



Joint Water Commission WTP Expansion to 85MGD

Jacobs

Challenging today.
Reinventing tomorrow.



PNWS – AWWA 1st Quarter Training - Resilience Strategies

February 25, 2021 @ 2:15 pm

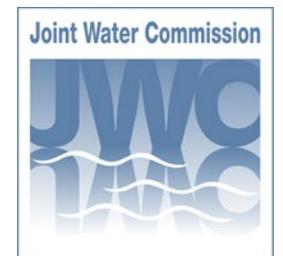
Agenda

Speakers:

Kevin Meeuwsen / Joint Water Commission

Brad Phelps / Jacobs

- **Joint Water Commission Background**
- **WTP Expansion Planning**
- **WTP expansion Construction Project**



Jacobs

Joint Water Commission Facilities



Barney Reservoir



**Fern Hill Reservoirs
(2 x 20 MG)**



**JWC Water
Treatment Plant**



Springhill Pumping Plant



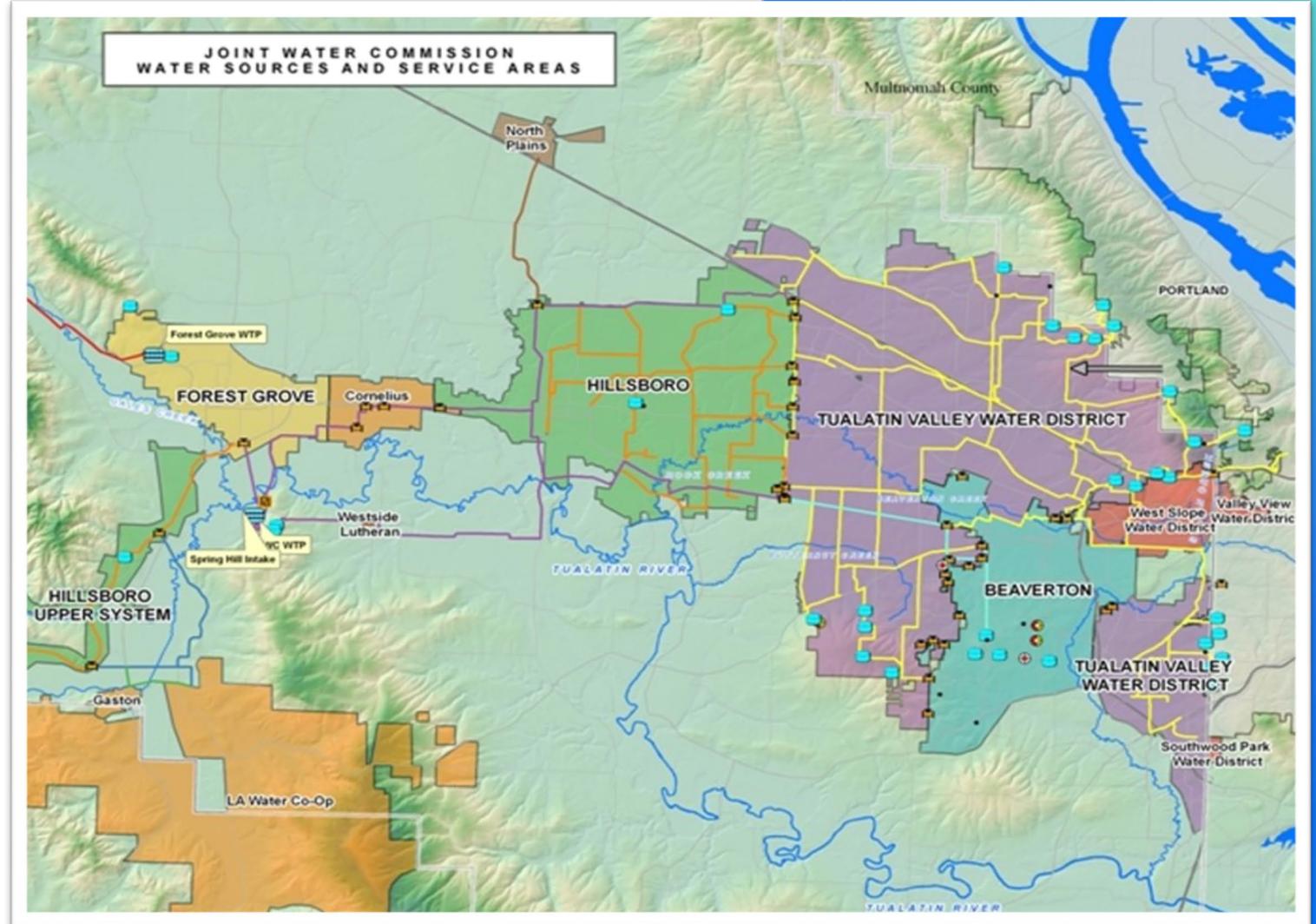
Henry Haag Lake

- The Joint Water Commission (JWC) is a partnership agency between the cities of Beaverton, Forest Grove, Hillsboro and the Tualatin Valley Water District.
- The City of Hillsboro is the managing agency for the JWC and its employees.
- The WTP runs 24 hours/day 365 days/year. Operators work 12 hour shifts, 7 days on/7 days off. There is a day shift and a night shift.



The JWC Water Treatment Plant...

- Serves over 365,000 customers in Washington County
- Is the largest conventional treatment plant in Oregon
- Had a peak capacity of 75 million gallons of water per day (MGD)
- Treats water from the Tualatin River

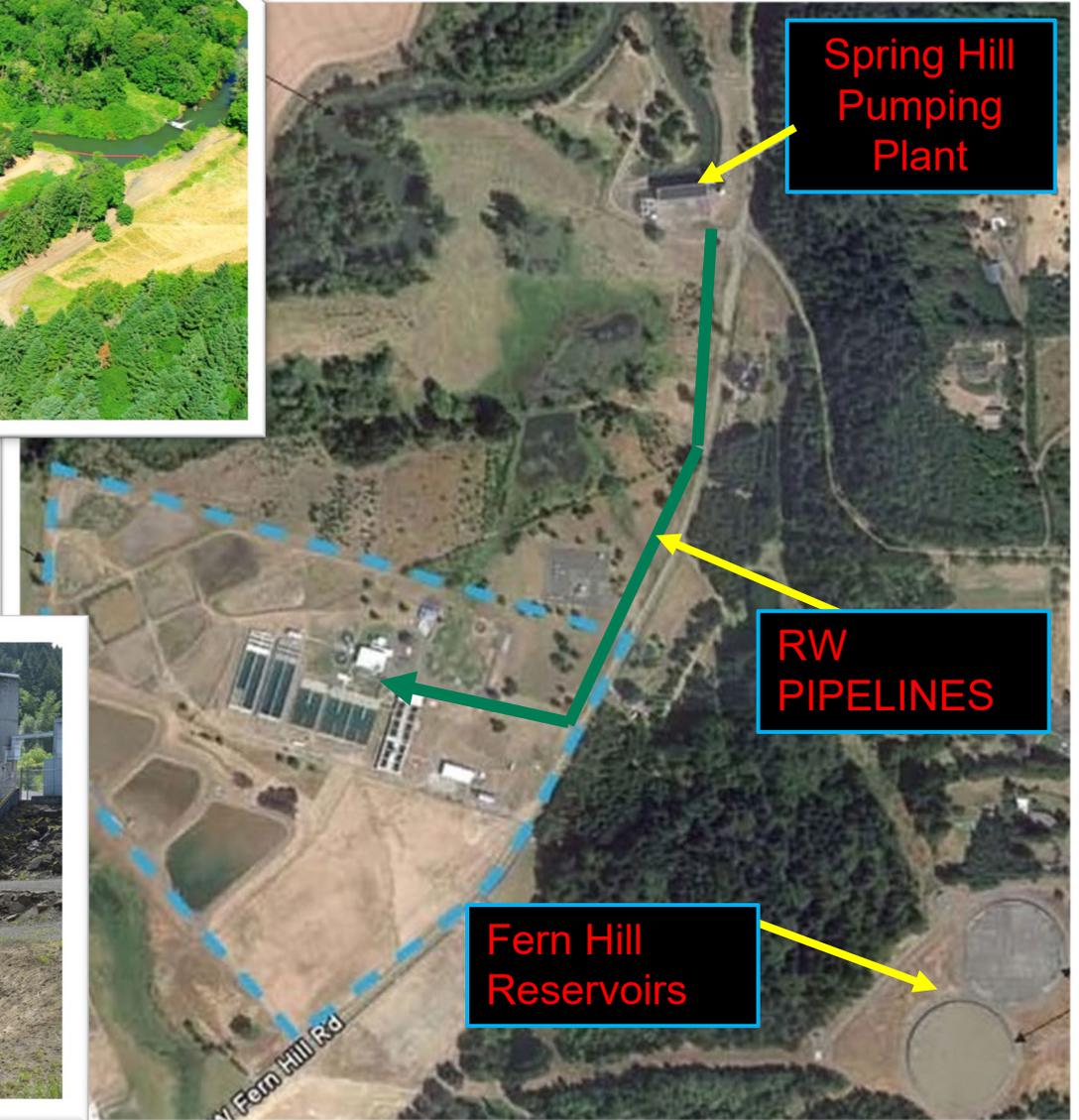
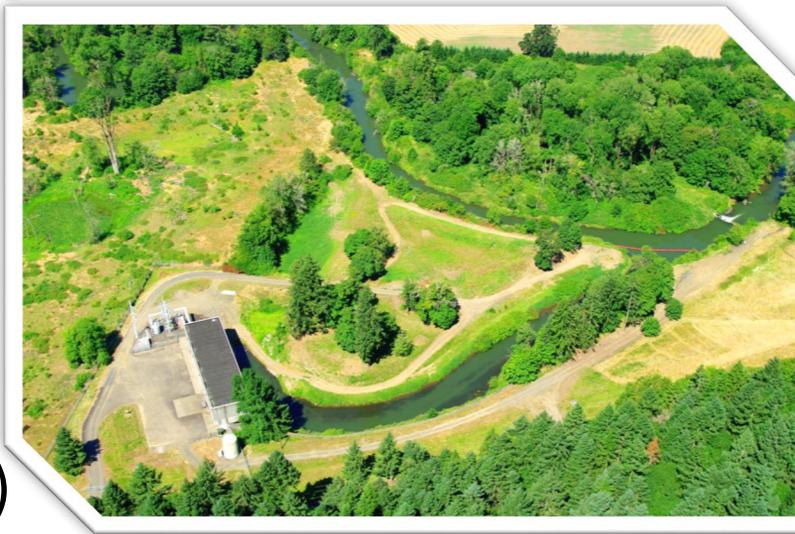


