City of The Dalles OREGON

Jacobs

Challenging today.
Reinventing tomorrow.

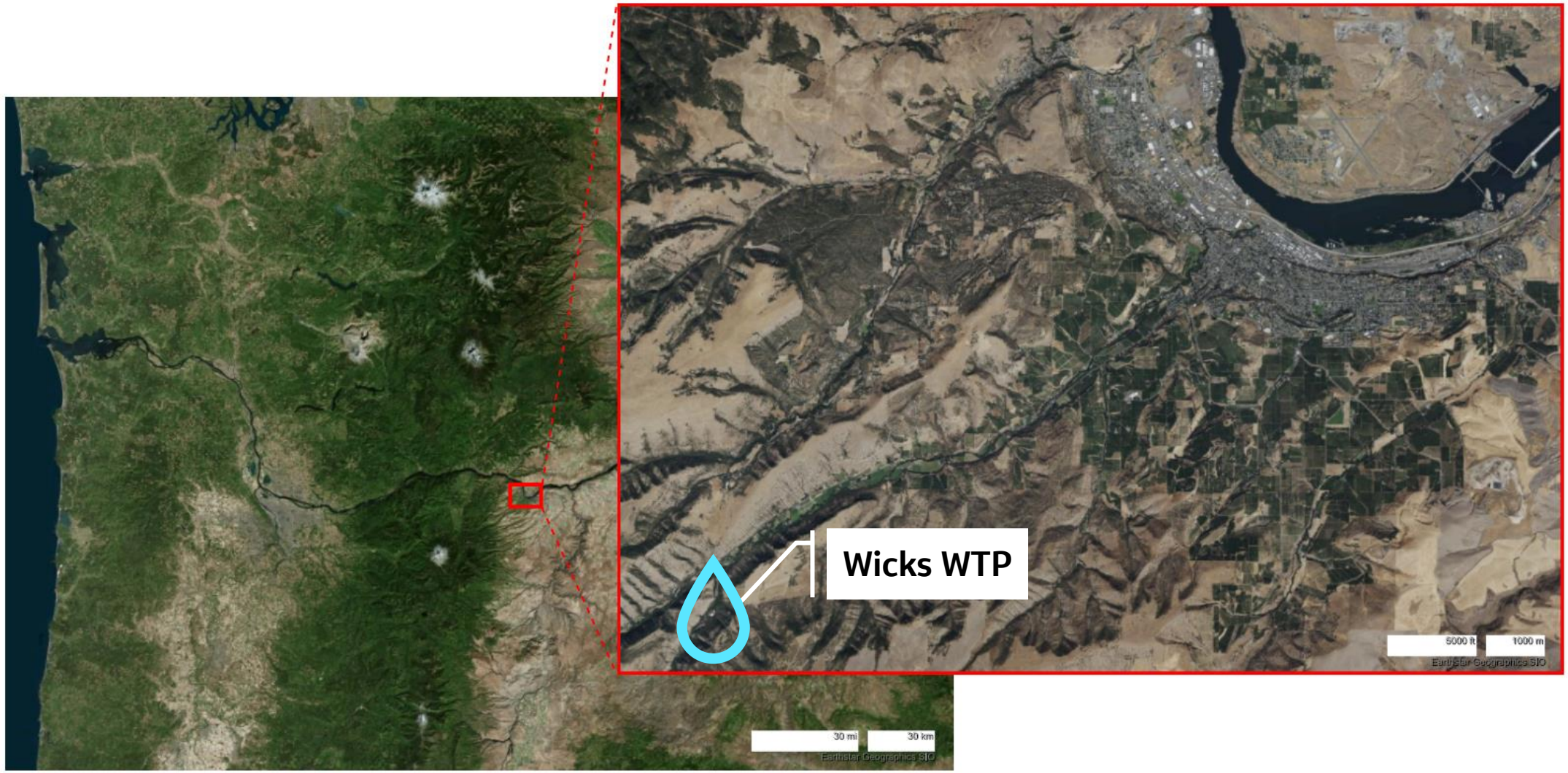
True Capacity: Understanding the Current State of The Dalles WTP

