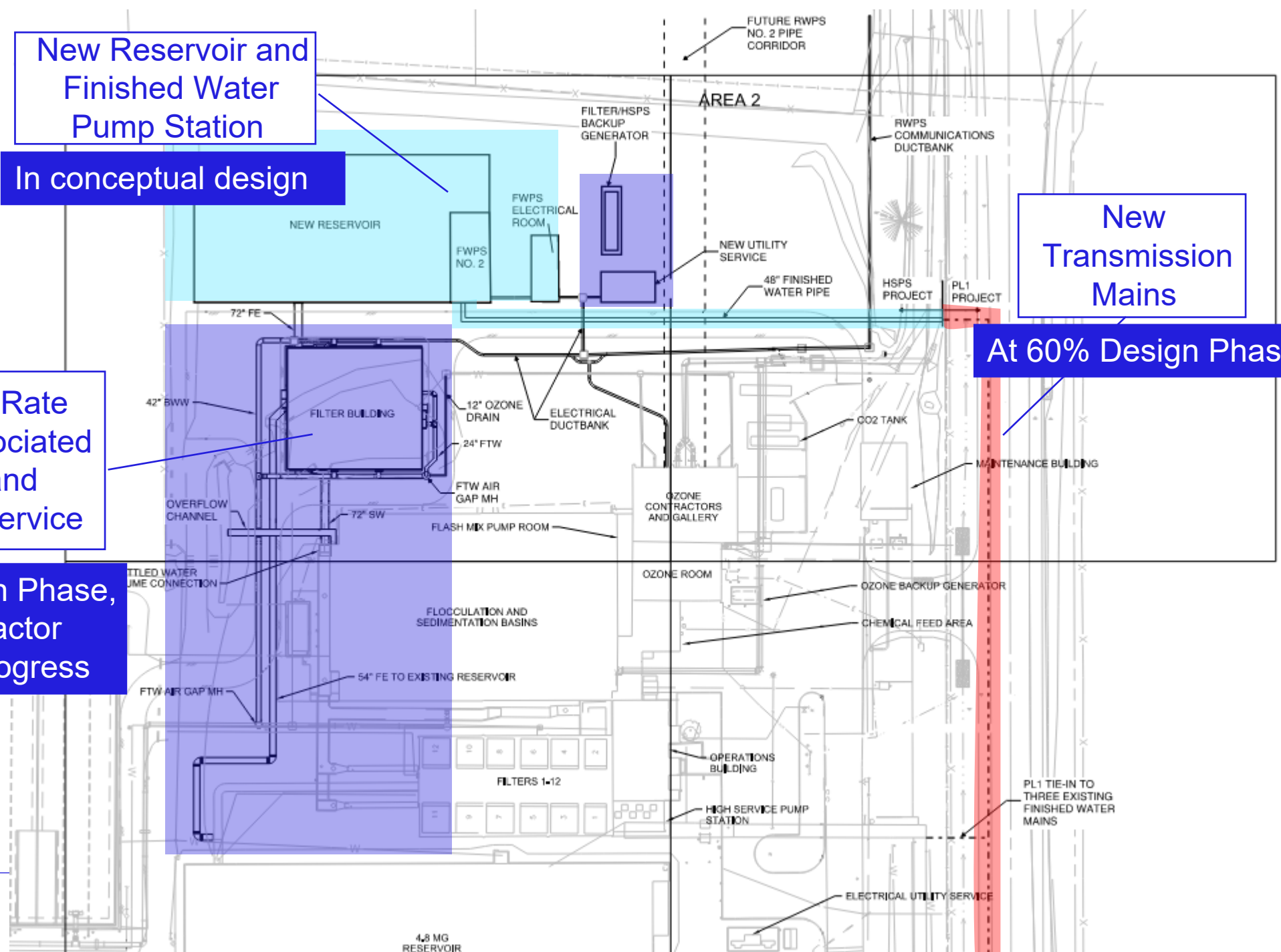
In conceptual design

New High Rate  
Filters, Associated  
Piping, and  
Electrical Service

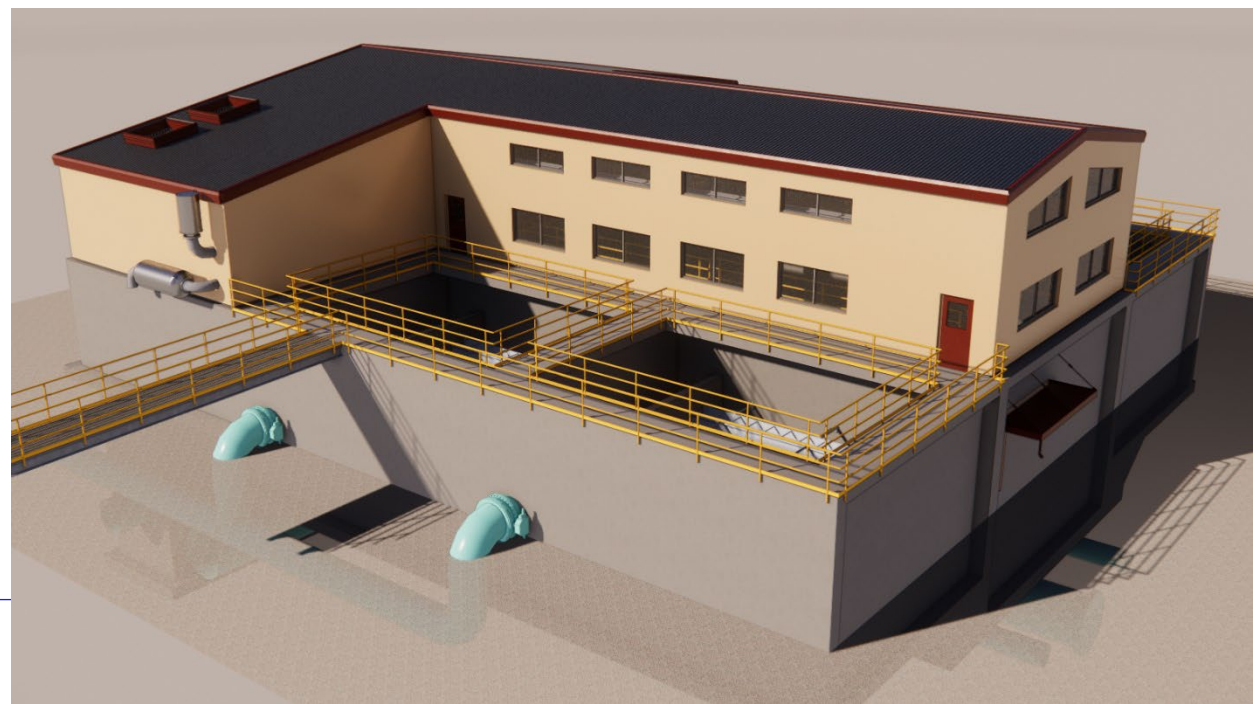
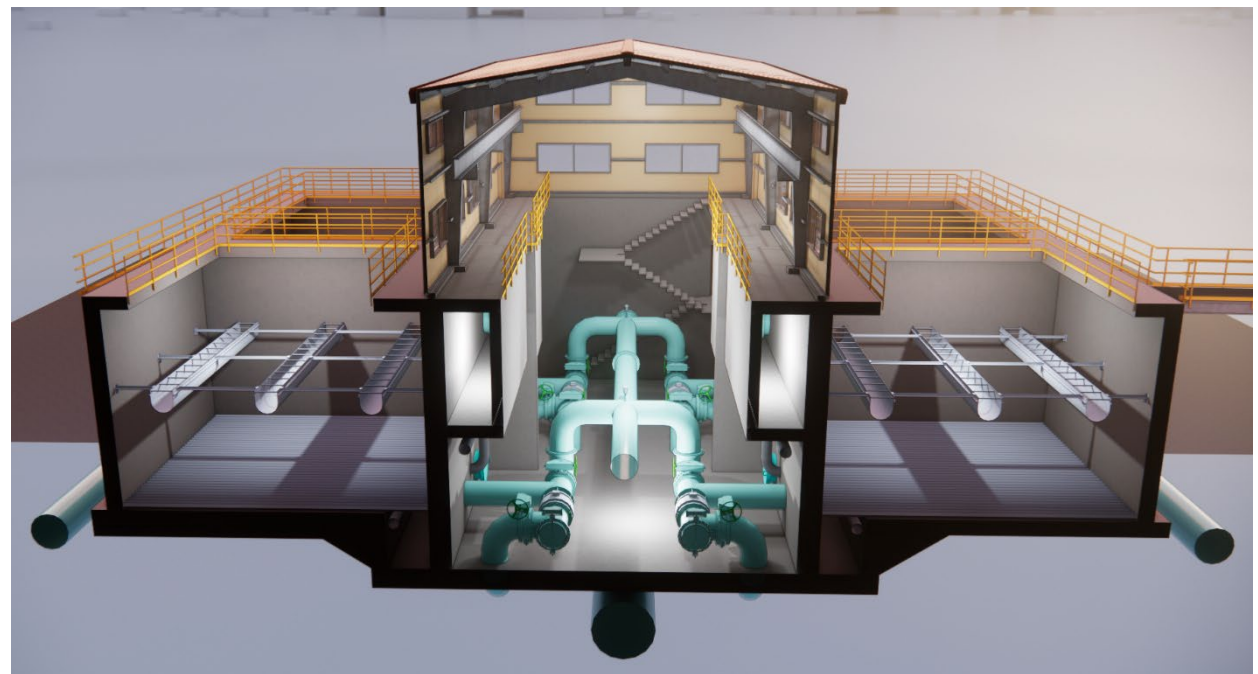
At 60% Design Phase,  
CM/GC Contractor  
selection in progress

New  
Transmission  
Mains

At 60% Design Phase







# Thank You



Challenging today.  
Reinventing tomorrow.