JWC Treatment Plant 40 Year Progression



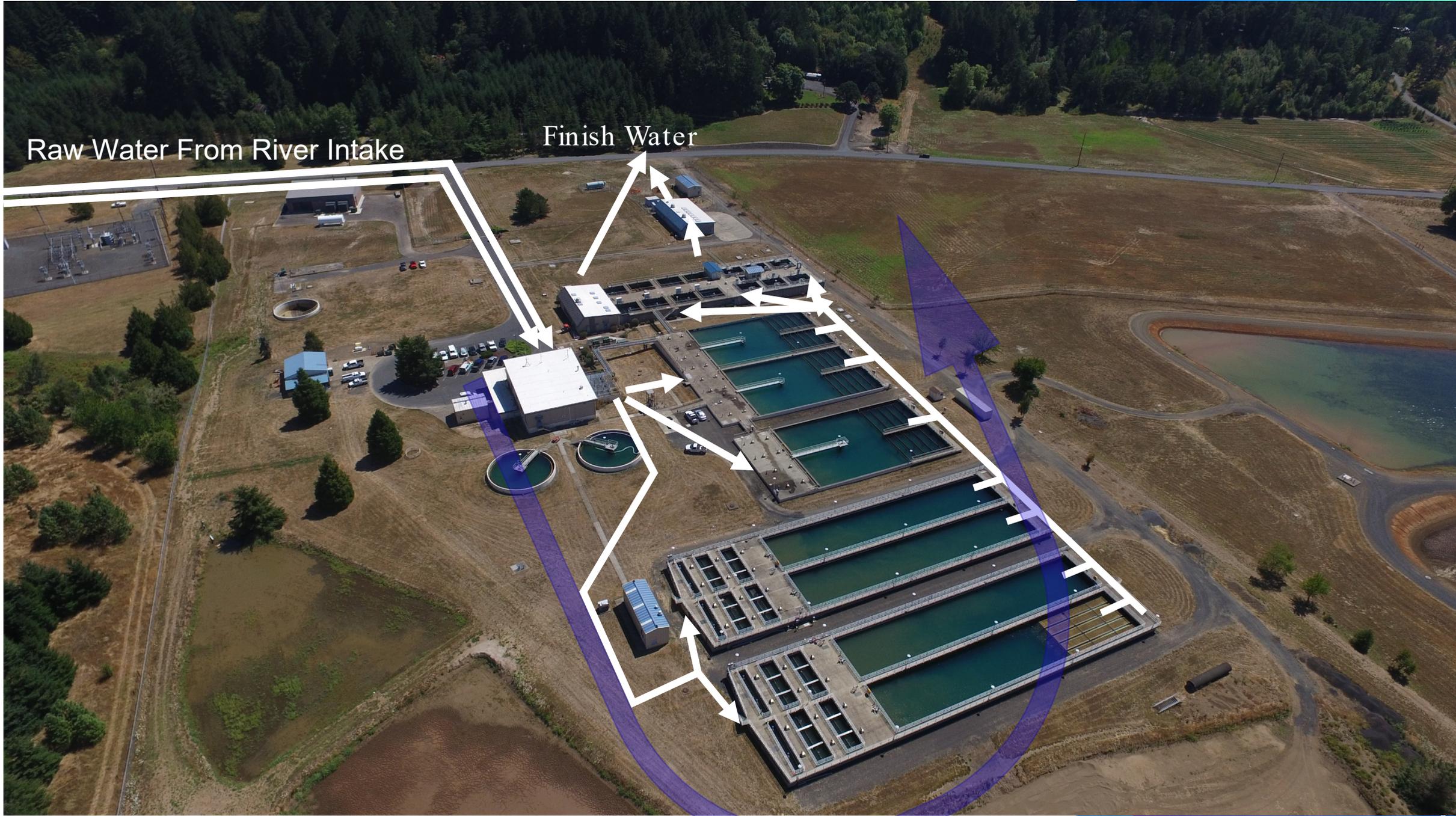
Raw Water Pump Station

- Spring Hill Pumping Plant is shared with Tualatin Valley Irrigation District
- JWC Pumps (NEW!):
400 HP 16,000 gpm (x4)