Tyler Kurtz – Jacobs

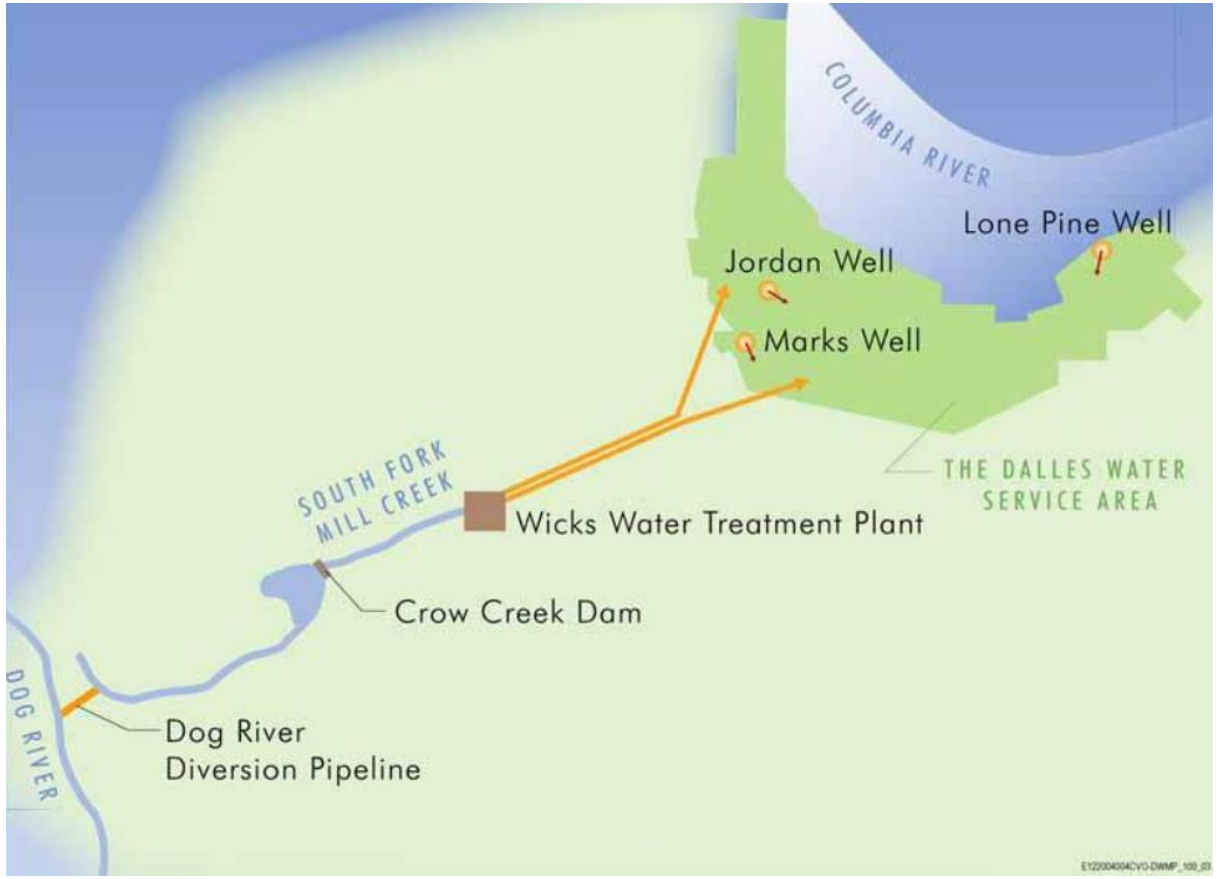
Tyler Mitchell – City of The Dalles

Background

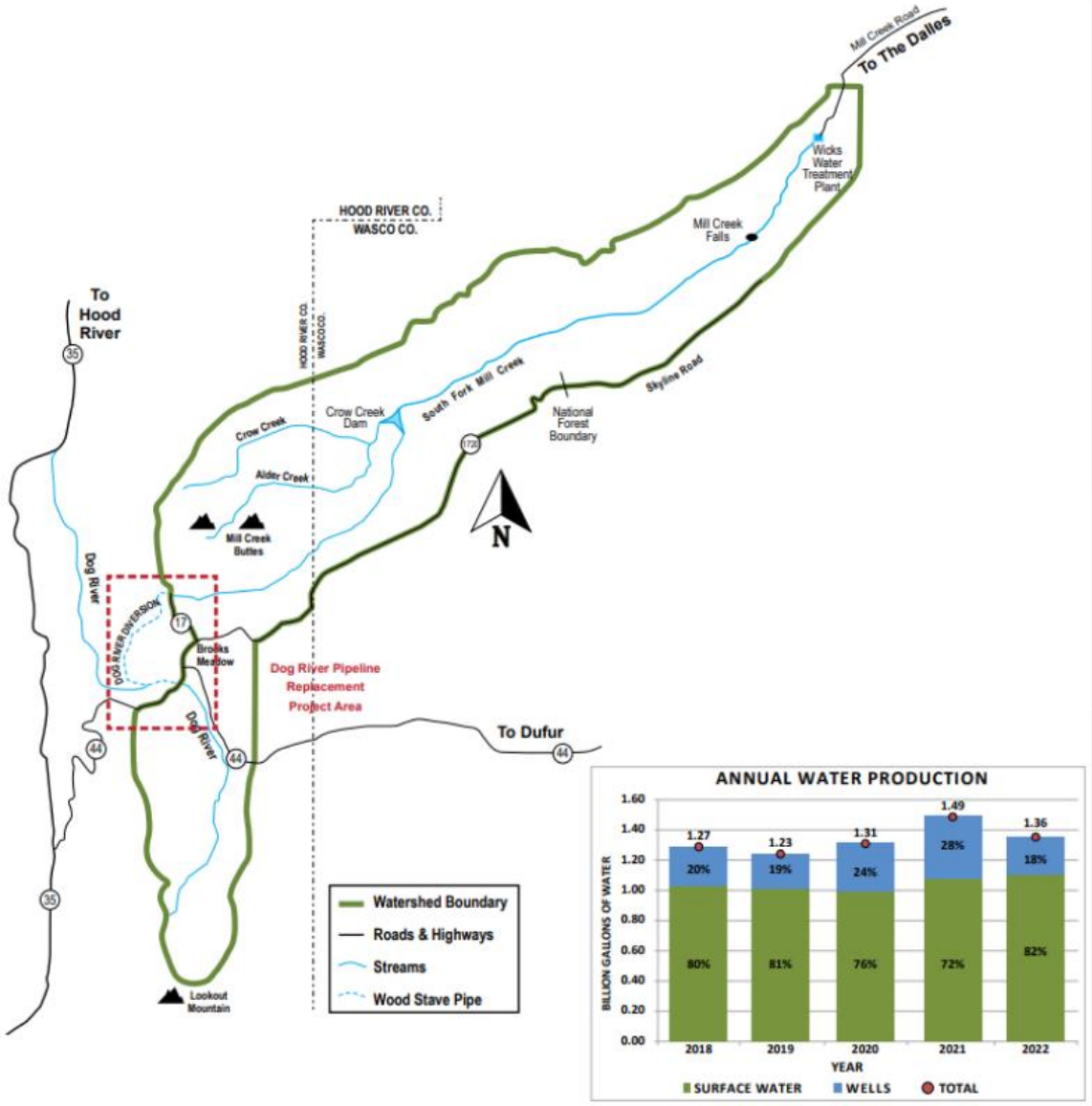
The Dalles, Oregon



The Dalles Water System



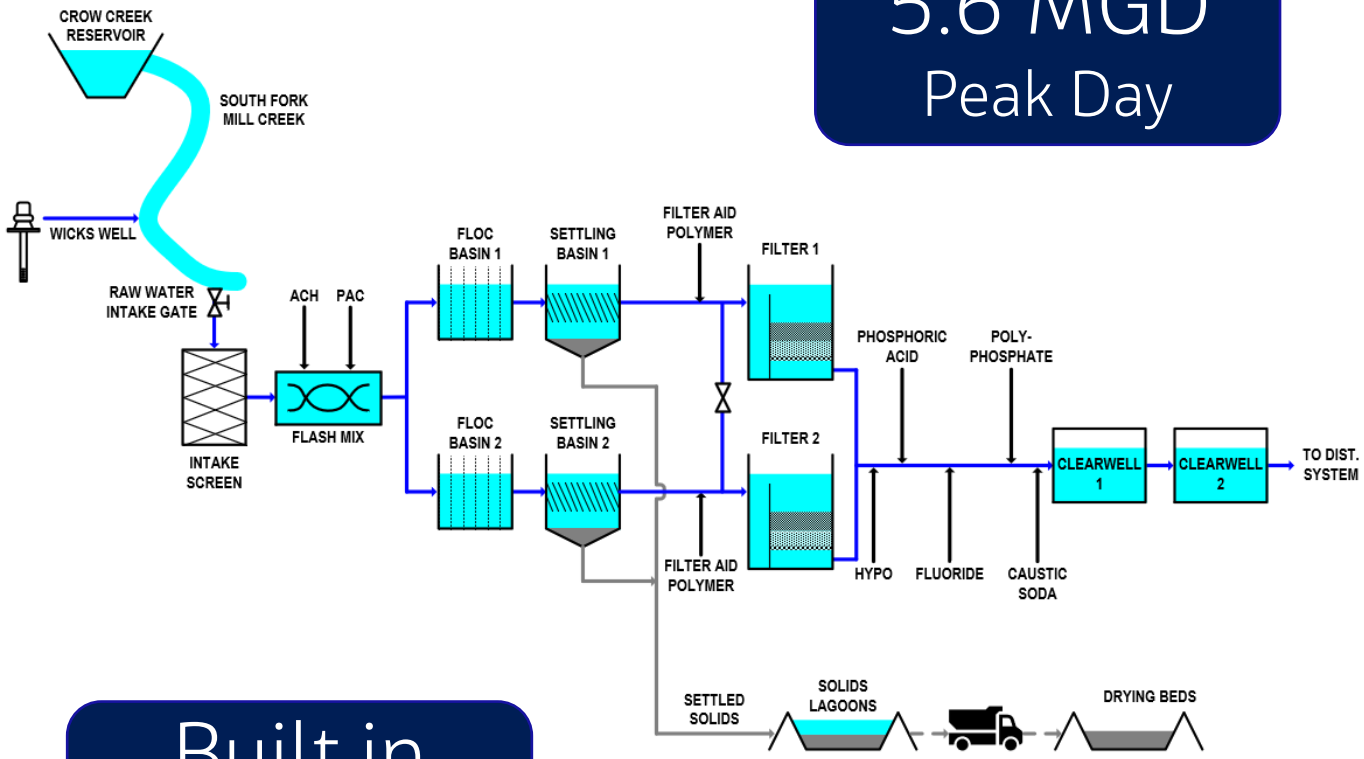
Source: 2006 Water Master Plan, CH2M



Source: 2022 Drinking Water Quality Report, City of The Dalles

Wicks Water Treatment Plant

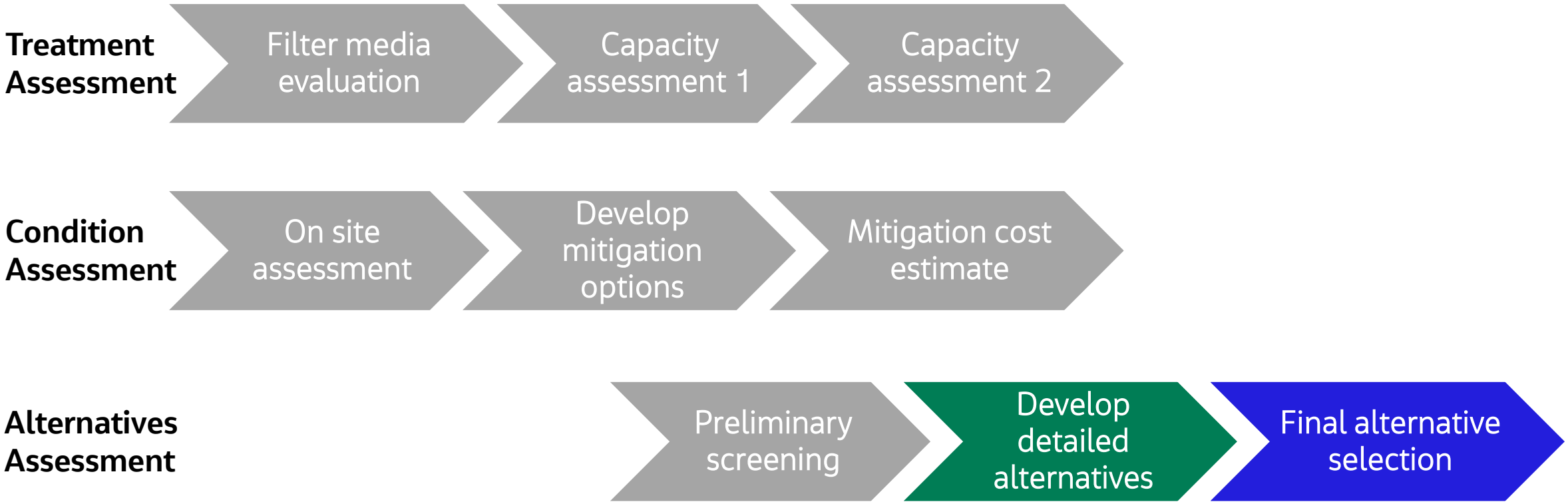
5.6 MGD
Peak Day



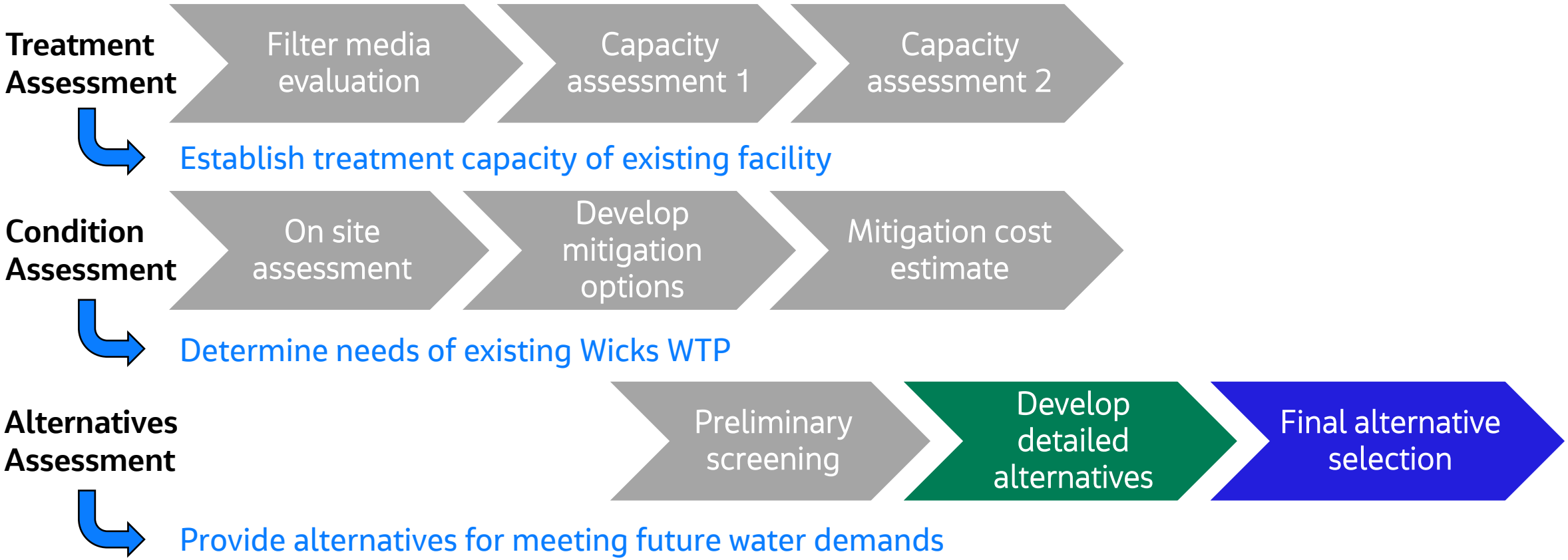
Built in 1950

Project Goals

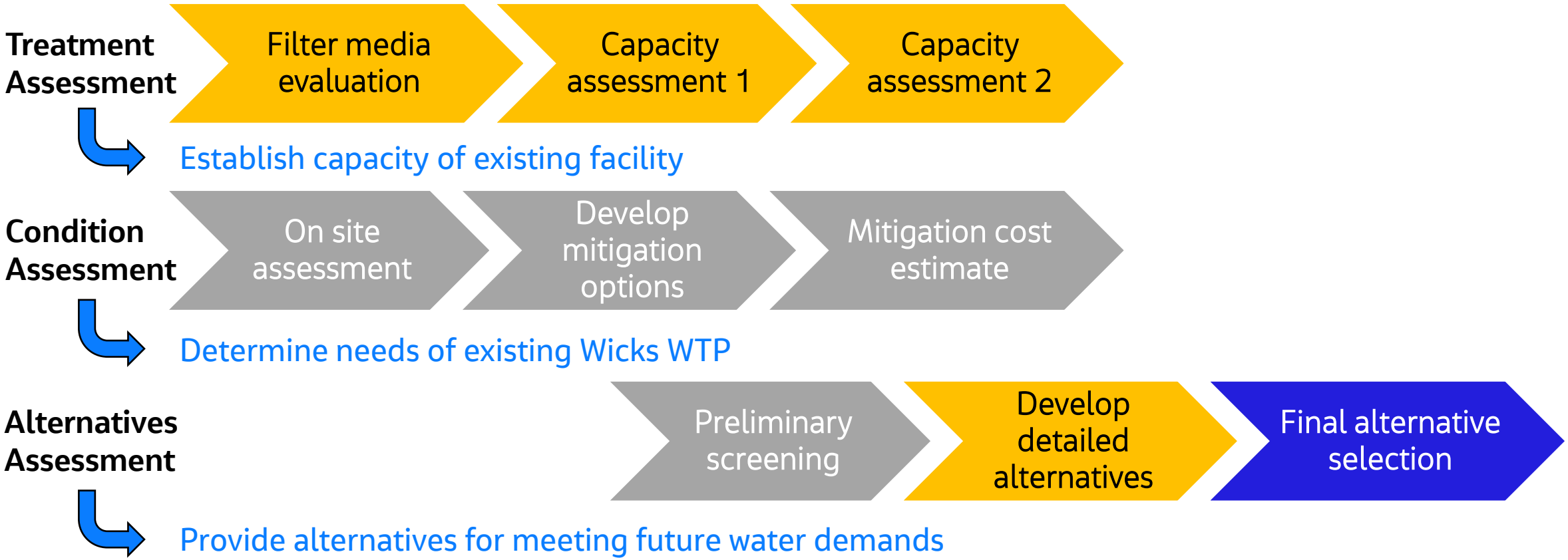
Wicks WTP Evaluation Overview



Wicks WTP Evaluation Goals



Discussed Today



Filter Evaluation

Filter Evaluation Overview

