



Jacobs

Challenging today.
Reinventing tomorrow.

Take it to the limit! Startup and Commissioning of 12 gpm/sf Deep Bed Filters at Medford Water Duff WTP

Joshua Kennedy and Andy Huffman
2025 PNWS-AWWA Conference, Boise, ID
Friday, May 9, 10:15am

Agenda

- Duff WTP Expansion to 65 MGD Background
- Design and Construction
- Startup and Commissioning Phase
- Lessons Learned
 - Procurement and long lead times - Andy
 - Rockwell drives and motors – Andy
 - Backwash piping and MH overflow - Josh
 - Existing reservoir and operational constraints (interim). Just asking the question doesn't mean you are getting the answer - Josh
 - Baffles, tracer study, minimum level in reservoir and emergency storage
- Next Steps

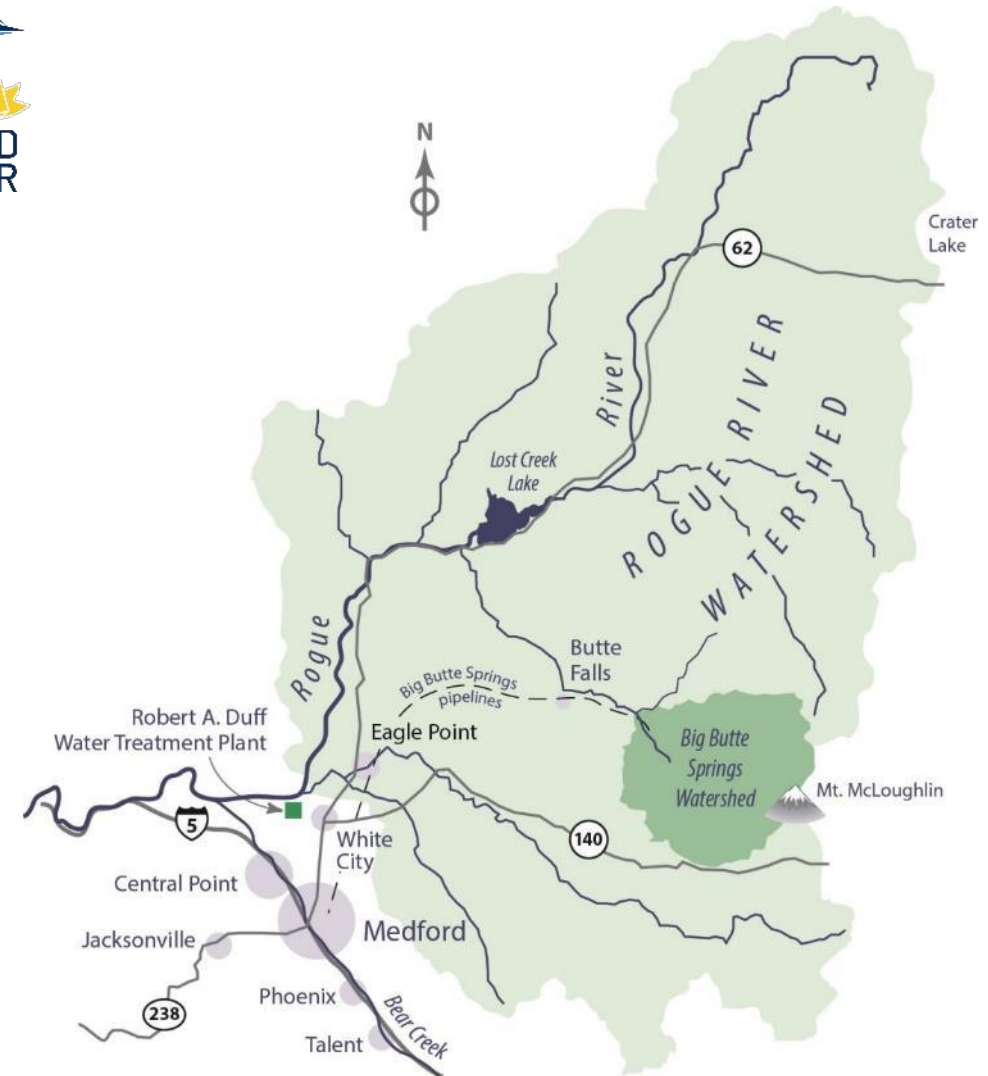


Duff WTP Expansion to 65 MGD Background

Background - Medford Water

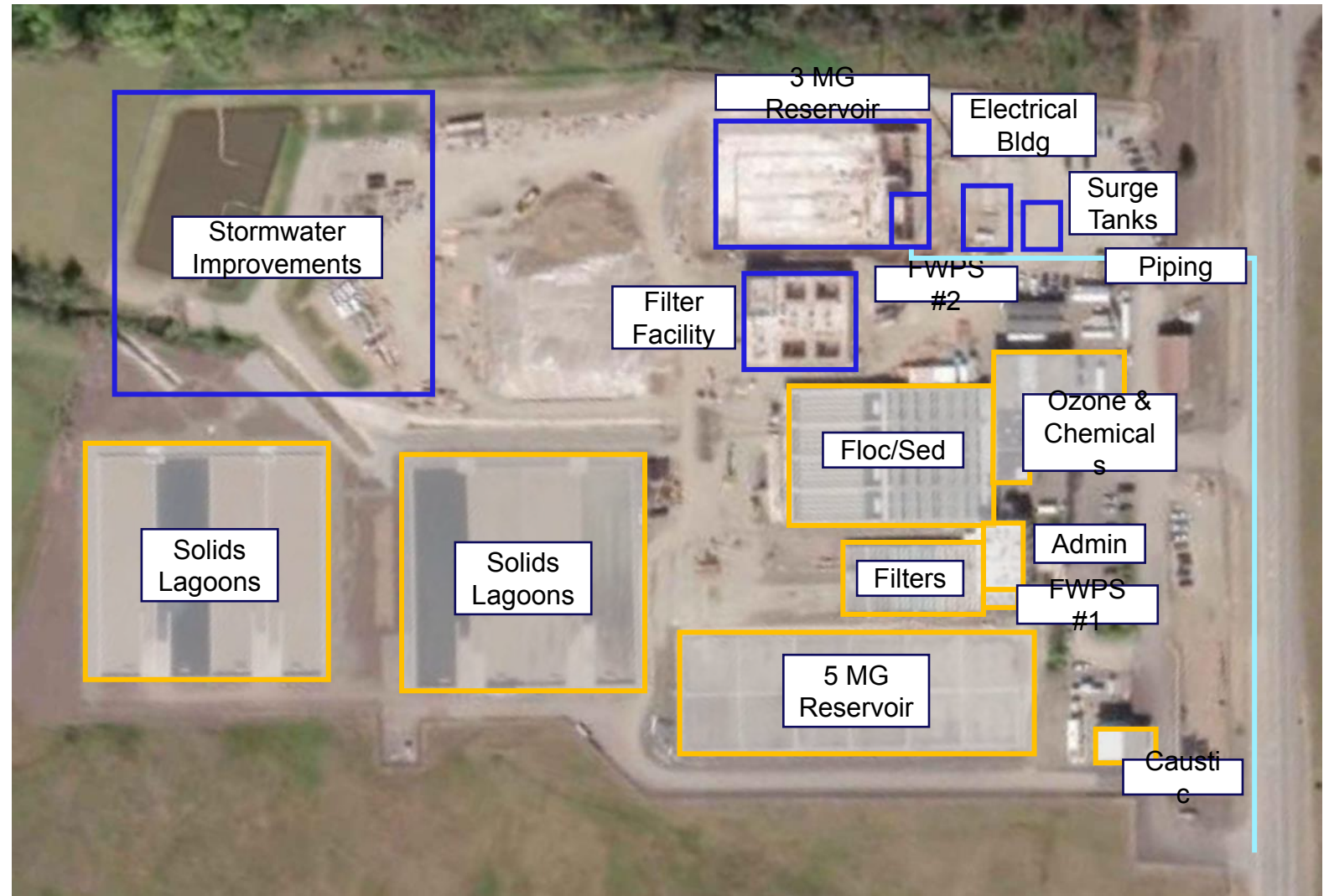


- Water Commission formed in 1922
- Big Butte Springs source began conveying water 30 miles to the Capital Hill Reservoir complex
- Second water source at Rogue River in 1968
- 150,000 customers in Medford and surrounding communities
- Two sources:
 - Duff Water Treatment Plant, Rogue River (45 mgd)
 - Big Butte Springs (26.4 mgd)
- Capacity: 71.4 mgd nominal
- System demand still increasing