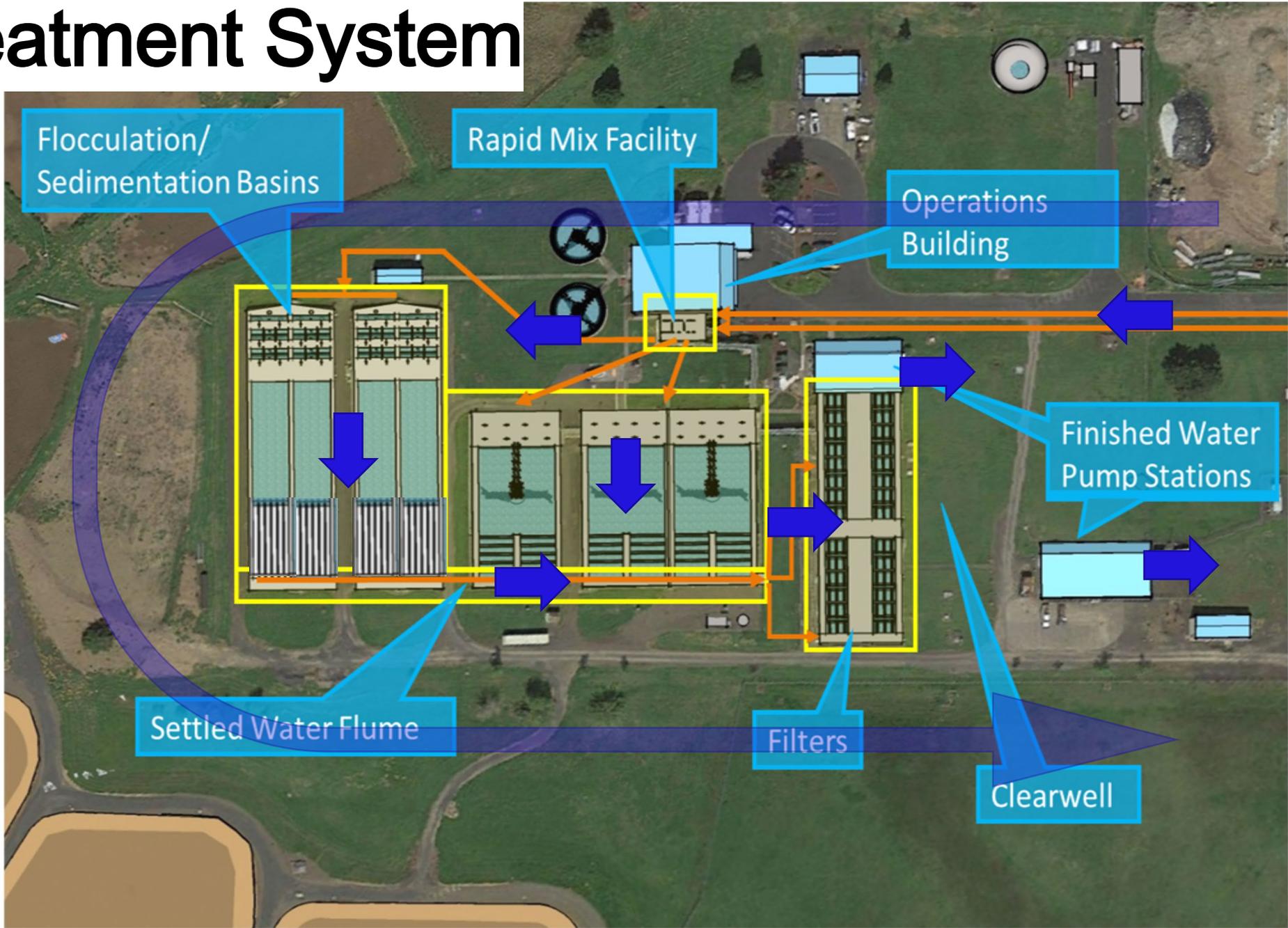


Raw Water From River Intake

Finish Water

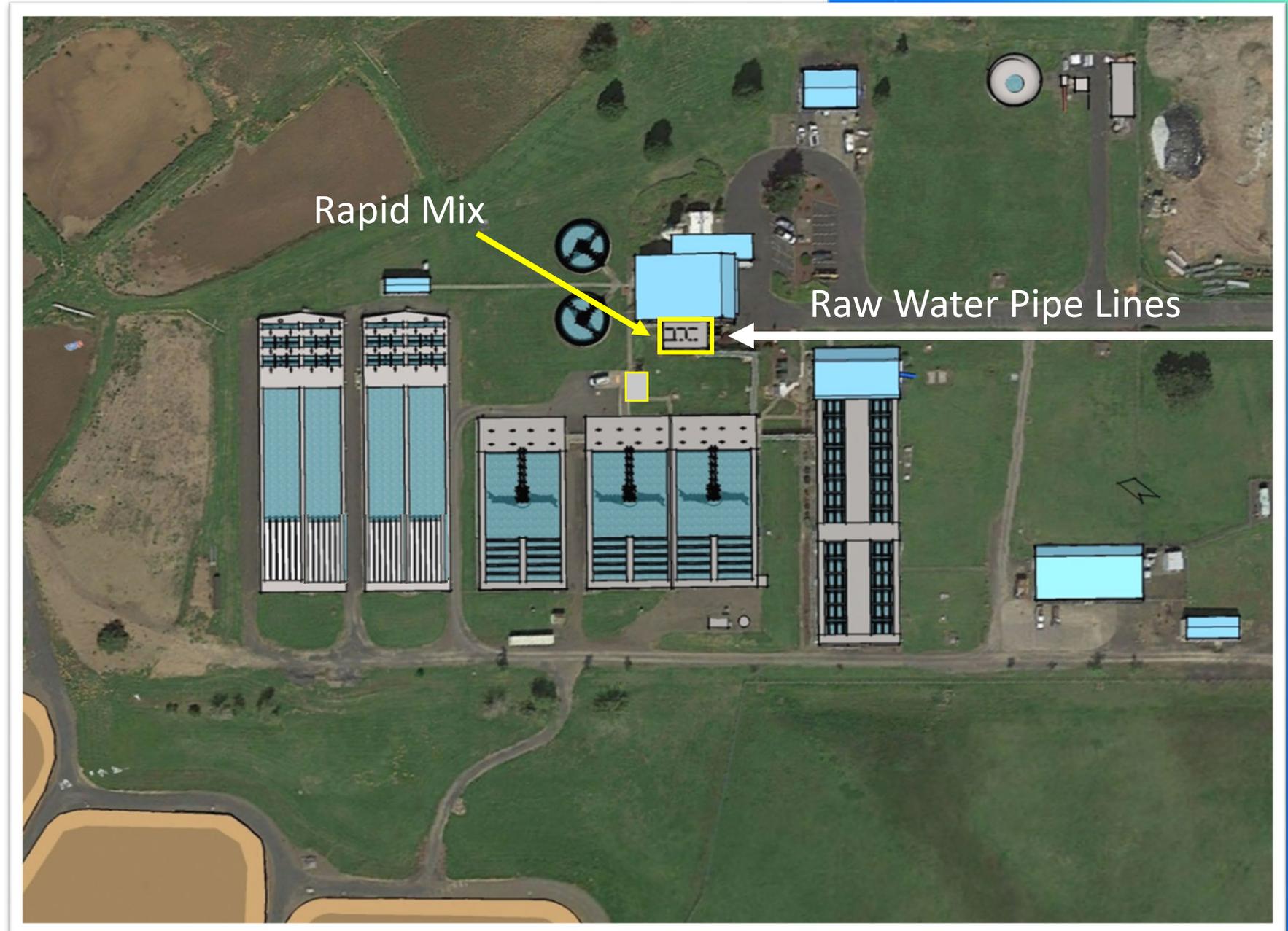


JWC Treatment System



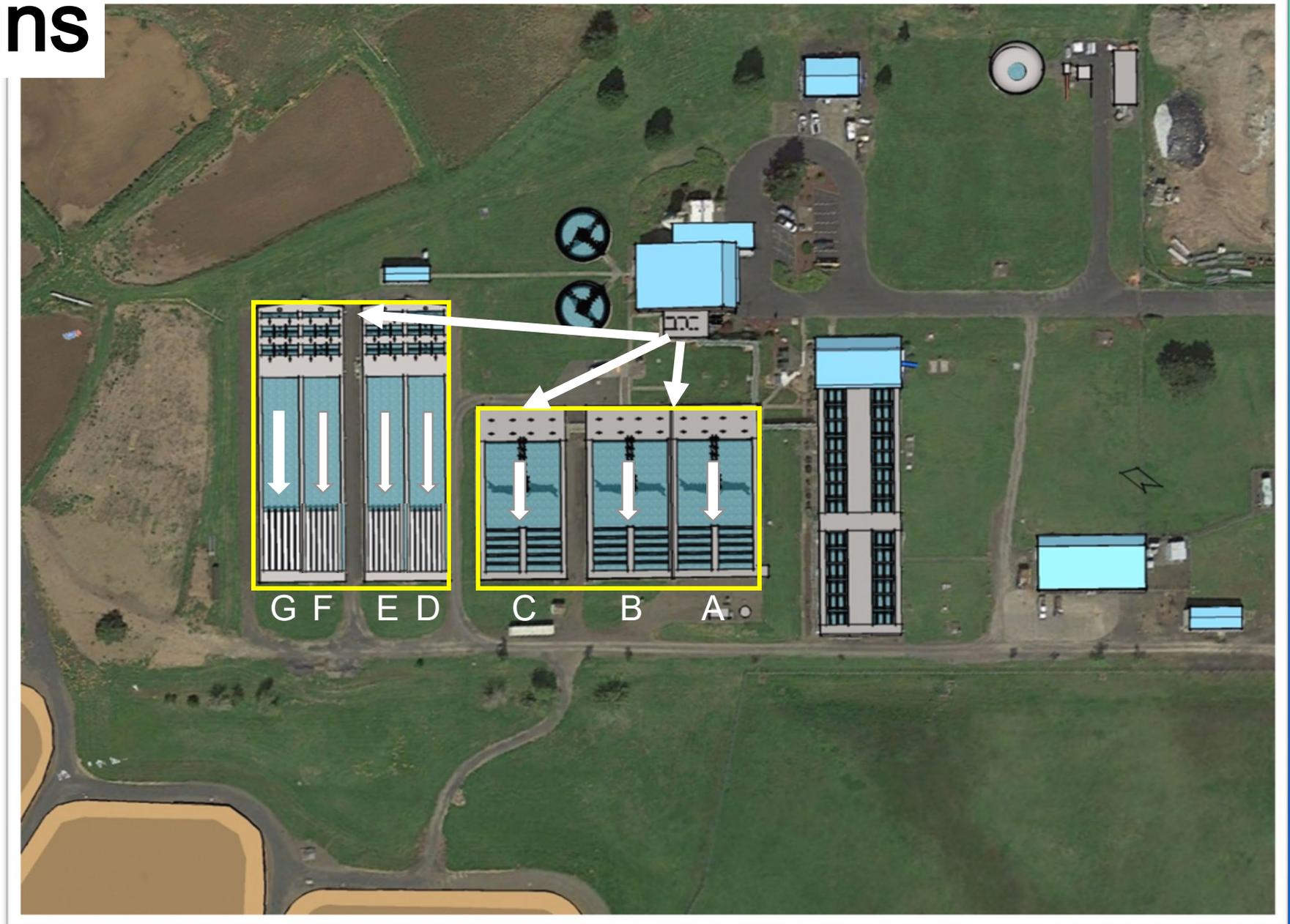
Rapid Mix

- Raw water enters the Rapid Mix where Aluminum Sulfate (Alum) and Chlorine (Cl₂) are added and mixed, Caustic can be added as needed.
- Powdered Activated Carbon (PAC) is added for taste and odor control or toxin events when needed