- Conducted first to allow capacity assessments to not be negatively skewed

Physical filter observations

↓

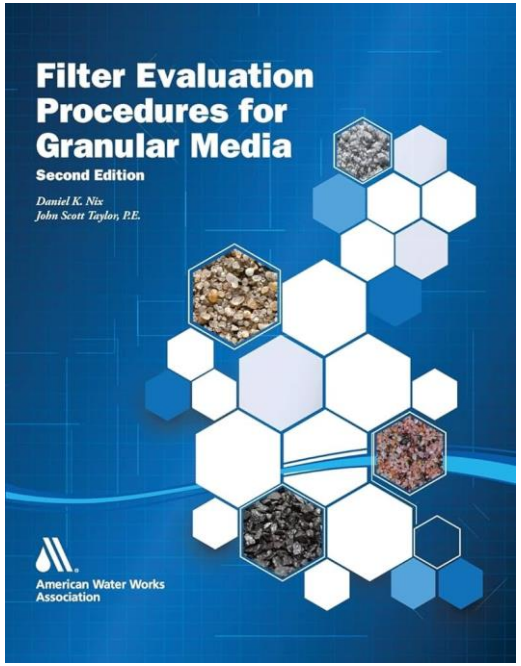
Pre-backwash floc retention analysis

↓

Backwash turbidity profiling and bed expansion

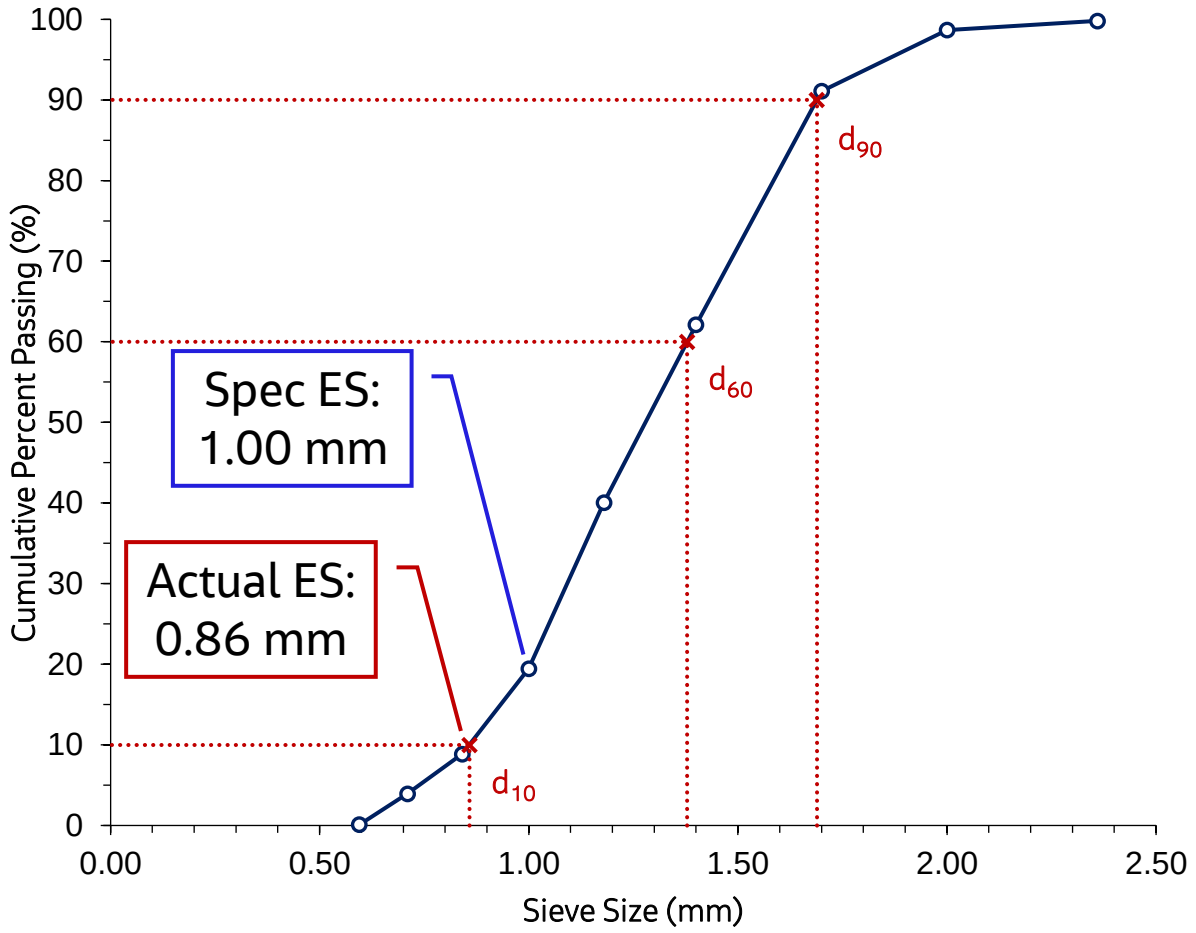
↓

Post-backwash floc retention analysis

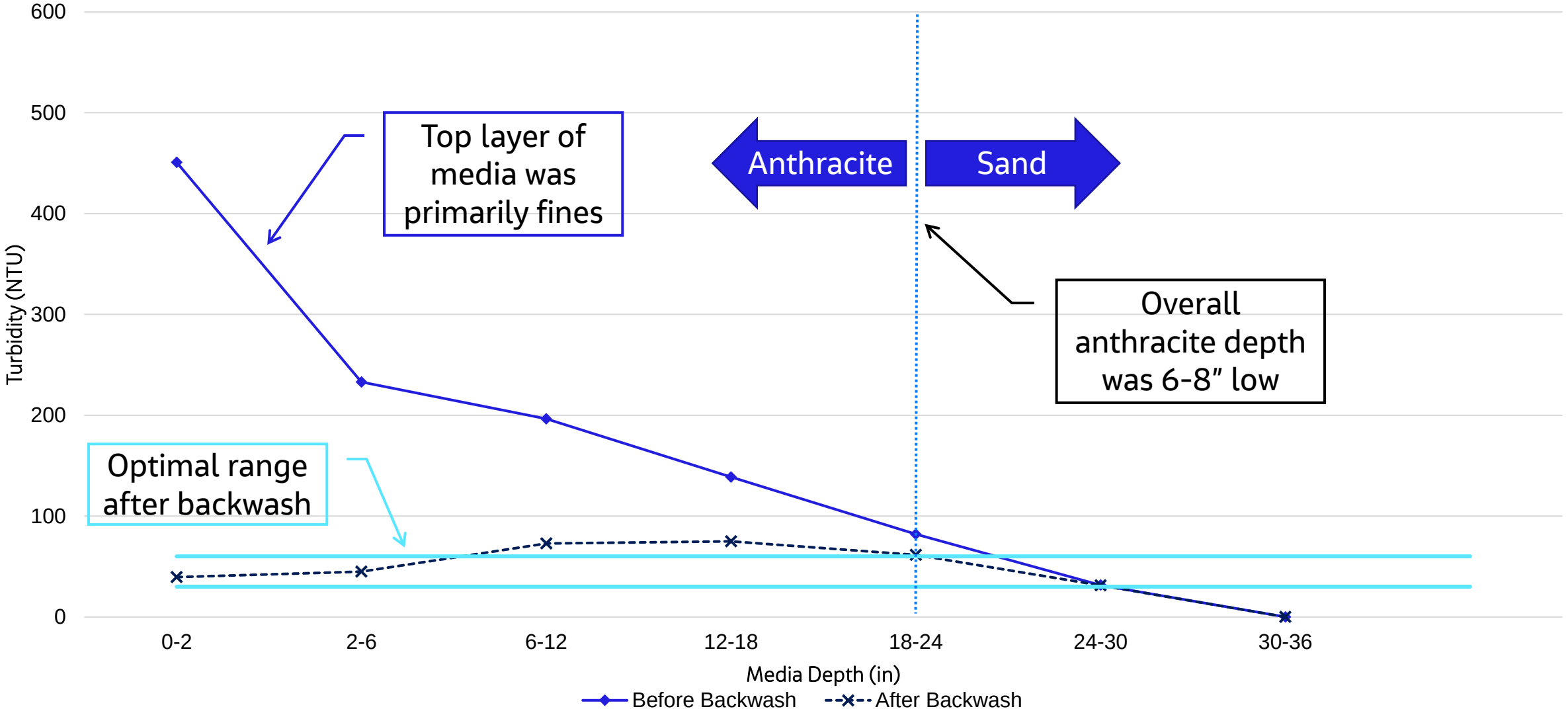


Filter Evaluation Findings – Sieve Analysis

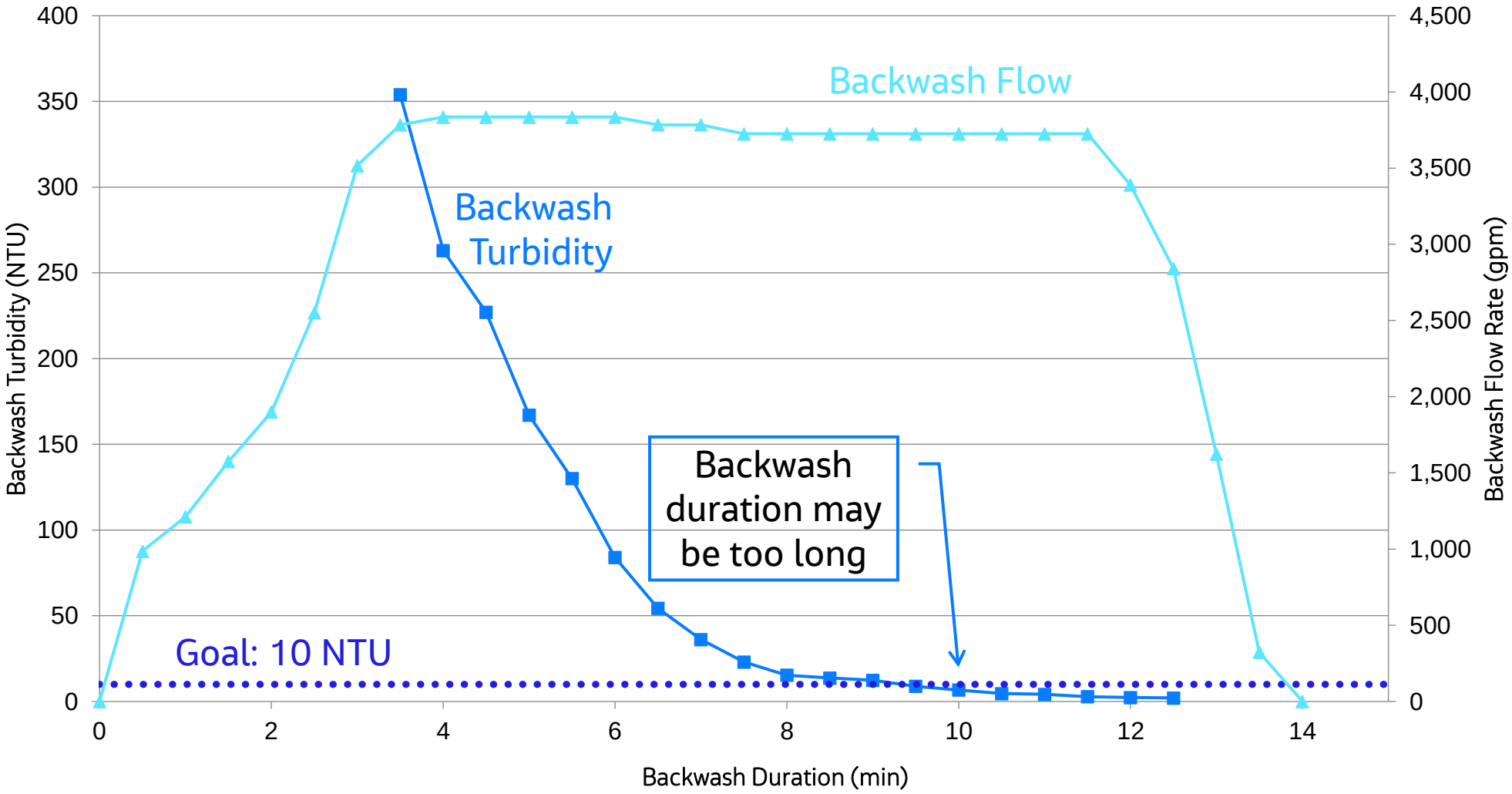
- Filter media was out of spec
  - 15 years old at time of testing
- Anthracite depth was 19”
  - Originally 26”
- Uniformity Coefficient (UC)
  - Actual: 1.61
  - Spec: <1.40
- Effective Size (ES)
  - Actual: 0.85 mm
  - Spec: 1.00 mm
- Be sure to confirm sieve sizes with lab
  - Reference AWWA B100 or AWWA B604



Filter Evaluation Findings – Floc Retention Analysis



Filter Evaluation Findings – Backwash Turbidity Profiling



Filter Evaluation Recommendations

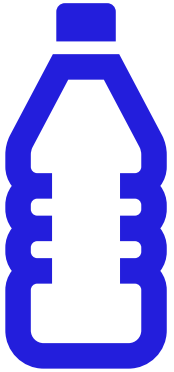
- Replace all media ✓
- Improve backwash sequence ⏳
  - Reduce backwash duration - end based on turbidity
  - Increase operator control
  - Turn off second surface wash
- Continue monitoring filters ✓
  - Floc retention analysis
  - BW turbidity profiling
  - Biannual filter performance assessment
- Assess use of coagulant aid ✓
- Continue to minimize filter aid polymer ✓