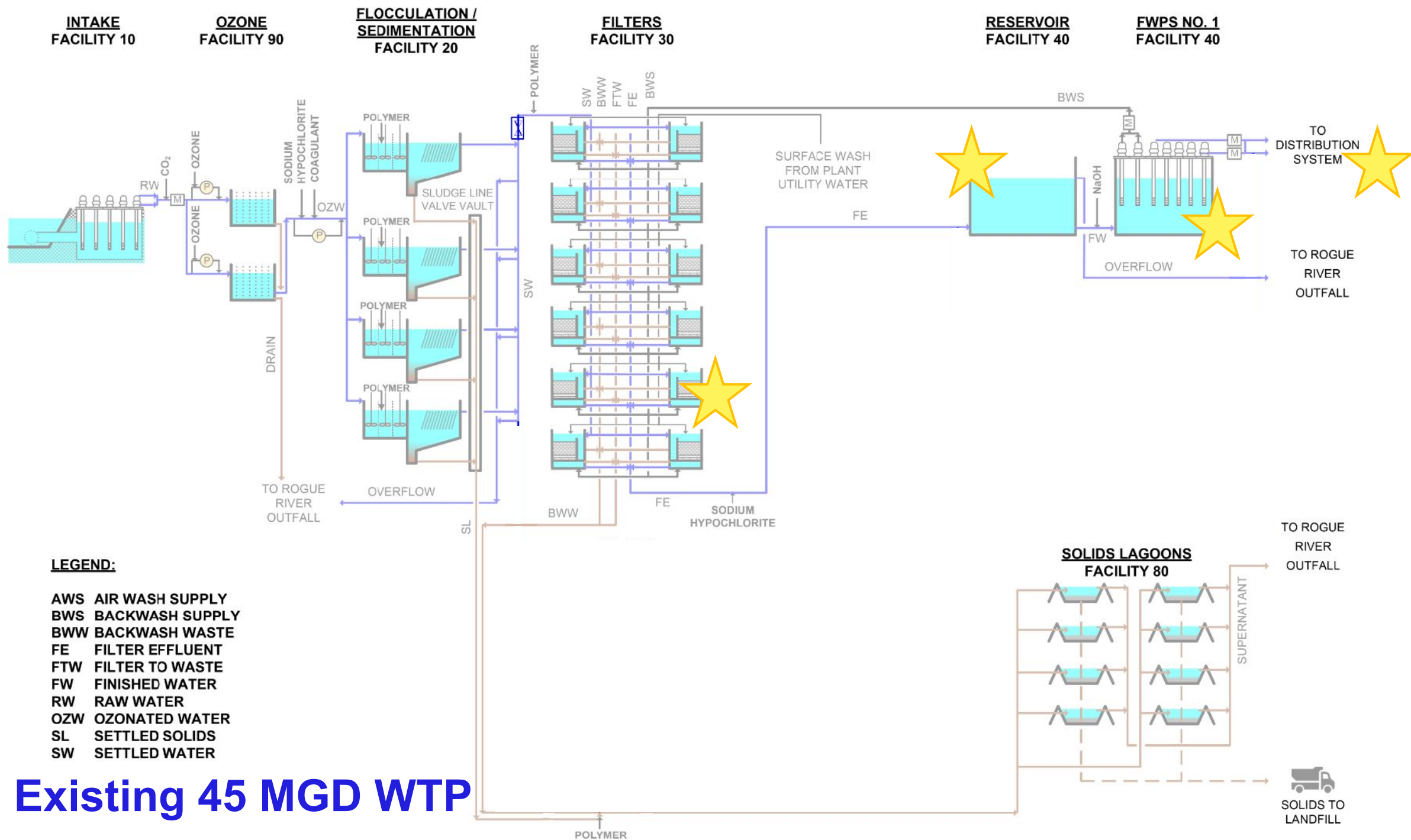
Background - Duff Water Treatment

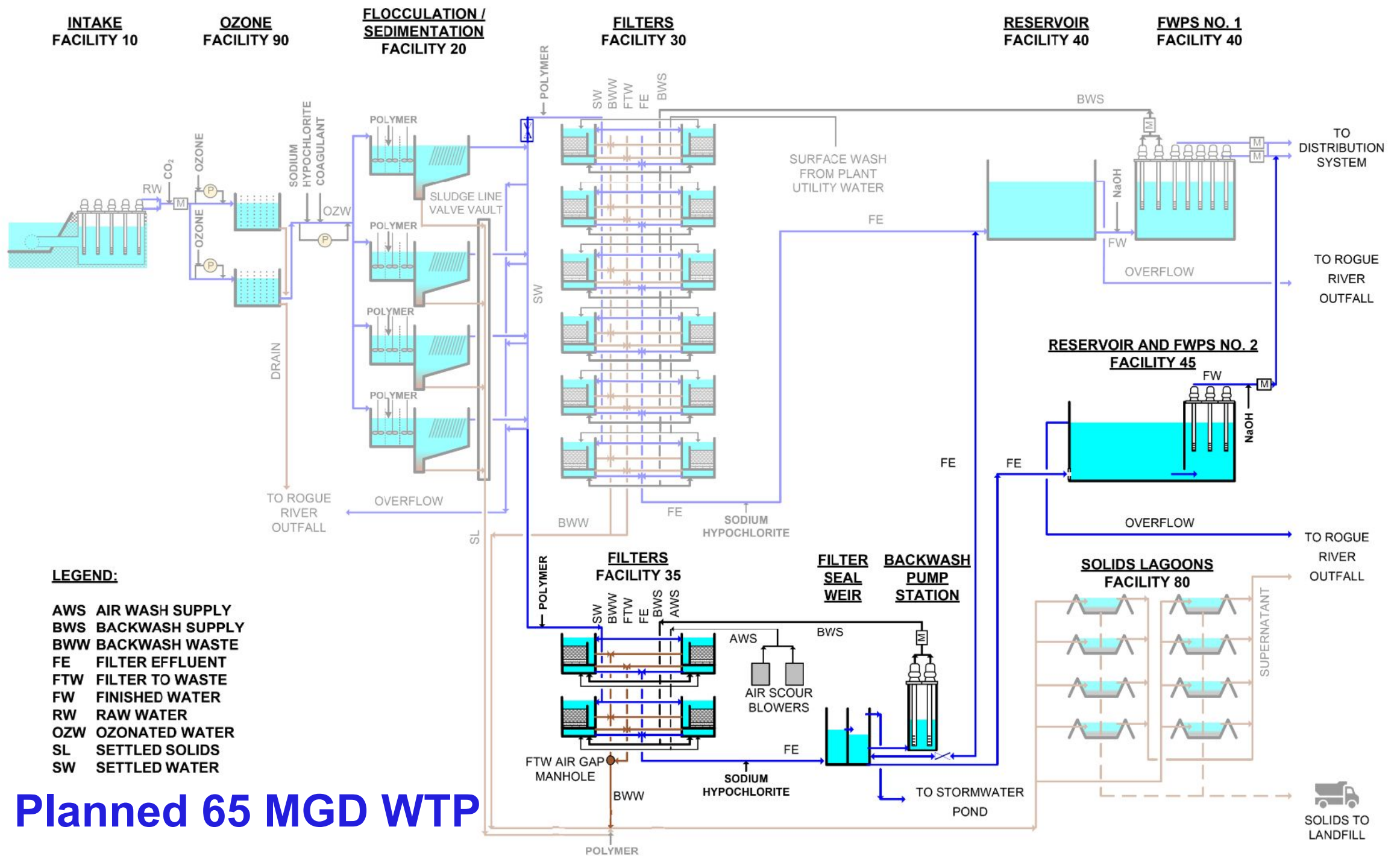
- History and capacity:
 - 15 mgd – original, 1968
 - 30 mgd – expanded 1981
 - 45 mgd – expanded 1999
 - 65 mgd – expansion began in 2001
- Ozone
- Intake T-Screens
- Raw Water Pumps
- Flocculation & Sedimentation
- Current construction
 - Filters
 - Reservoir & Pump Station
 - Transmission Piping



Design and Construction

A large industrial facility, likely a water treatment plant, featuring a complex network of large blue pipes and machinery. The pipes are painted a vibrant blue and are connected by various valves and fittings. The machinery includes large cylindrical tanks, pumps, and control panels. The facility is housed in a concrete structure with a high ceiling and industrial lighting. The overall scene conveys a sense of scale and engineering.