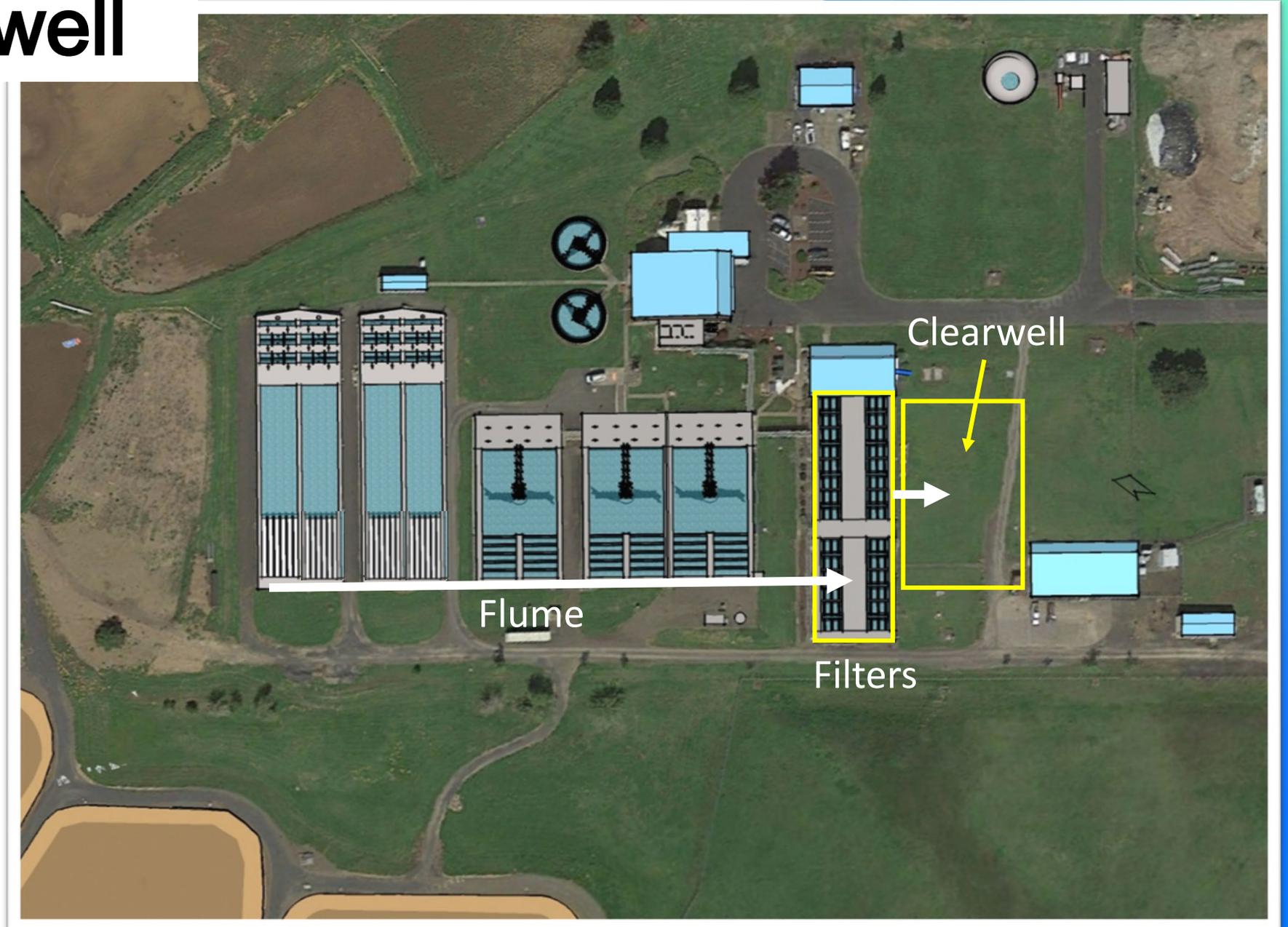
Floc/Sed Basins

- Flow is split into the seven flocculation/ sedimentation basins: Basins A through G
- New Rapid Mix valve allows for better distribution of flow through basins
- Basins D through G have parallel plate settlers.



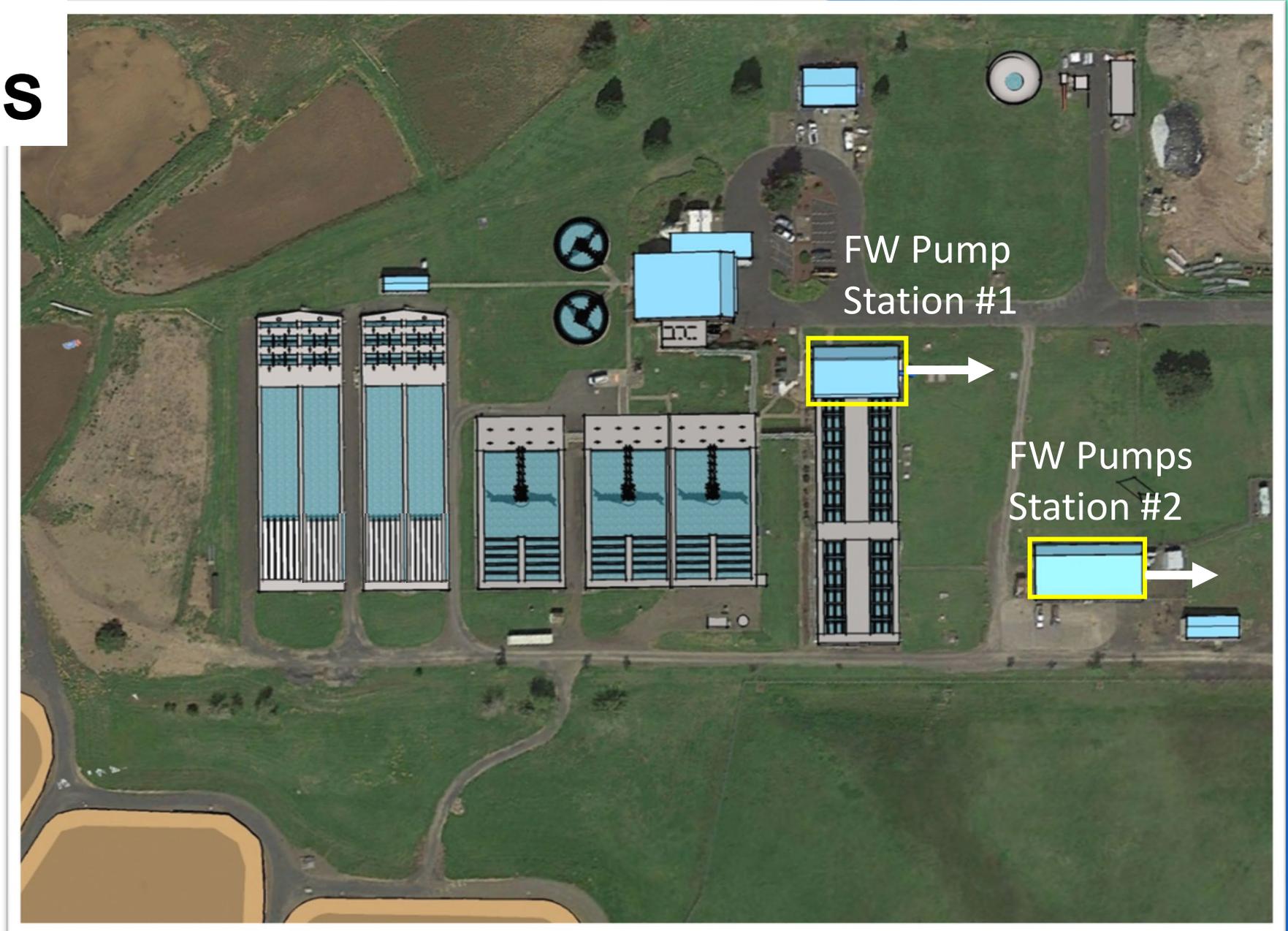
Filters / Clearwell

- Polymer and chlorine is added prior to the filters.
- 14 *Filters* x 462 sqft x 8.7 gpm/sf (4,019 gpm each) 6" sand, 50" anthracite.
- From the filters, the water enters the *Clearwell* where more Cl₂ along with Caustic Soda is added for pH control.