Capacity Assessment

Capacity Assessment Goals

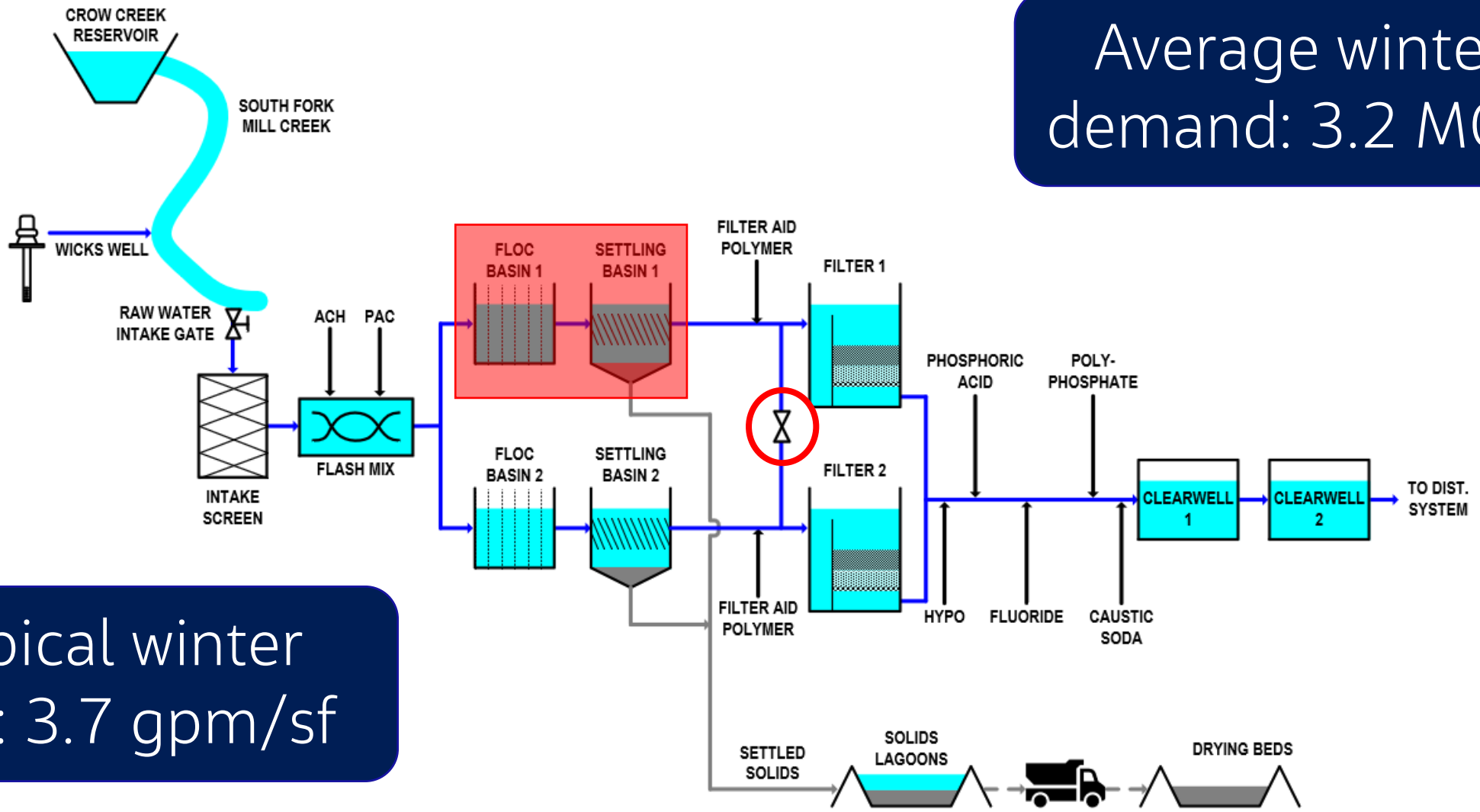
Determine max winter capacity while meeting treatment goals