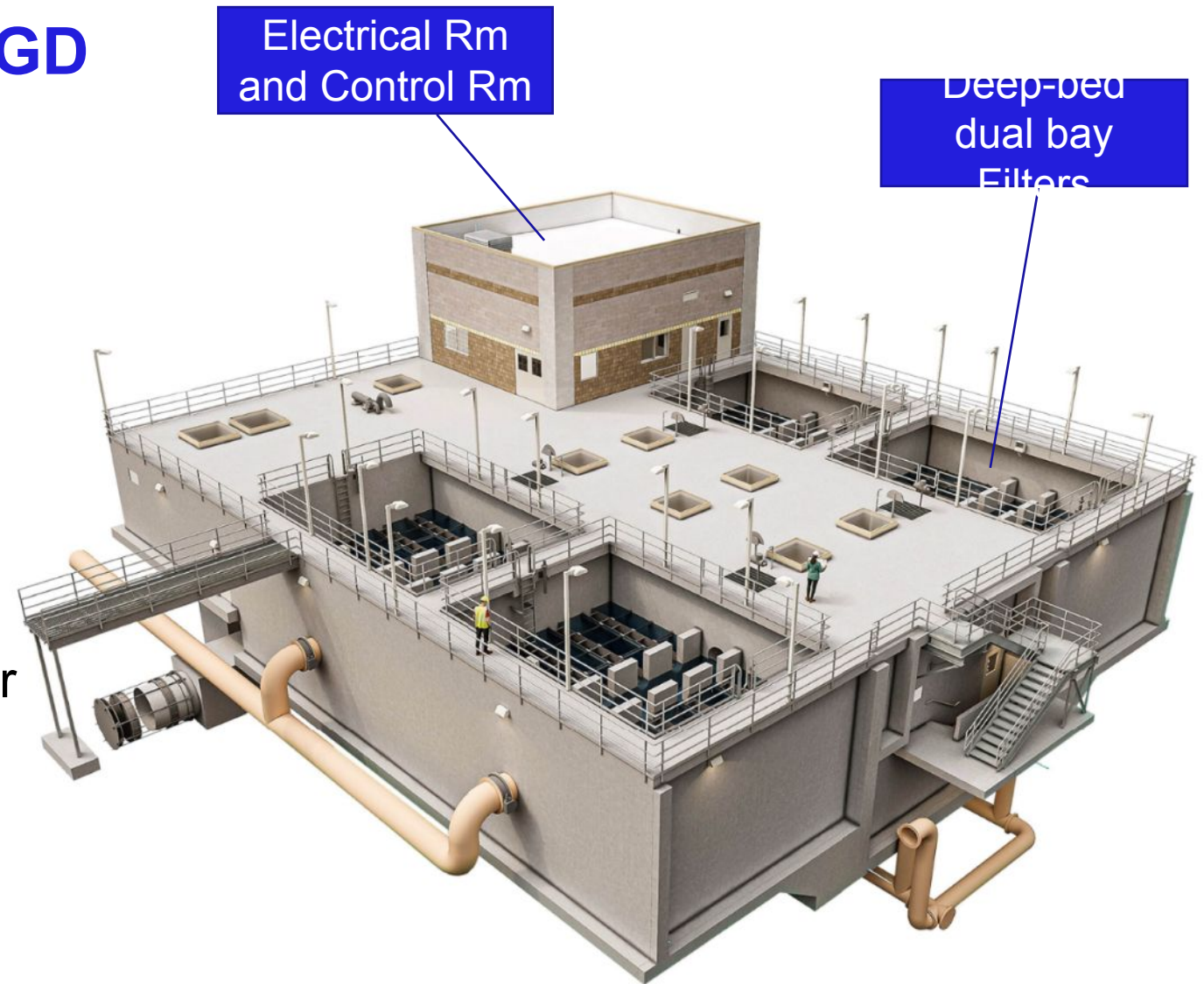
Planned 65 MGD WTP

Duff WTP Expansion to 65 MGD



Duff WTP Expansion to 65 MGD

- New Filters details:
 - Dual-bay
 - 784 sq ft size, operate at up to 12 gpm/sf
 - Media:
 - 72" anthracite, ES 1.5 mm, UC 1.4
 - 12" sand, ES 0.6 mm, UC 1.4
 - Loading rates up to 12 gpm/sf
 - AWI SST underdrains with air scour