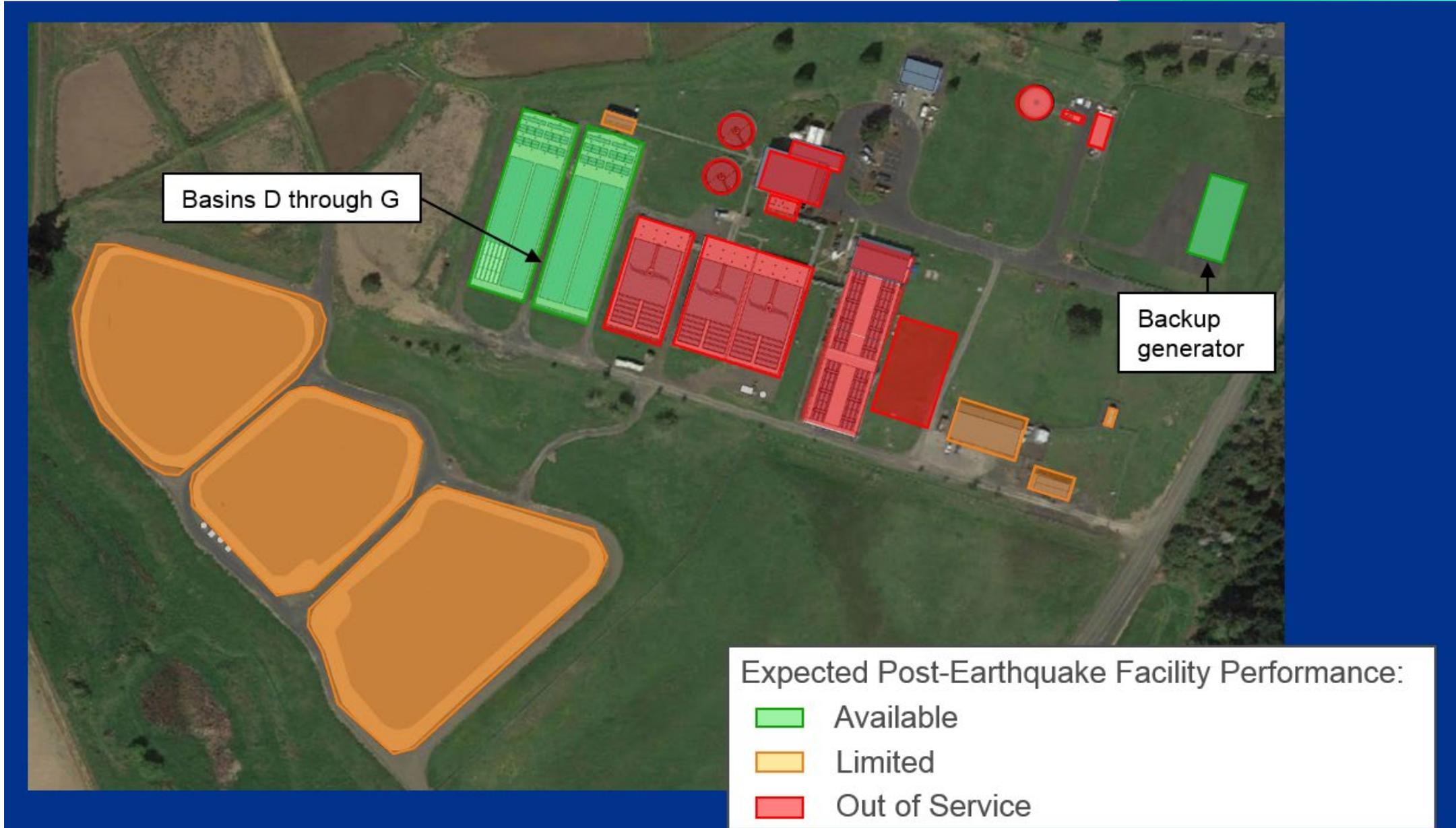


Finish Water Pump Stations

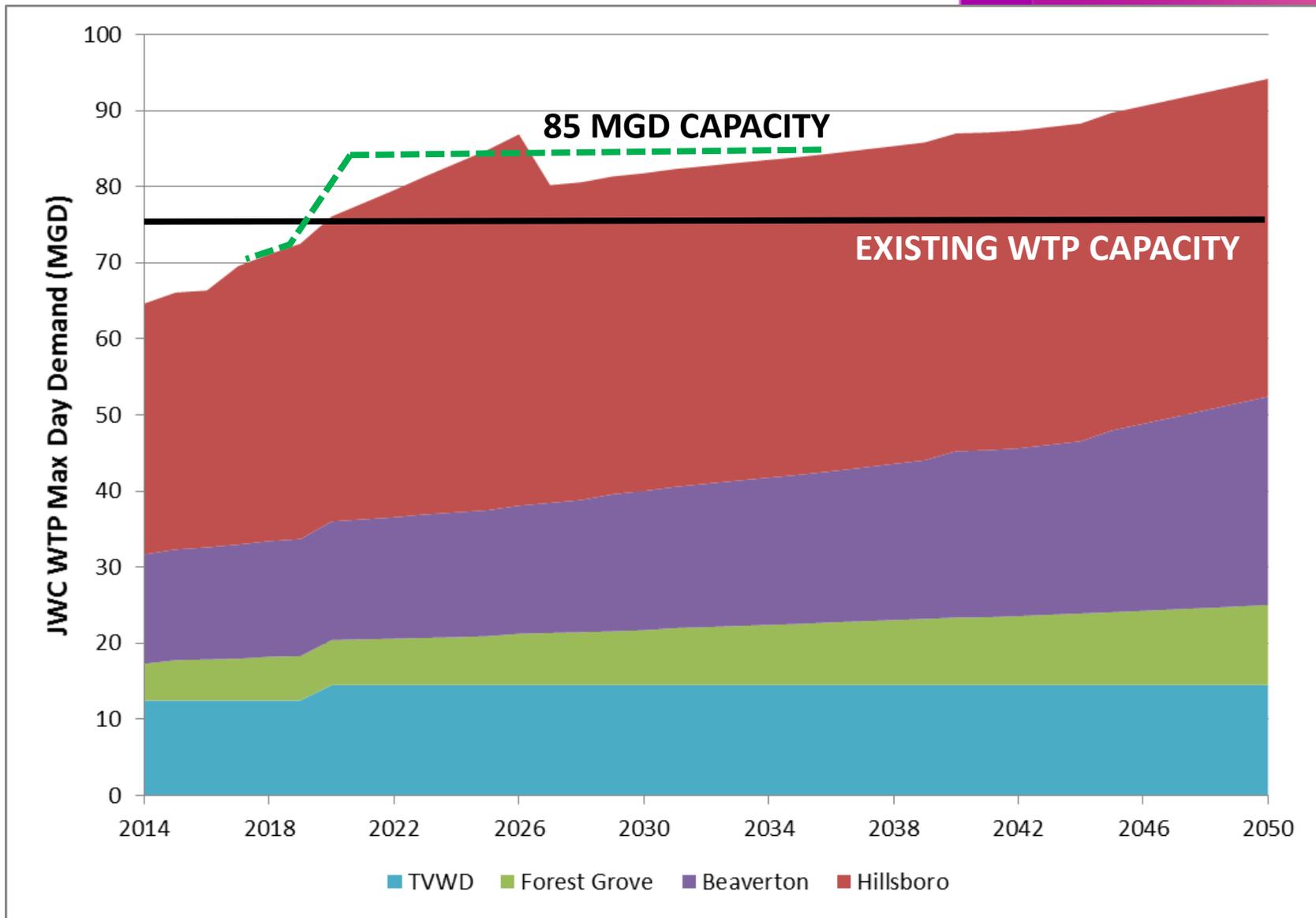
- From the clearwell the finished water is pumped out of the pump stations where Cl₂ is added again.
- Finished Water Pump Station #1:
 - 3 x 4,000 gpm
 - 2 x 7,000 gpm
 - 1 x 6,000 gpm
- Finished Water Pump Station #2:
 - 3 x 9,000 gpm