Capture typical winter raw water



Identify treatment bottlenecks

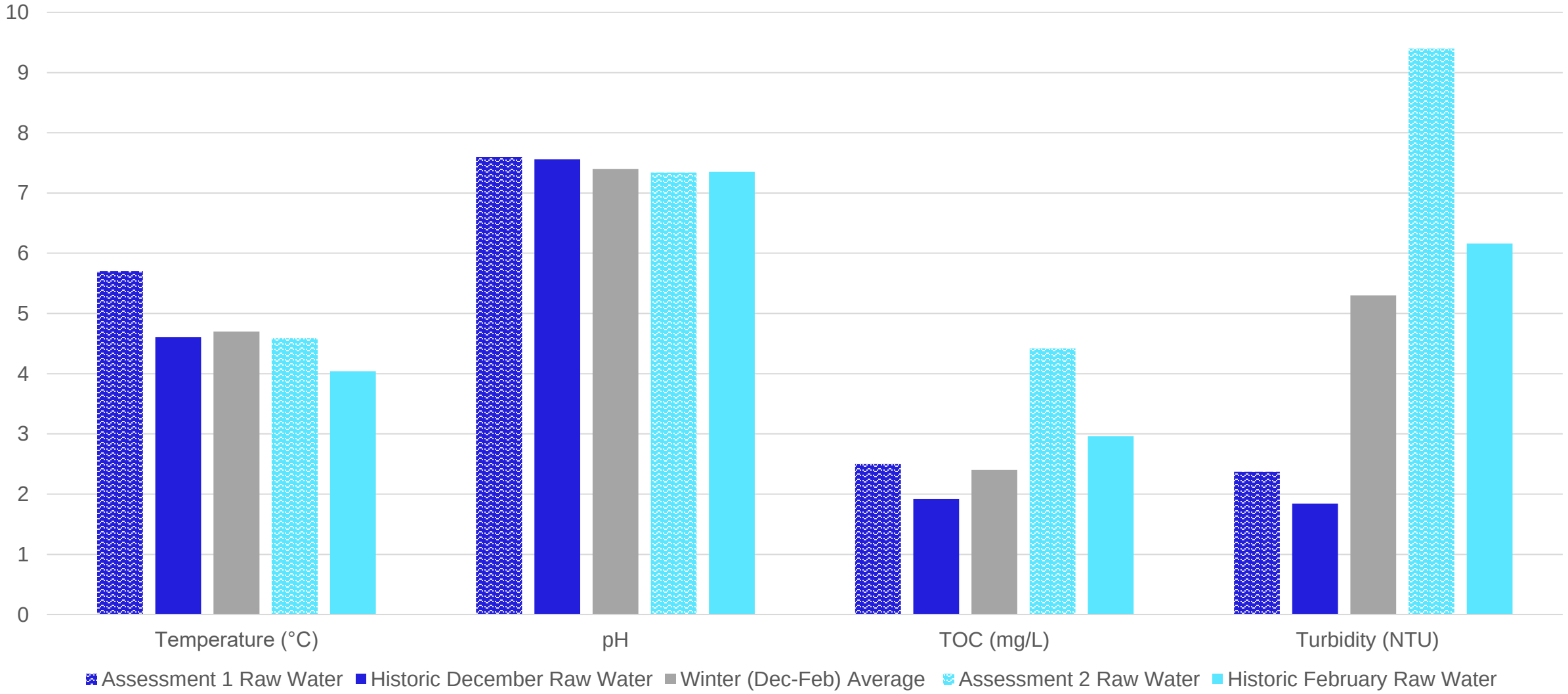
Capacity Assessment Setup



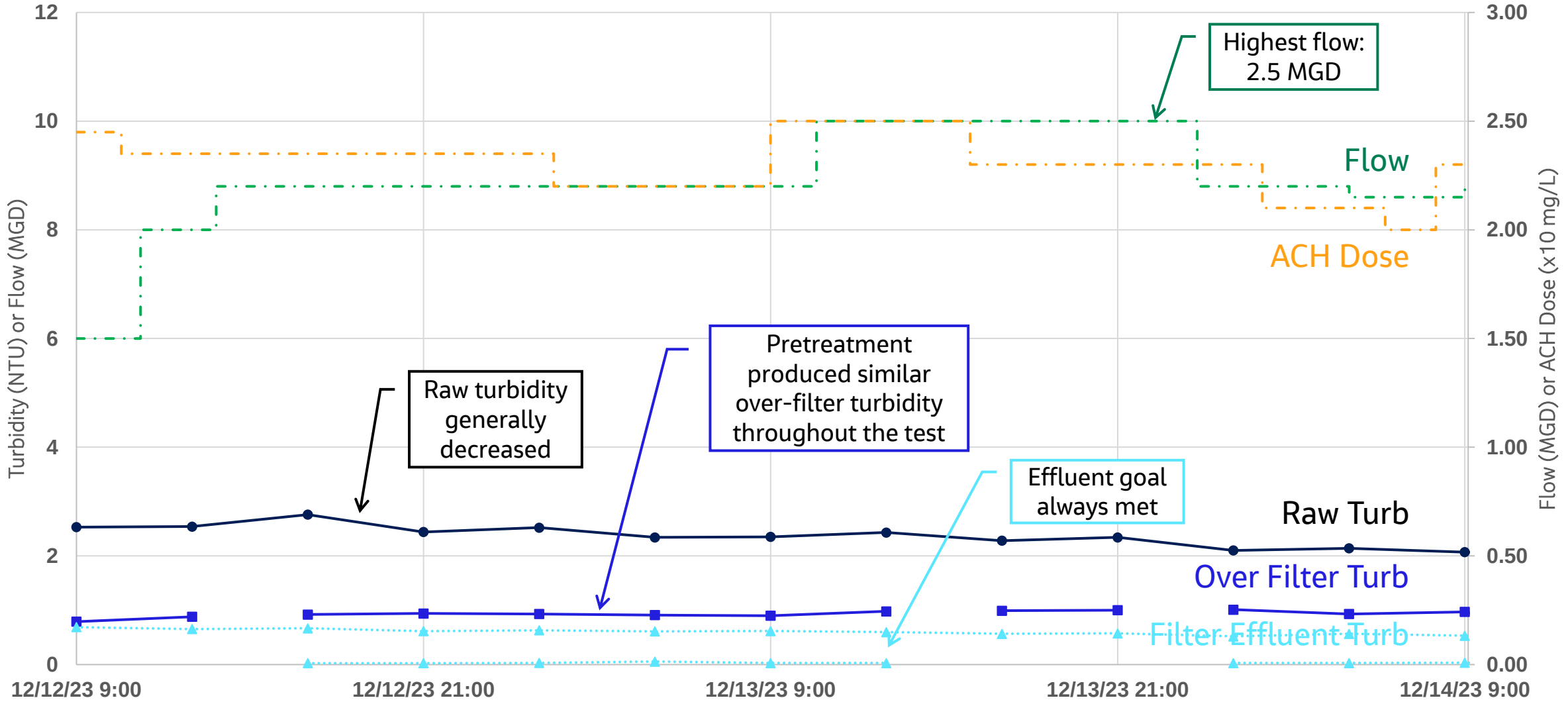
Average winter demand: 3.2 MGD

Typical winter FLR: 3.7 gpm/sf

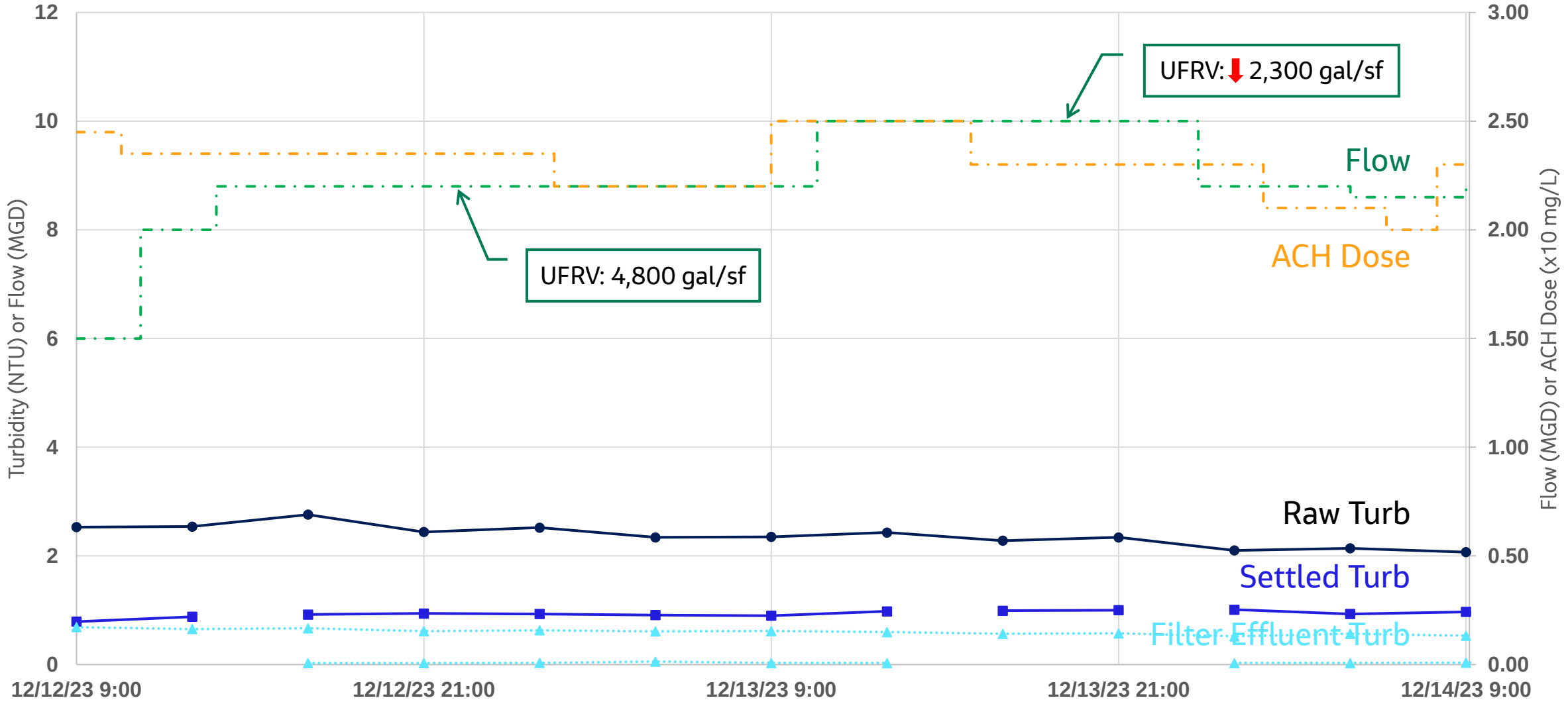
Capacity Assessment Raw Water Quality



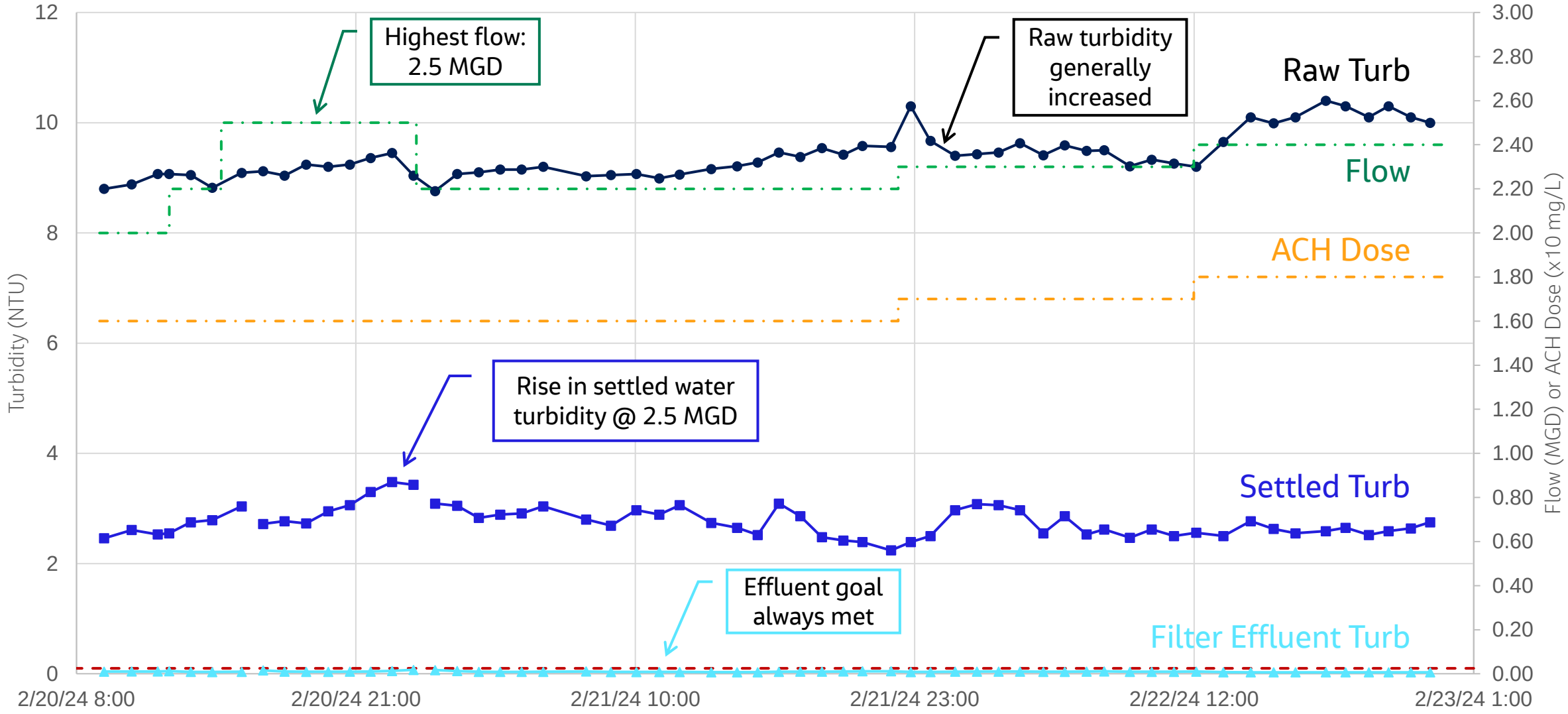
Capacity Assessment 1 Results



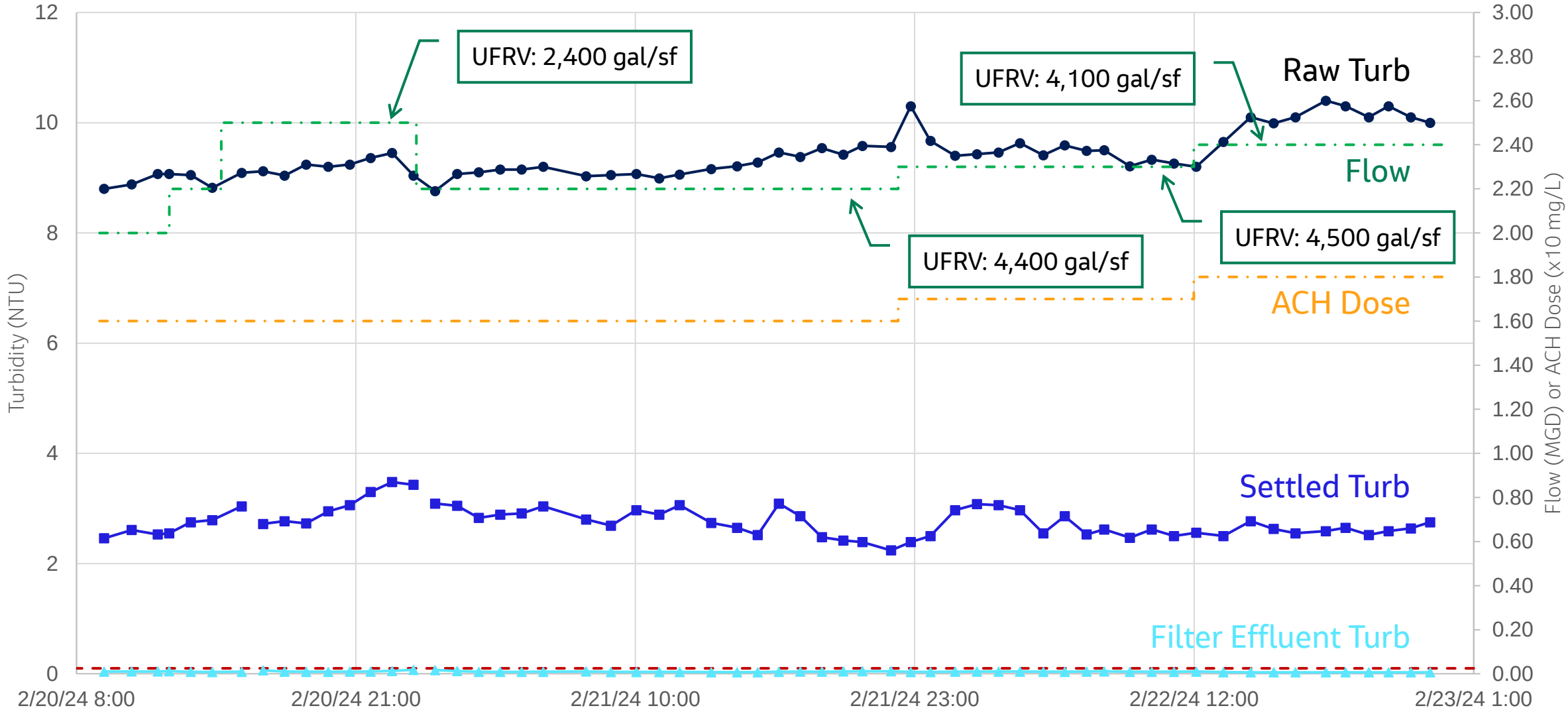
Capacity Assessment 1 Results



Capacity Assessment 2 Results