Duff WTP Expansion to 65 MGD - Construction



Duff WTP Expansion to 65 MGD - Construction



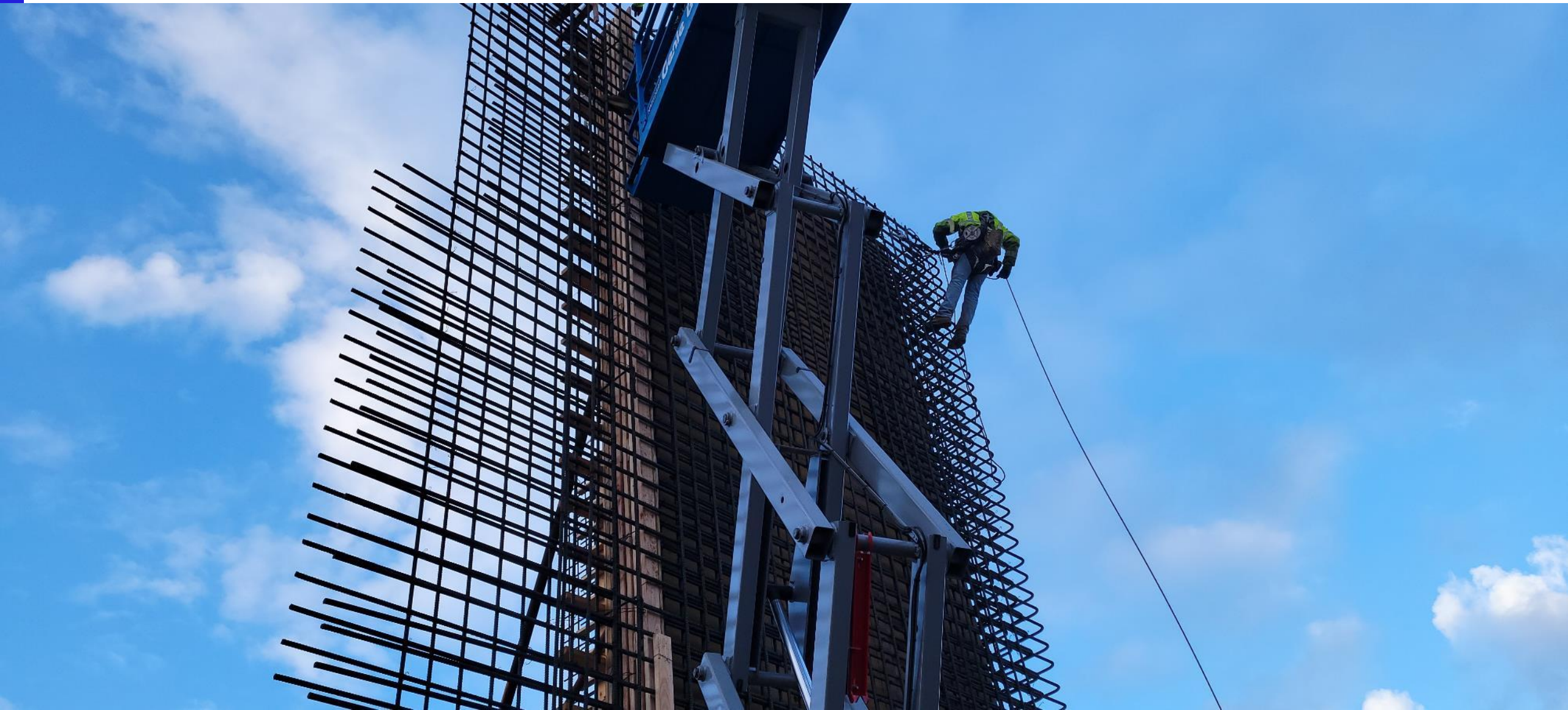
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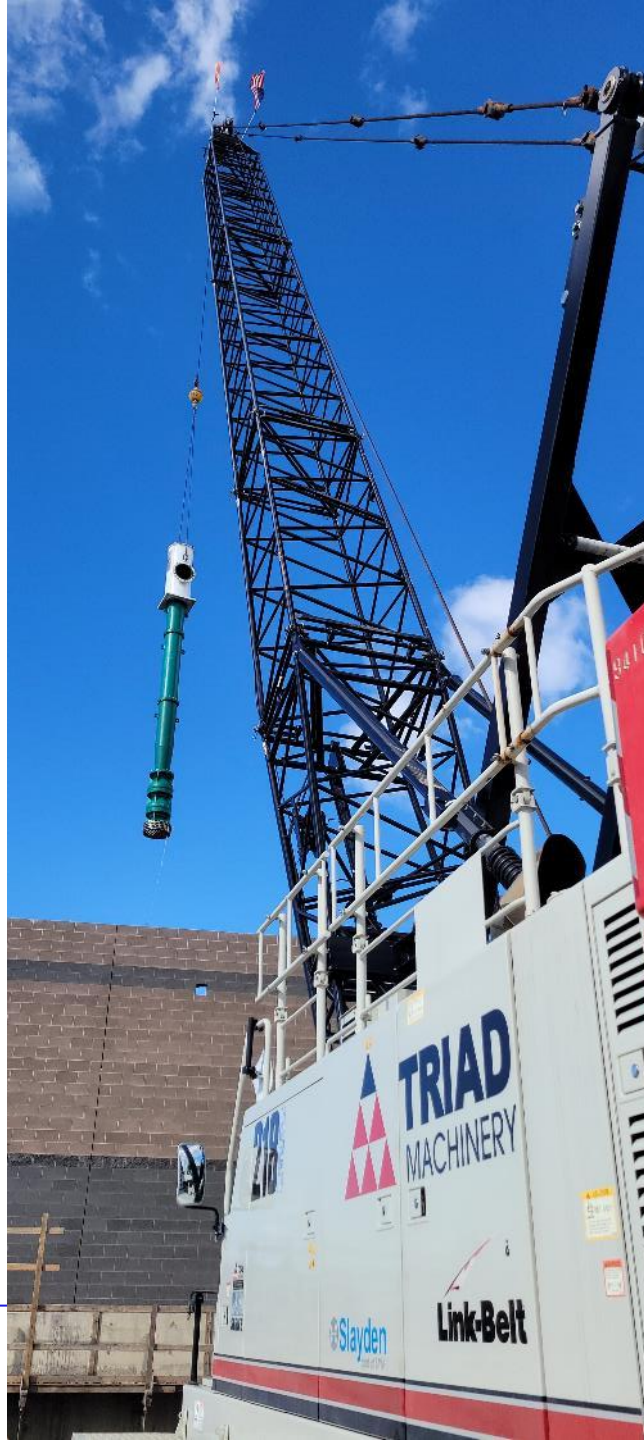
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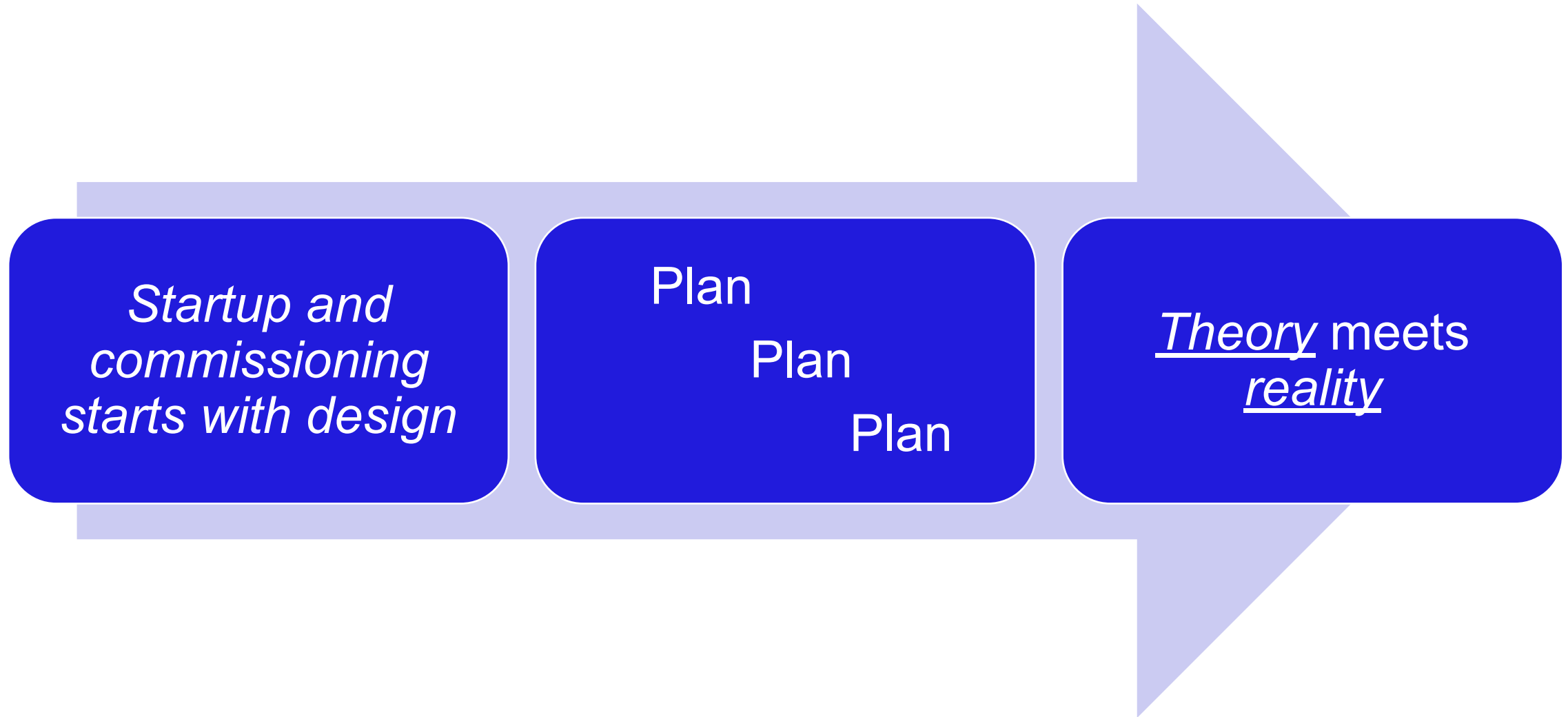
Duff WTP Expansion to 65 MGD - Construction