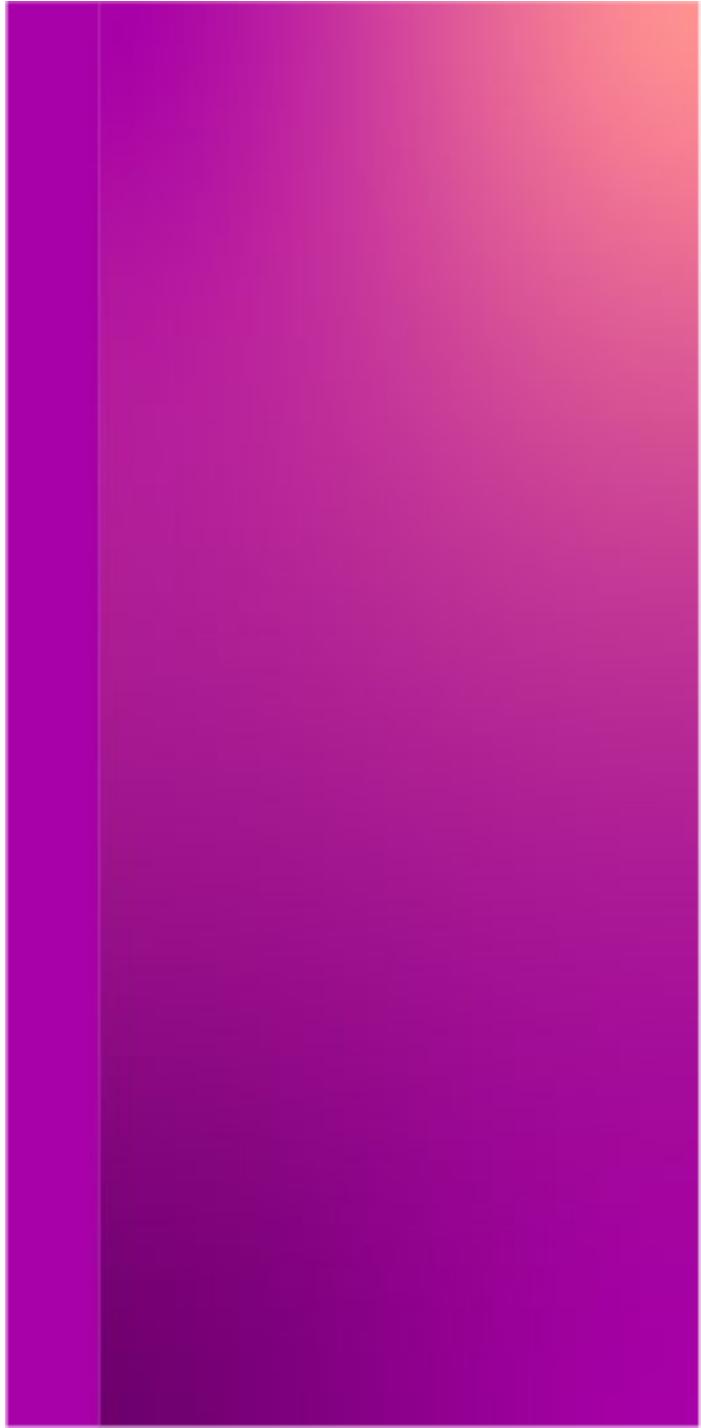
JWC WTP Expected Seismic Performance



JWC Partner Peak Day Demand Projections



Planning



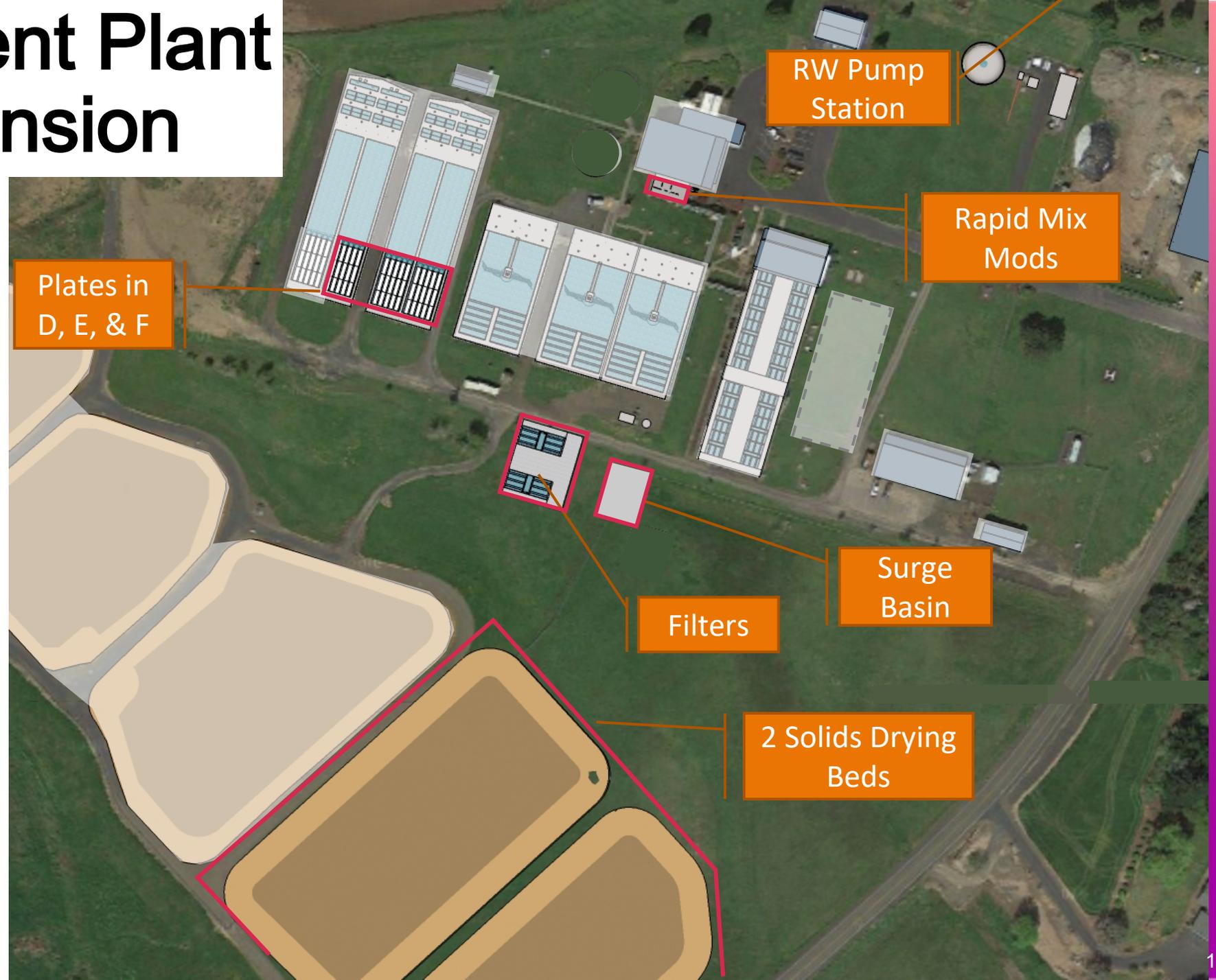
JWC Treatment Plant 85MGD Expansion

Package 1 –

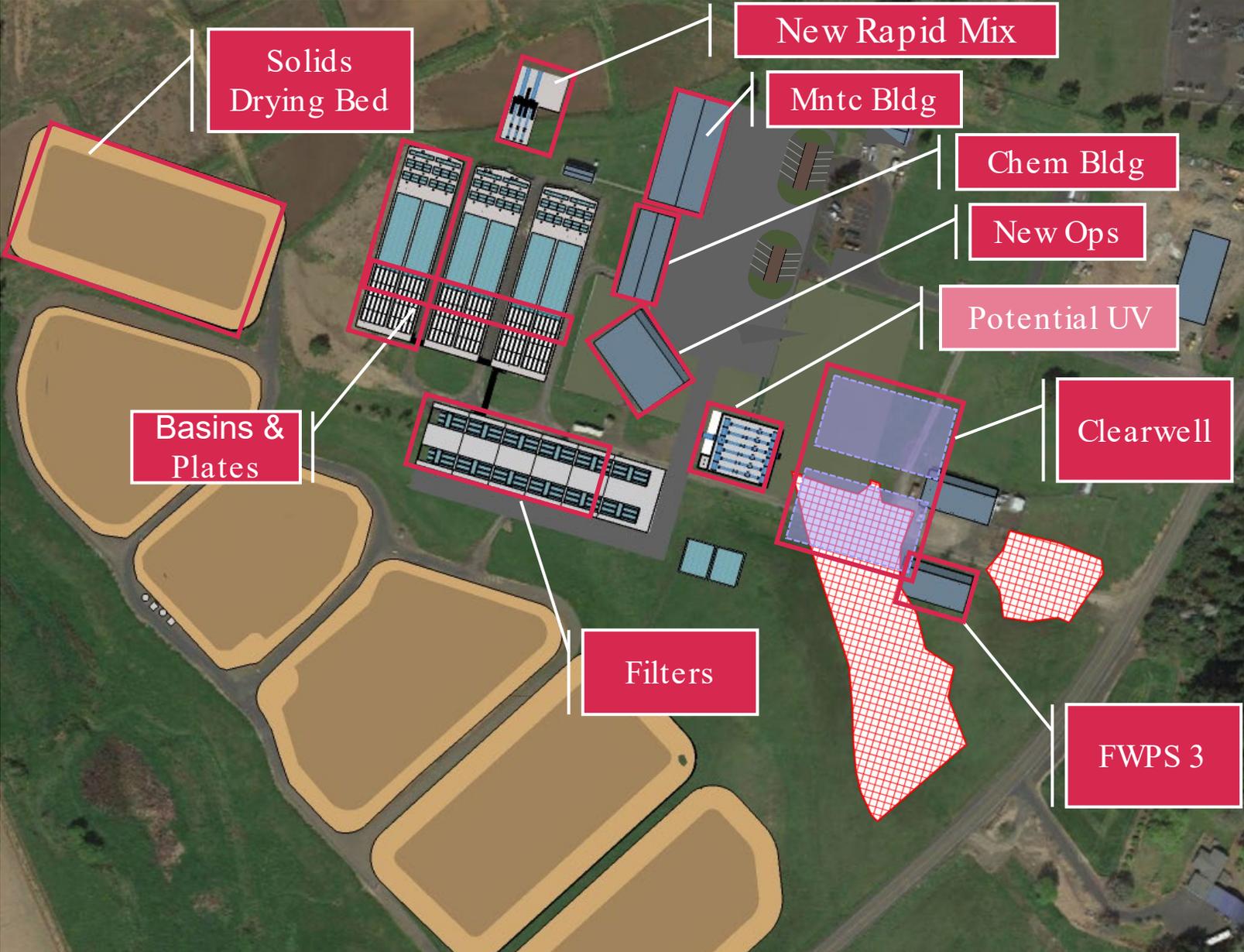
- Life Safety Improvements and Long Lead Items Procurement

Package 2 –

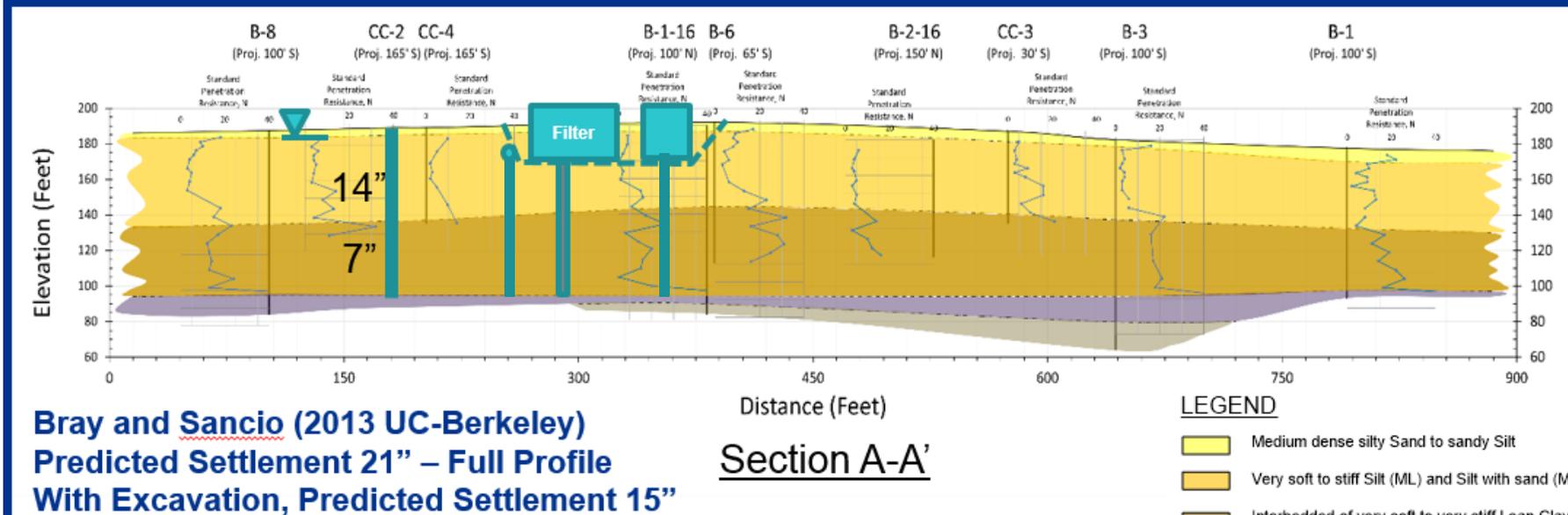
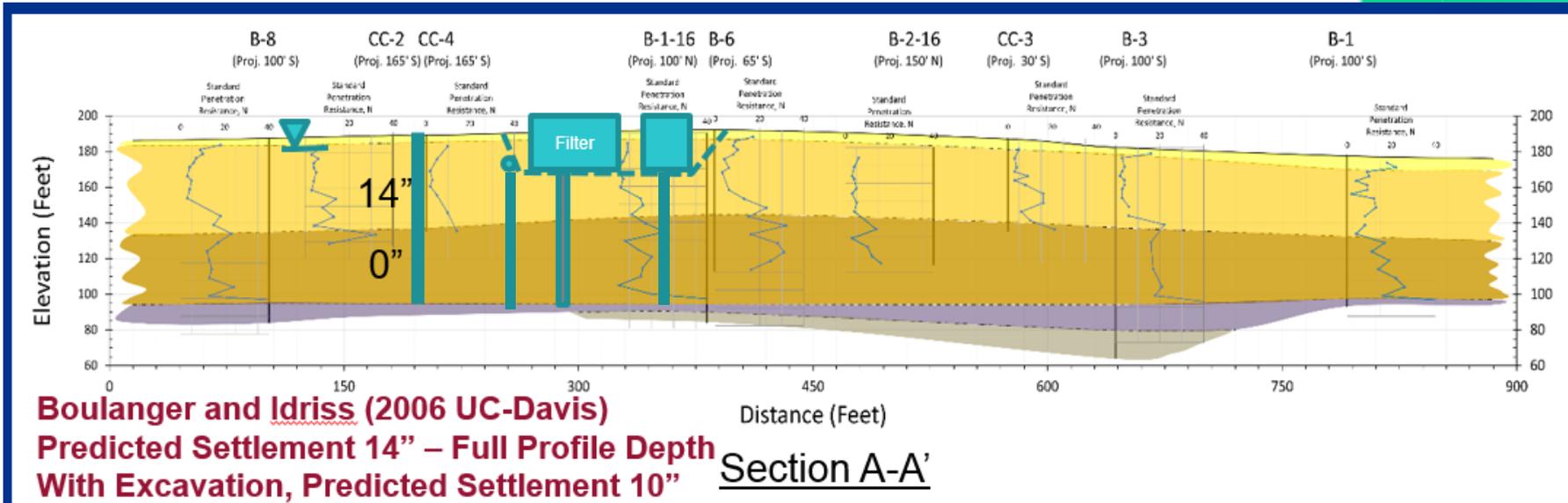
- Infrastructure Improvements