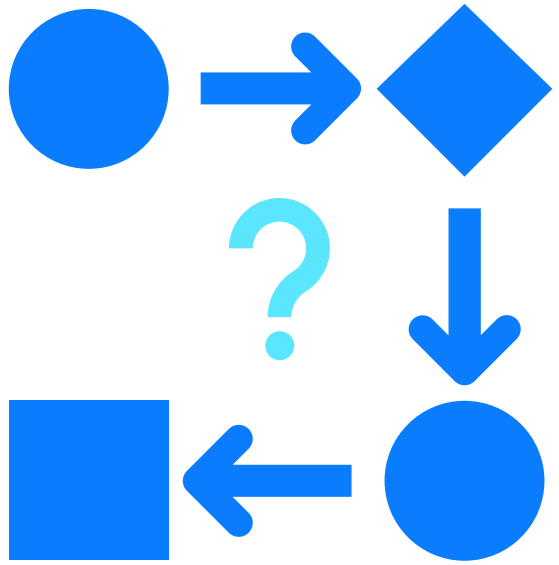
Capacity Assessment 2 Results



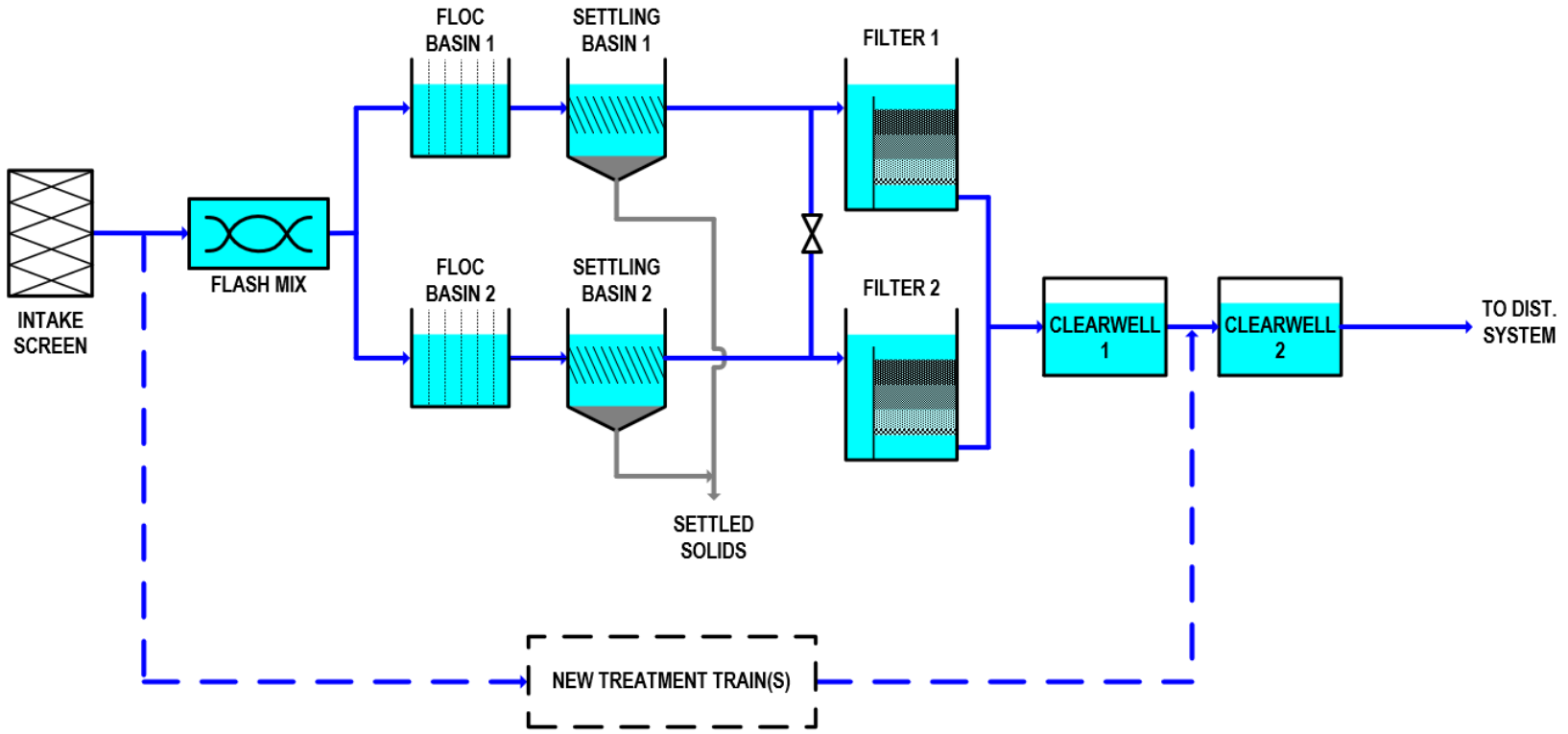
Capacity Assessment Summary

- Adequate pretreatment performance was observed up to 5.0 MGD
- **Filtration capacity was the limiting factor**
  - First capacity assessment suggested 4.4 MGD winter filtration capacity
  - Second capacity assessment suggested 4.8 MGD winter filtration capacity
- **Net overall production capacity: 3.7-4.1 MGD**
  - Based on 4,000 gal/sf UFRV