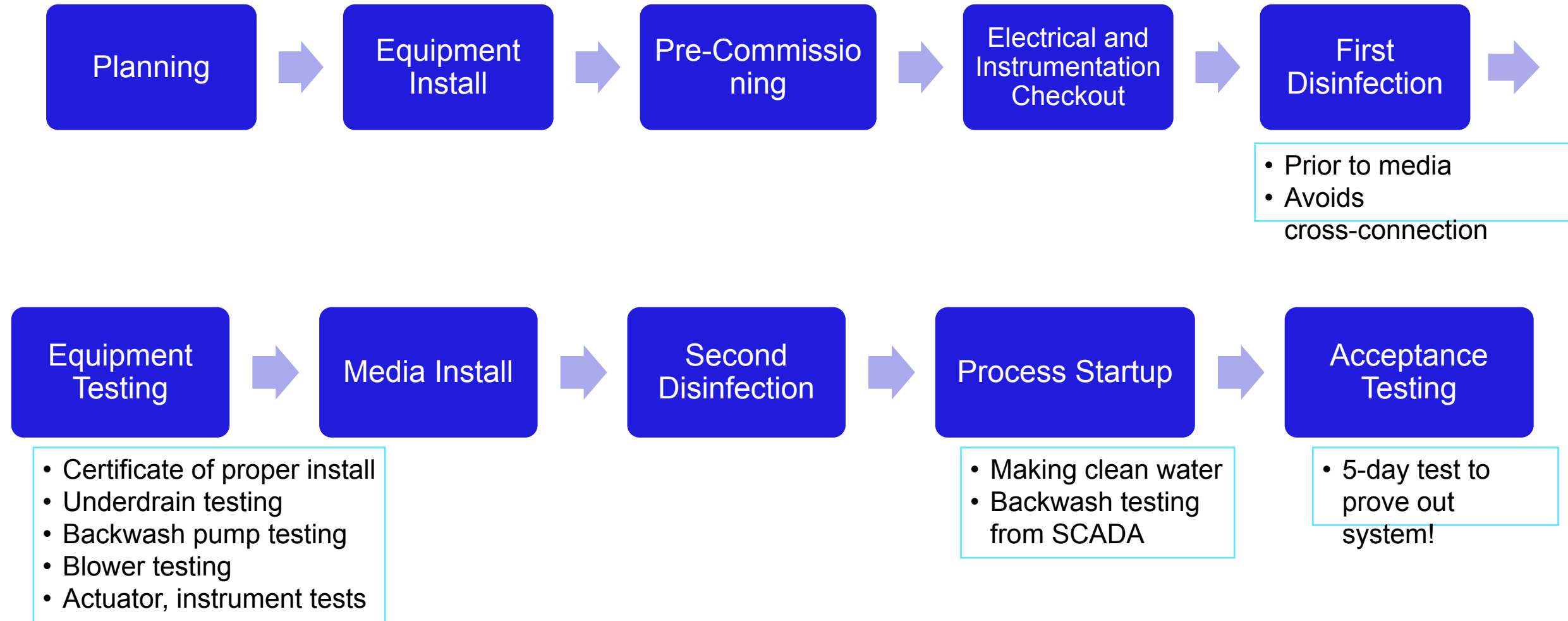
Startup and Commissioning



Overview and Approach

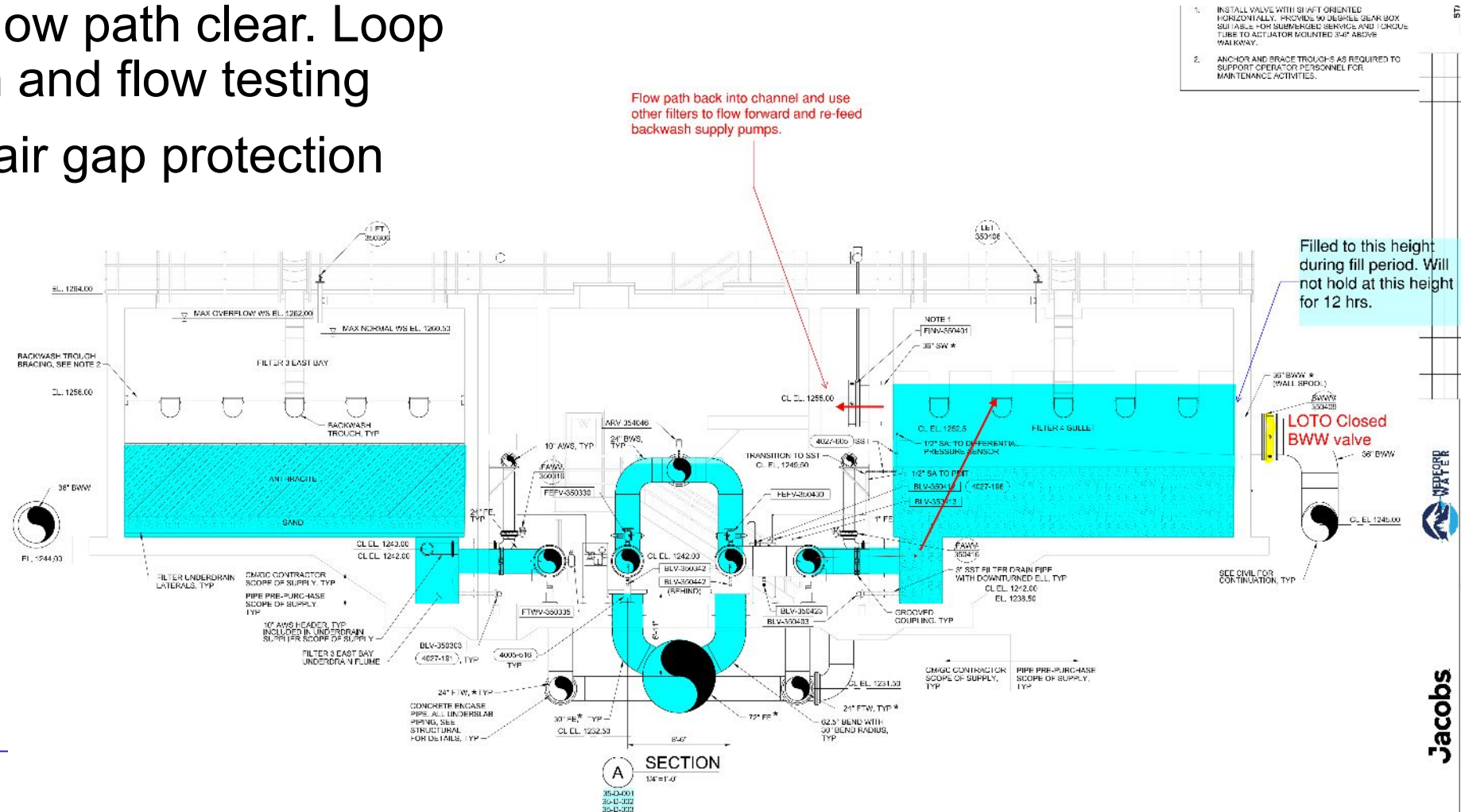


Overview and Approach



Startup and Commissioning Key Successes

- Commissioning Plan
- Diagrams to make flow path clear. Loop used for disinfection and flow testing
- Plan for LOTO and air gap protection
- Startup forms ready to be filled out
- Clear roles and responsibilities
- Challenge testing!
 - Power failure test
 - Overflow test



Startup and Commissioning Photos



Media installation

Media backwashing



Startup and Commissioning Photos



First backwash after full filter run

Testing backwash sequence



Startup and Commissioning Photos



Dosing chemical at seal weir

Overflow test





Lessons Learned

Construction Procurement and Lead Times

- Issue
 - Electrical gear with lead times up to 2-3 years
 - Clients at the whim of large suppliers
- Lesson
 - Establish timeframes during design, include alternate equipment types if required to meet project timeframes (i.e. dry-type instead of oil-filled transformer)
 - Early procurement (owner furnished, pre-selected, or alternative delivery)
 - Establish delivery timeframes in contract?