JWC Treatment Plant Future



JWC WTP Subsurface Conditions

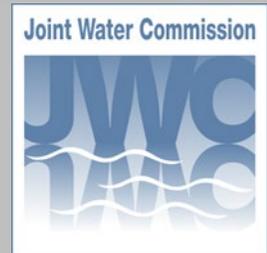


LEGEND

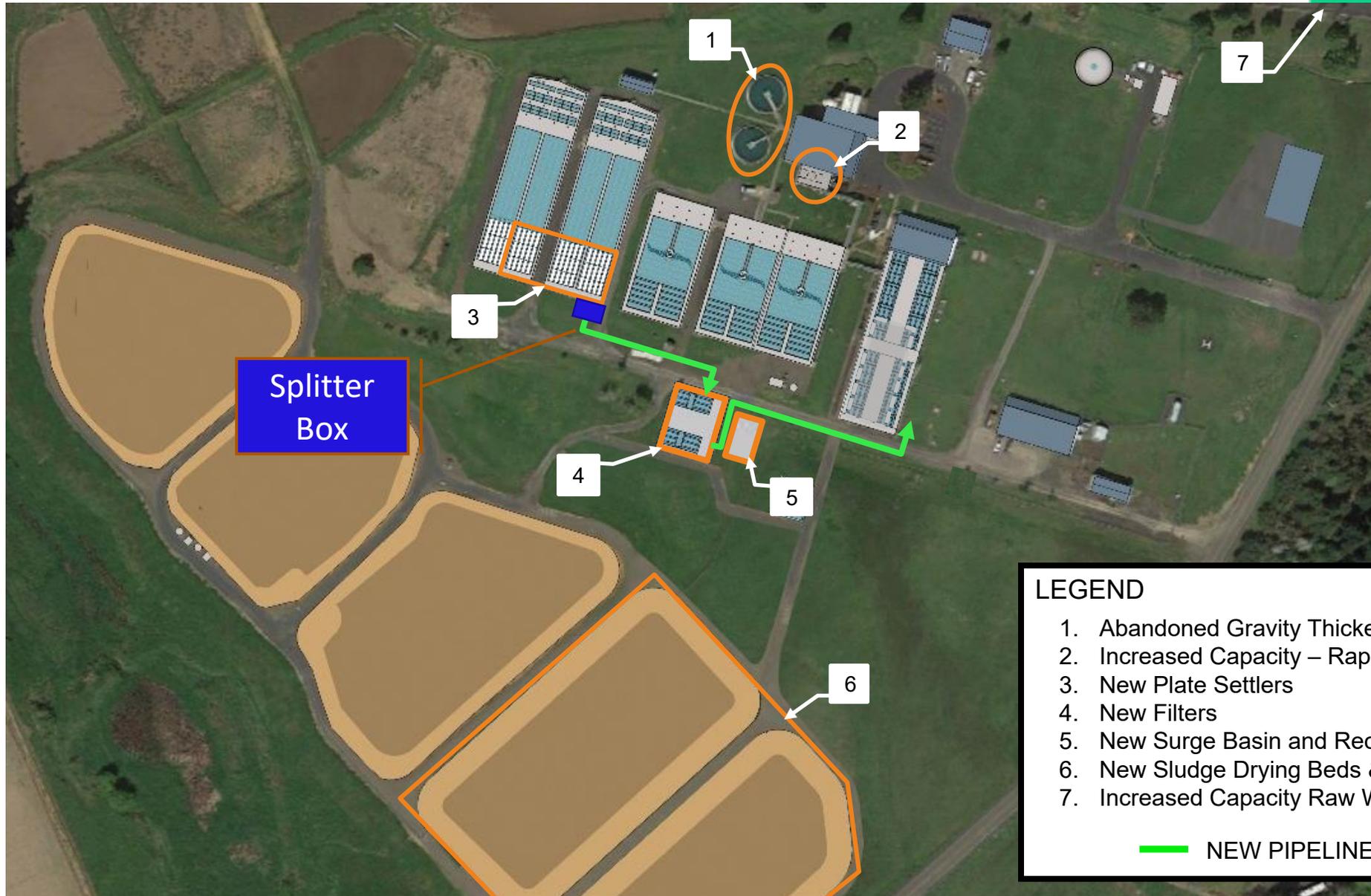
- Medium dense silty Sand to sandy Silt
- Very soft to stiff Silt (ML) and Silt with sand (ML)
- Interbedded of very soft to very stiff Lean Clay (CL), Silt (ML), silty Clay and clayey Silt (ML/CL)
- Medium to very dense Sand and Gravel

Polling Question

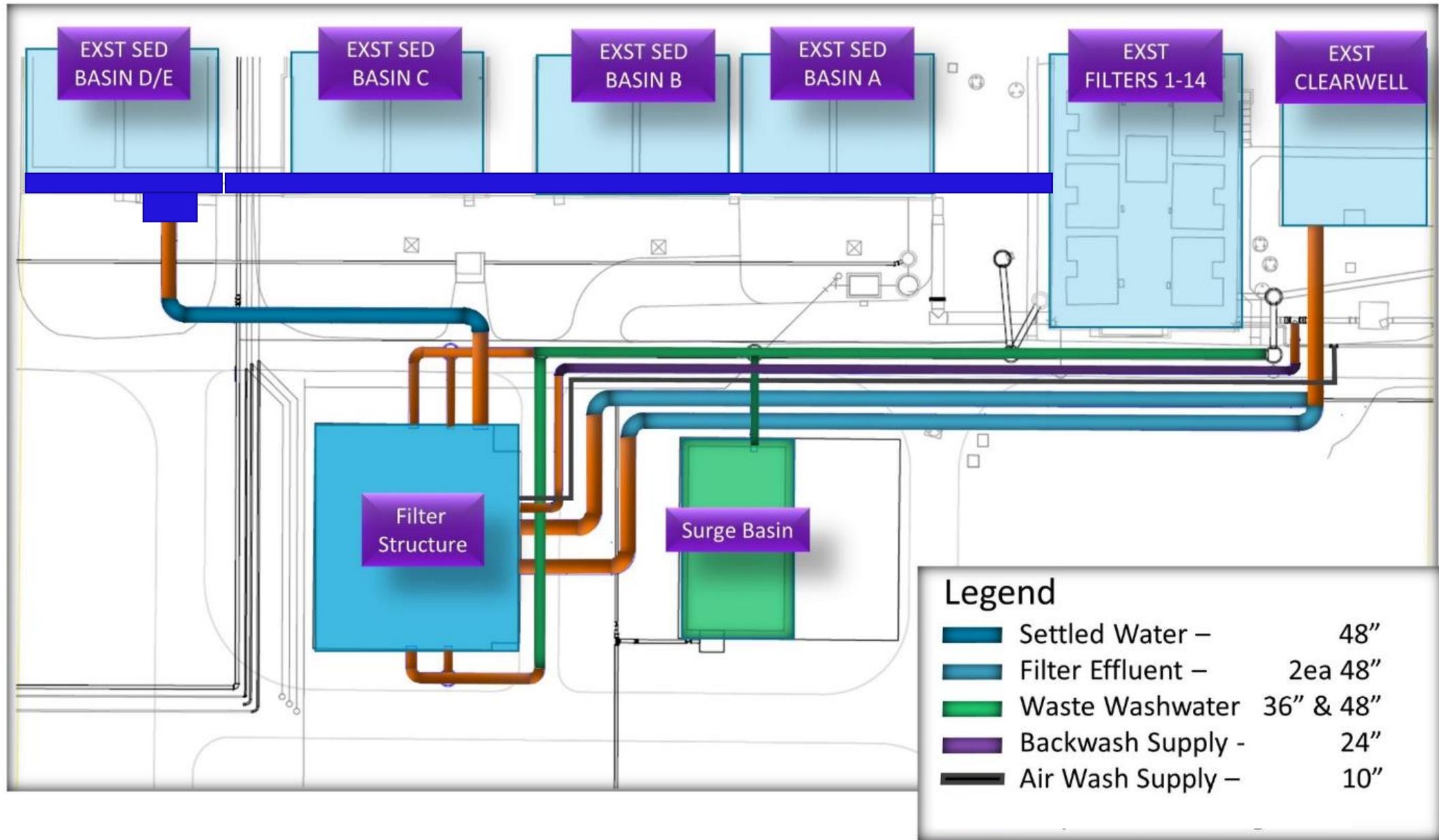
1. What was the target capacity of the 2015 - 2020 JWC WTP Expansion in MGD?