Potential Alternatives

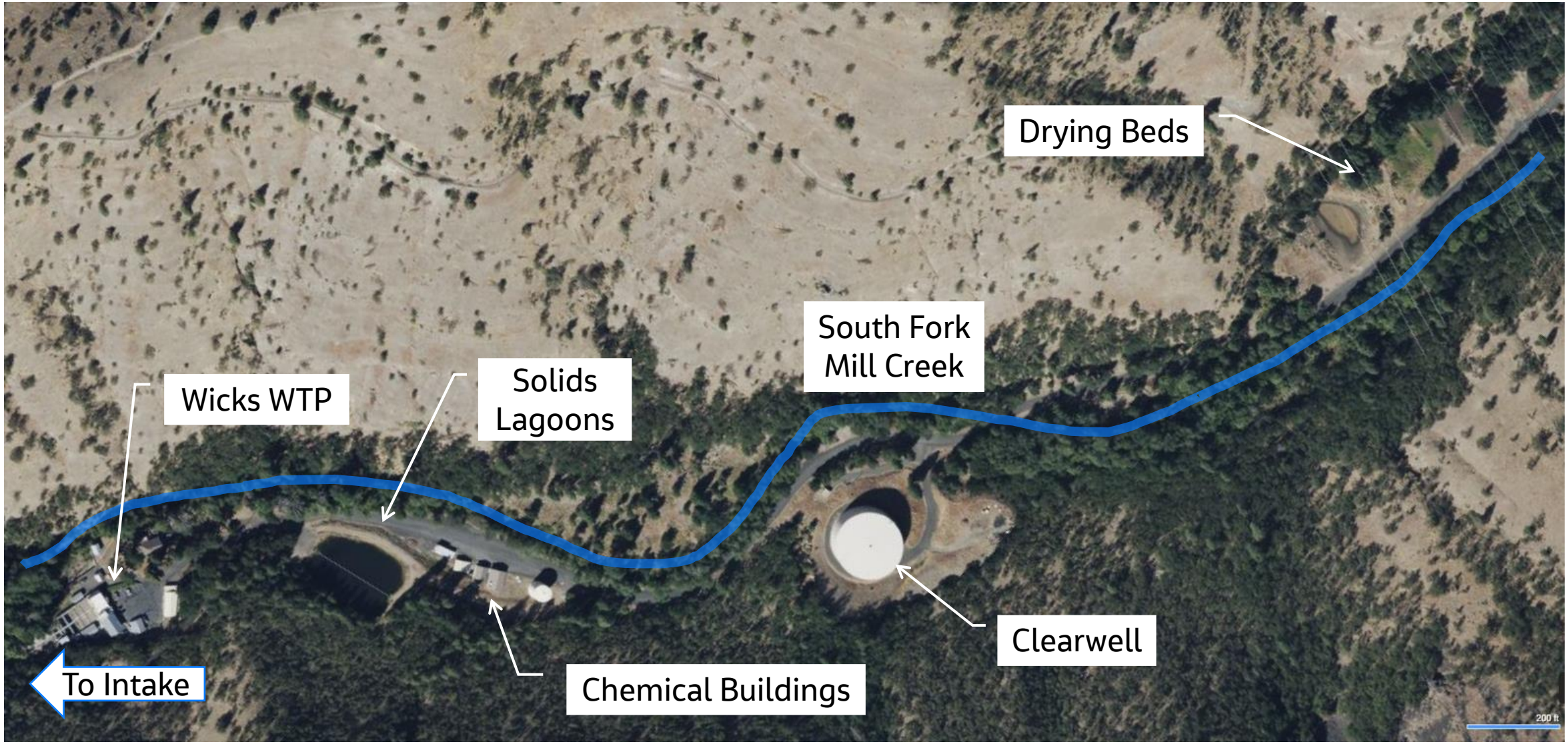


New 9 MGD WTP



6 MGD Expansion

Site Constraints



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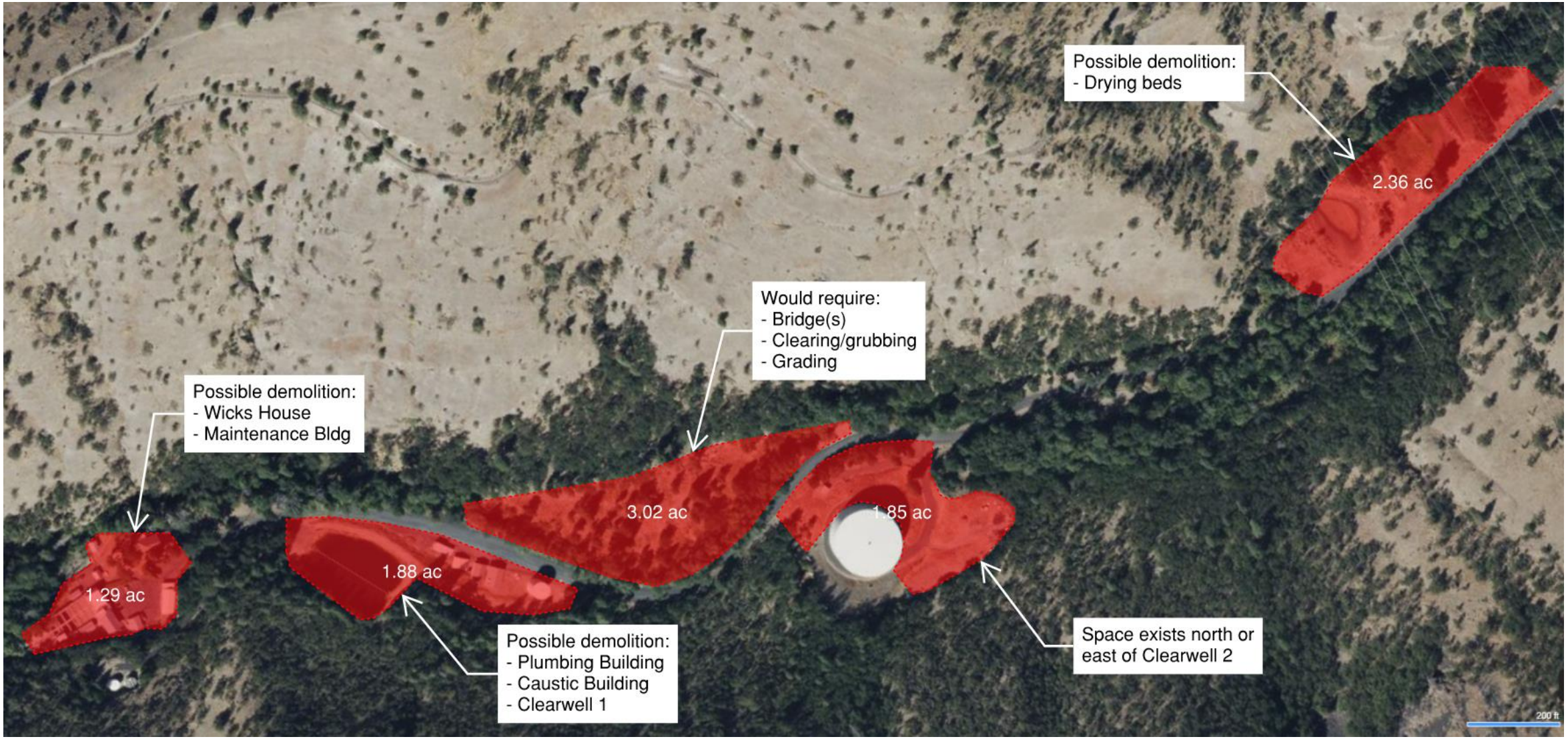
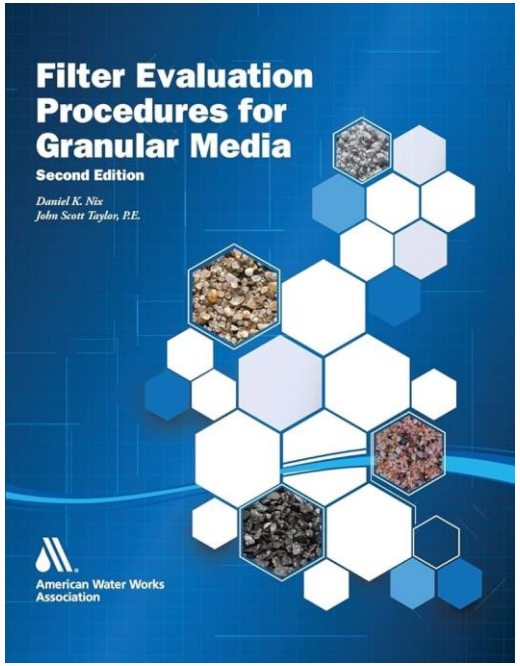


Conclusions

Conclusions

- Conduct regular filter surveillance to fully understand filter performance
  - Reference *Filter Evaluation Procedures for Granular Media* as needed
  - Perform **monthly backwash turbidity profiling** to examine backwash efficacy
  - Perform **floc retention analysis every 6 months** to assess filter and backwash performance



- Wicks WTP is capable of treating up to **4.8 MGD in the winter** (weather permitting)
- **Net winter production capacity: 3.7-4.1 MGD**

Acknowledgements

- City of The Dalles
  - Dave Anderson, Public Works Director
  - Larry McCollum, Water Supply & Treatment Division Manager

- Jacobs
  - Brady Fuller, Project Manager
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  - Talia Assi, Process Engineer
  - Benedicte Diakubama, Process EIT

- Consor
  - Brian Ginter, Project Manager
  - Emily Flock, Project Engineer

Thank you!

Tyler Kurtz – tyler.kurtz@jacobs.com
Tyler Mitchell – tmitchell@ci.the-dalles.or.us

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