Equipment Factory Testing

- Issue
 - Factory testing not completed prior to shipment of gear
 - Poor communication with vendor
 - Gear stored but not accepted
- Lesson
 - Contracting at GC and subcontractor level matters!
 - Require witness testing for critical gear
 - Communicate, communicate, communicate



Backwash Hydraulics

- Issue:
 - Filter to waste air gap overflow
 - *Best laid plans* – hydraulics difficult to predict when connecting to existing infrastructure
- Lesson:
 - Utilize data logger for continuous monitoring
 - Drain-down step of backwash is too fast – lots of water and air entering BWW pipe
 - Slow down actuator, install air relief



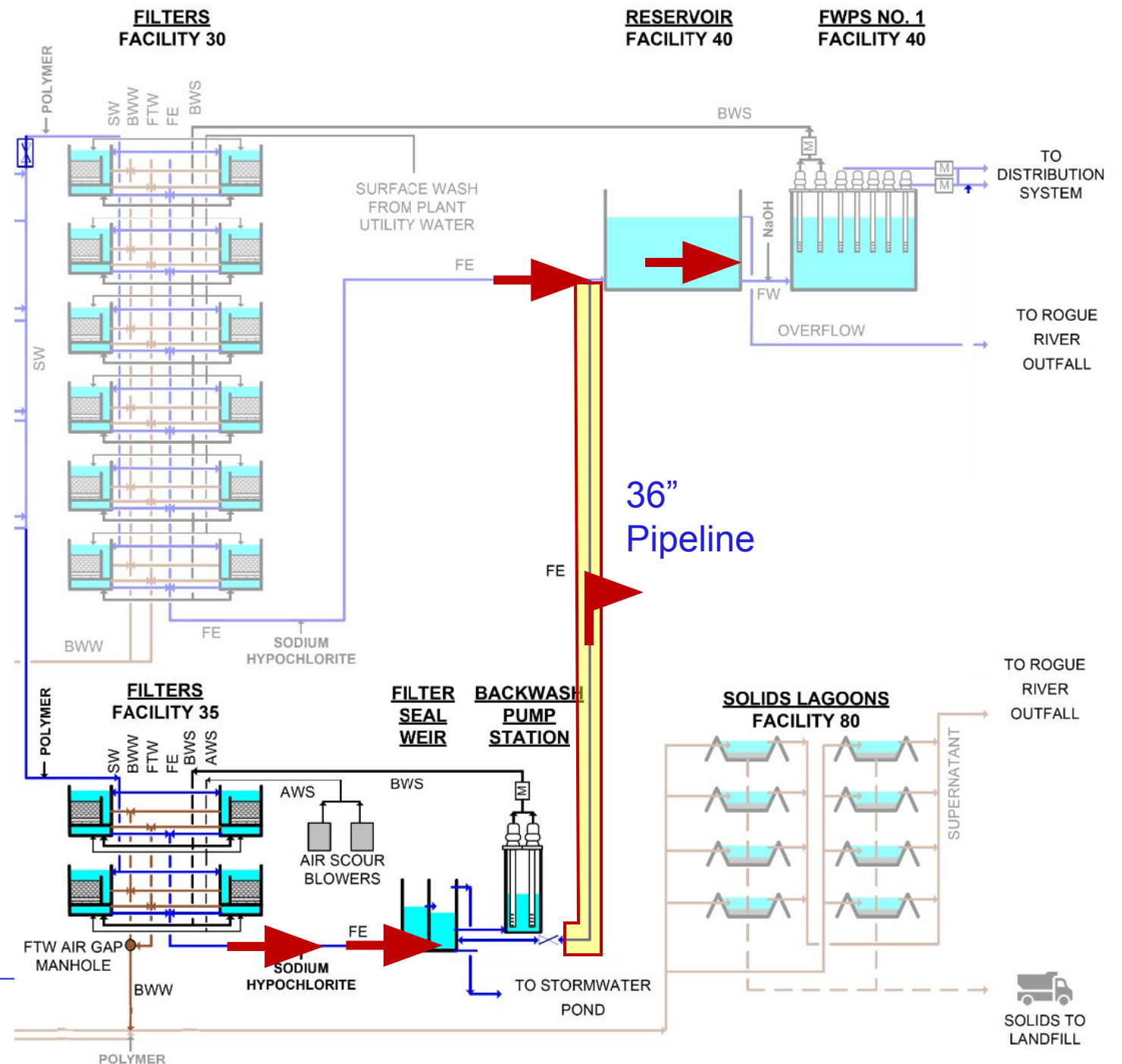
Interim Filter Operations

■ Issue

- Filters commissioned ahead of 3MG reservoir
- Limited capacity in 36" pipe

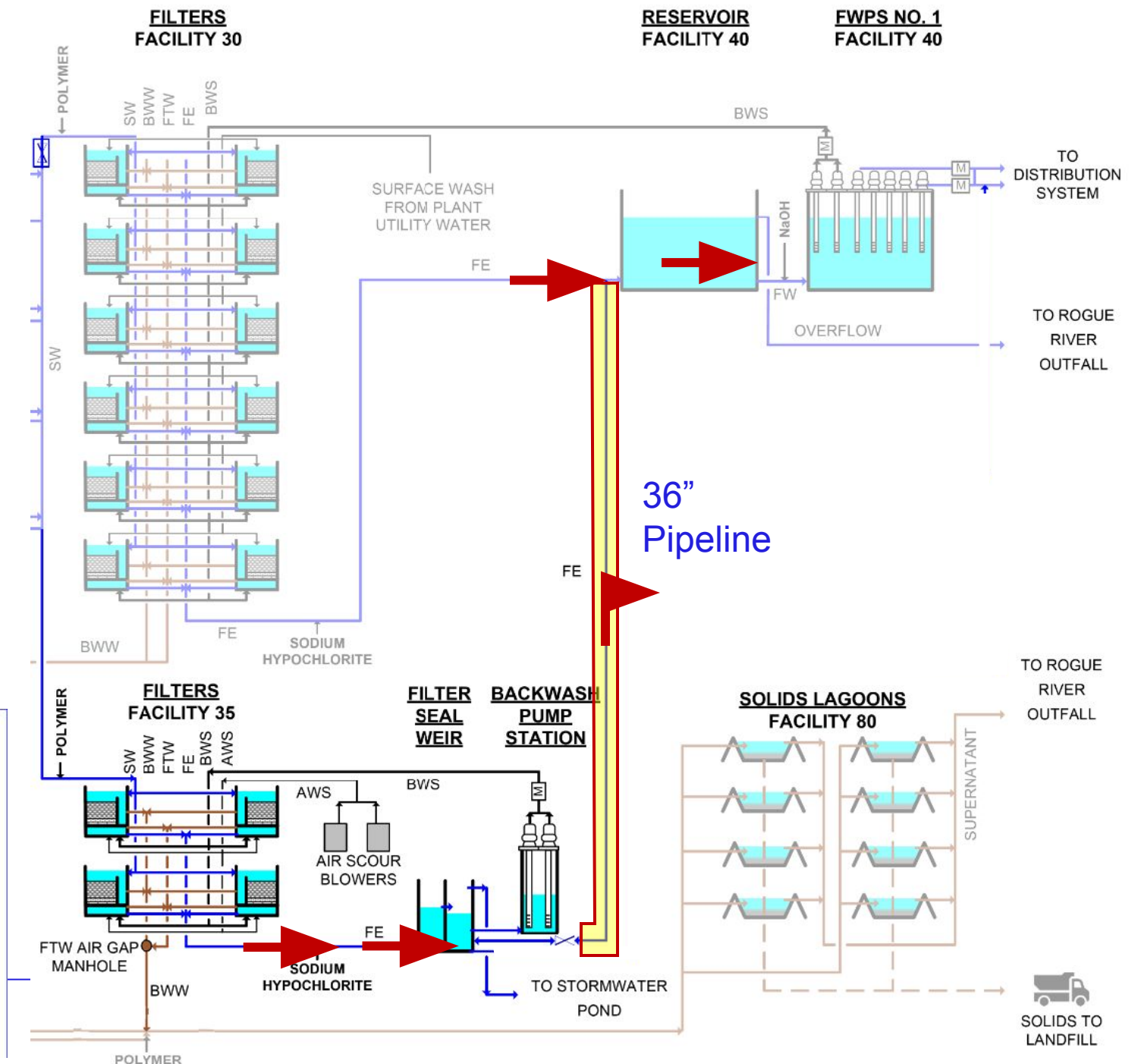
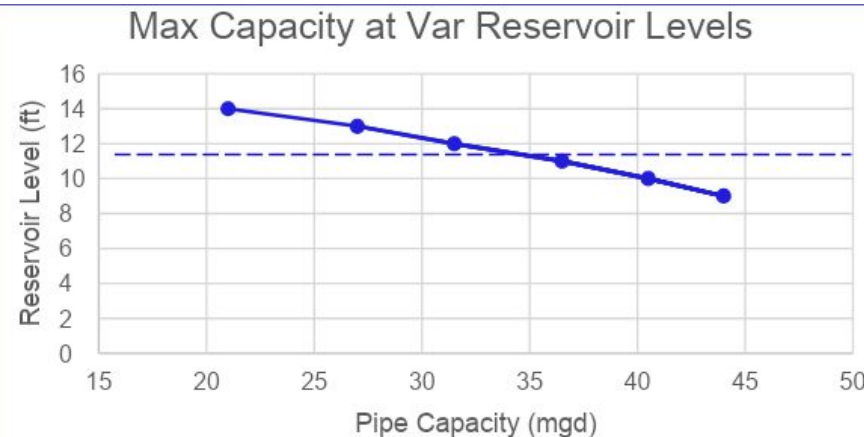
■ Lesson