JWC WTP Expansion Project Elements



ERDIP Filter Yard Pipelines



Initial Considerations For Filter Yard Pipelines

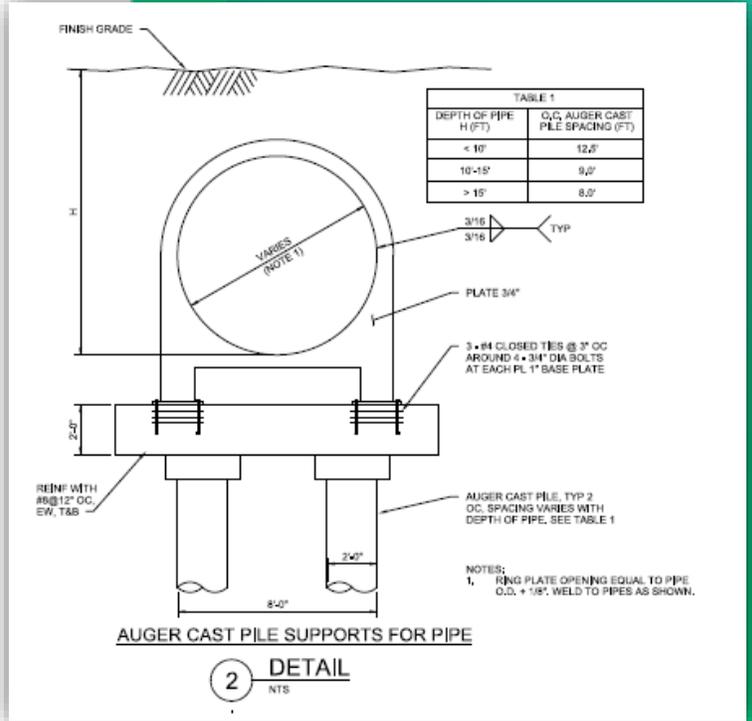
	Structure Flotation Prevention	Spoils Generation	Neighbor Impacts	Subsurface Compatibility
Nothing	-	-	-	-
Cement Soil Mixing	-	High	Low	Yes
Stone Columns	-	Medium	Low	No Not Below EL130
Auger Cast Piles	Resists Flotation	Medium	Low	Yes
Driven Steel Piles	Resists Flotation	Low	High	Yes

Initial Design Auger Cast Piles:

Filter Structure: 53 Piles

Surge Basin: 45 Piles

Pipelines: 280 Piles



Revised Concepts For Filter Yard Pipelines

Alternative	Filter Yard Piping Cost
Initial Design Concept with Steel Pipe on Auger Cast Piles	\$9.2 M ~370% More Costly
Revised Design Concept with Seismic Ductile Iron Pipe	\$2.5 M
Yard Piping Cost <u>Savings</u>	\$6.7 M

Seismic Resiliency Planning

All new structures need to meet and exceed current seismic standards

Filters

- 30" auger cast piles (53)
- 30' rebar cages
- Depths to 80'

Surge Basin

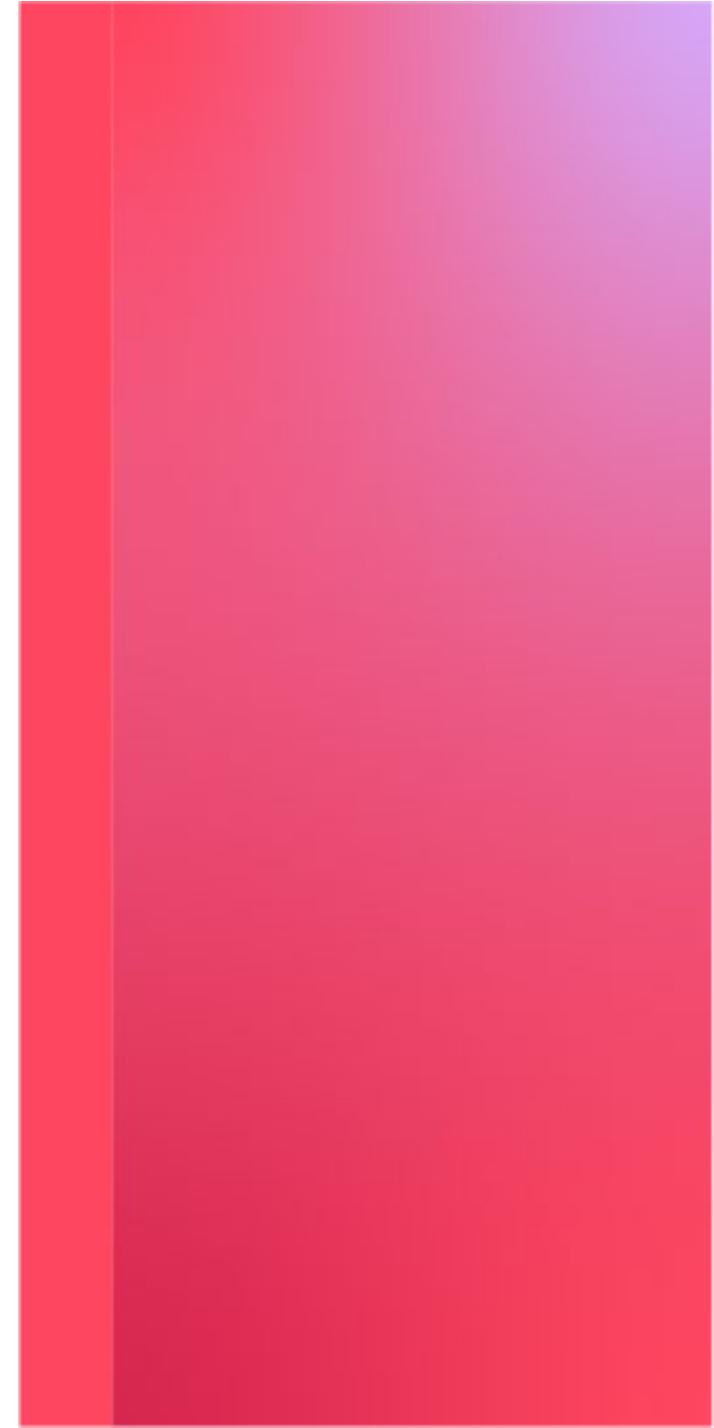
- 24" auger cast piles (45)
- 25' rebar cages
- Depths to 70'

Yard Piping

- Earthquake Resistant Ductile Iron Pipe for all critical and large diameter pipes



Construction



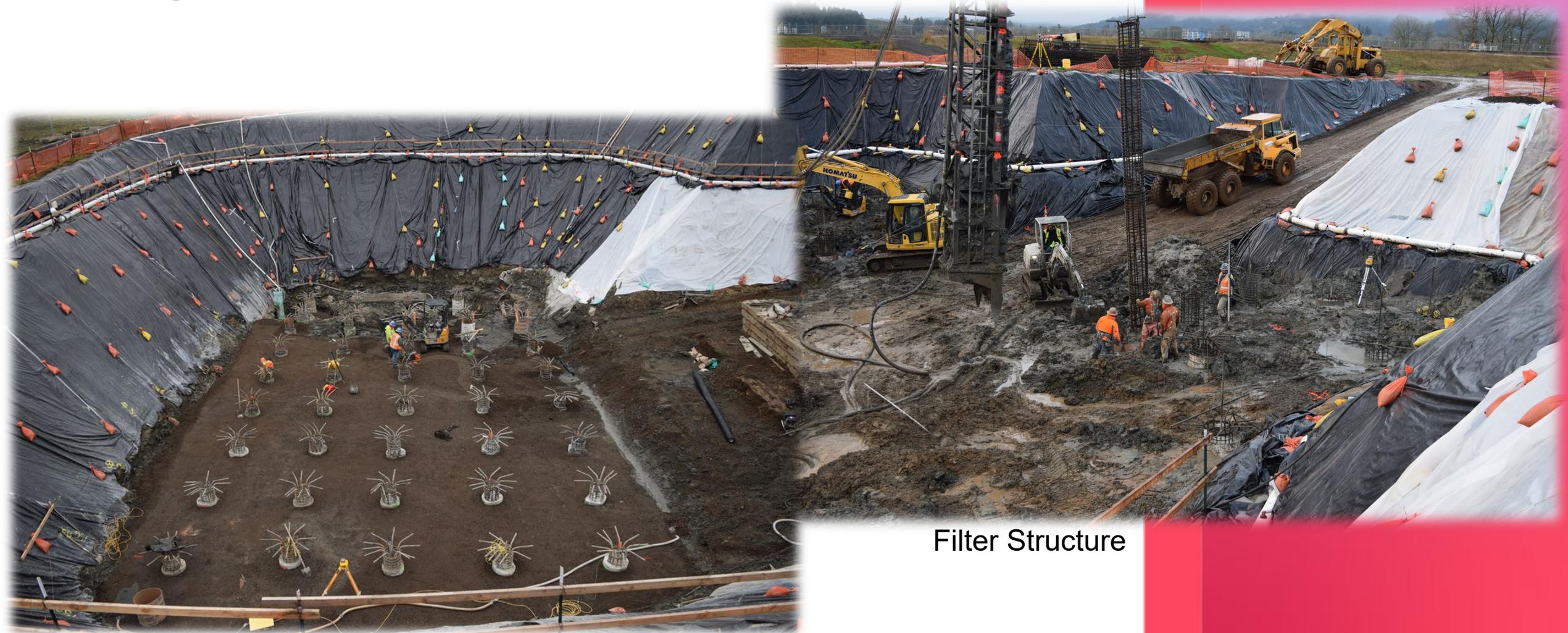
Raw Water Intake Capacity Increase



Excavation for Filter and Surge Basin



Auger Cast Piles— Surge Basin & Filter Structures



Surge Basin

Filter Structure

Filter Structure Construction



Clearwell Connection Construction



Solids Drying Bed Construction



Questions

1. The pile supported pipe cost about how much more than Earthquake Resistant Ductile Iron Pipe (ERDIP).