- Communication, expectation setting
- Establish capacity at various reservoir levels



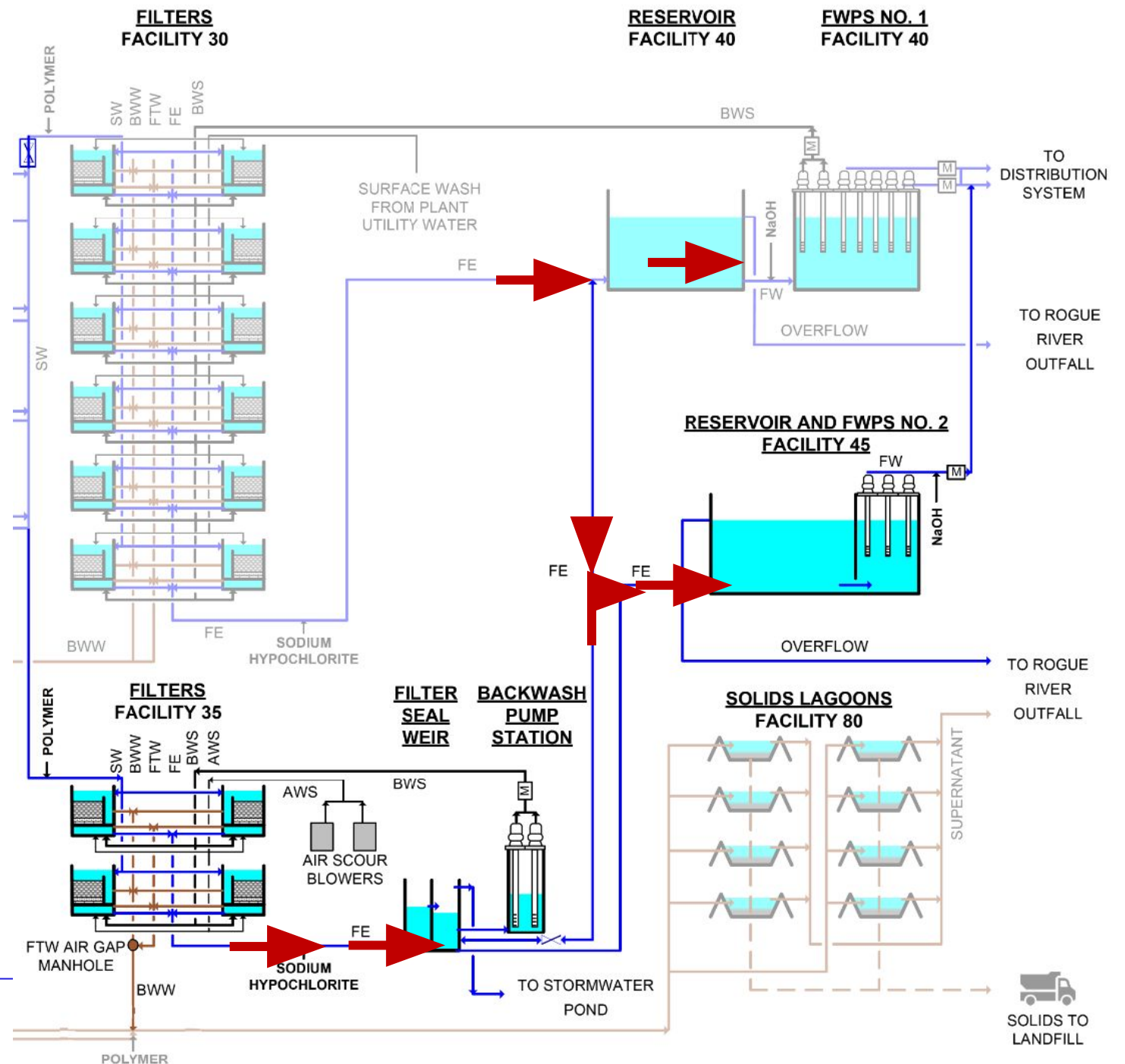
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Next Steps



Upcoming work at Duff WTP

- 3 MG reservoir and 45 MGD pump station are in construction
- Disinfection planned for July
- Startup and commissioning of reservoir/pump station in July/August





Thank You

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Reinventing tomorrow.



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