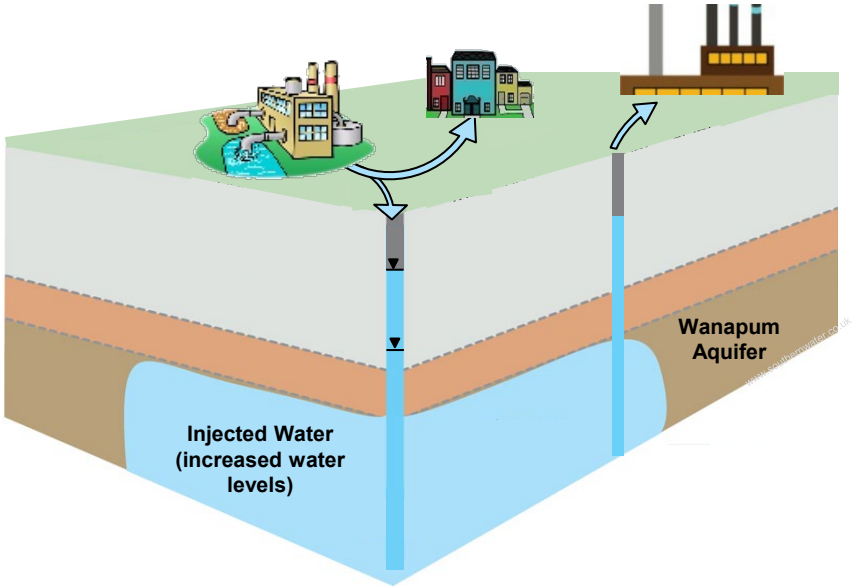
City of Othello

Aquifer Storage and Recovery (ASR) Program: Phase 2 Test



Presented by

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Tim Flynn, LHG, CGWP

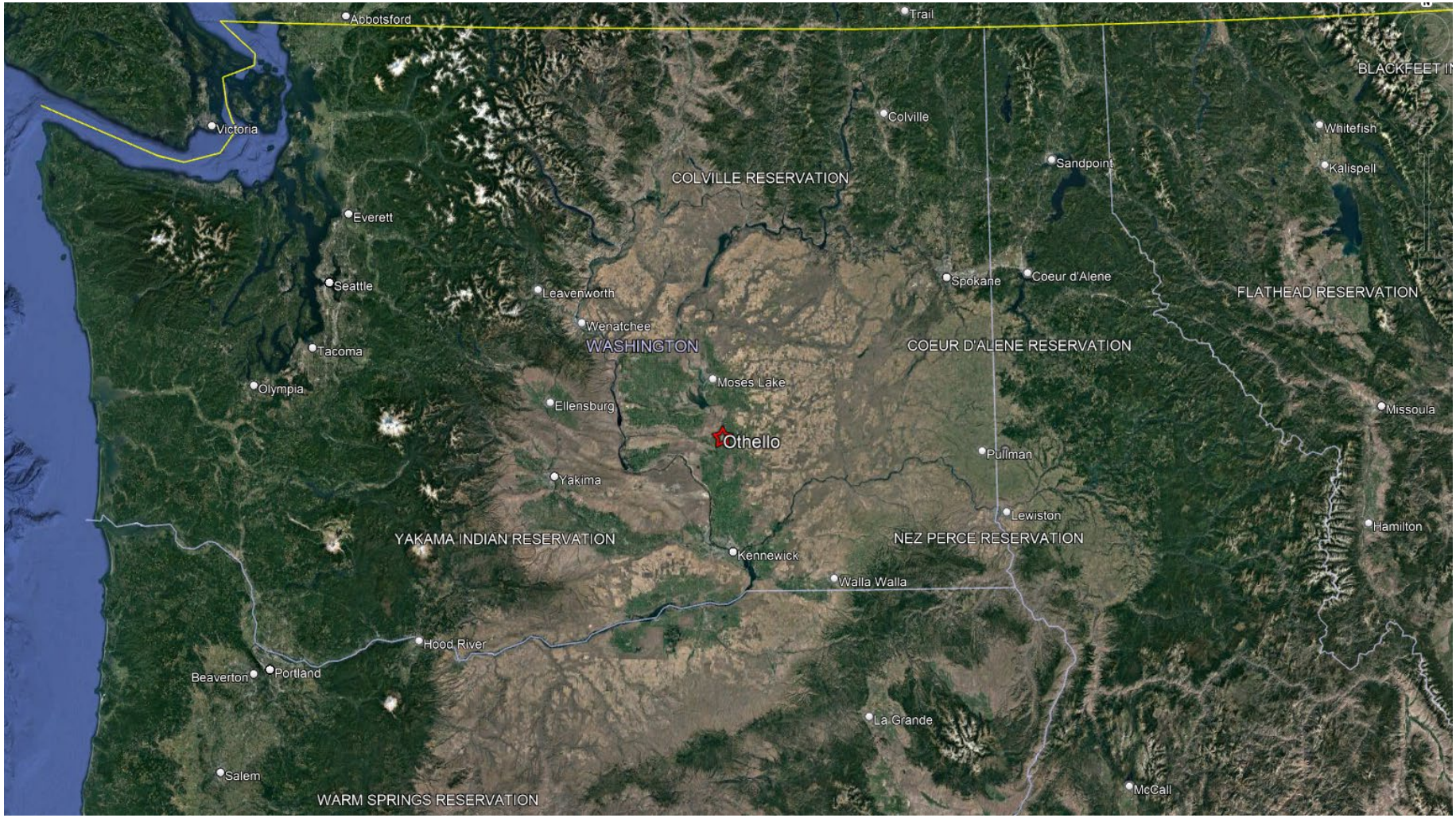
Aspect CONSULTING

CITY OF OTHELLO ESTABLISHED 1910

Presentation Outline

- Background/Intro
- Treatment System Overview
- Results
- Lessons Learned
- Next Steps

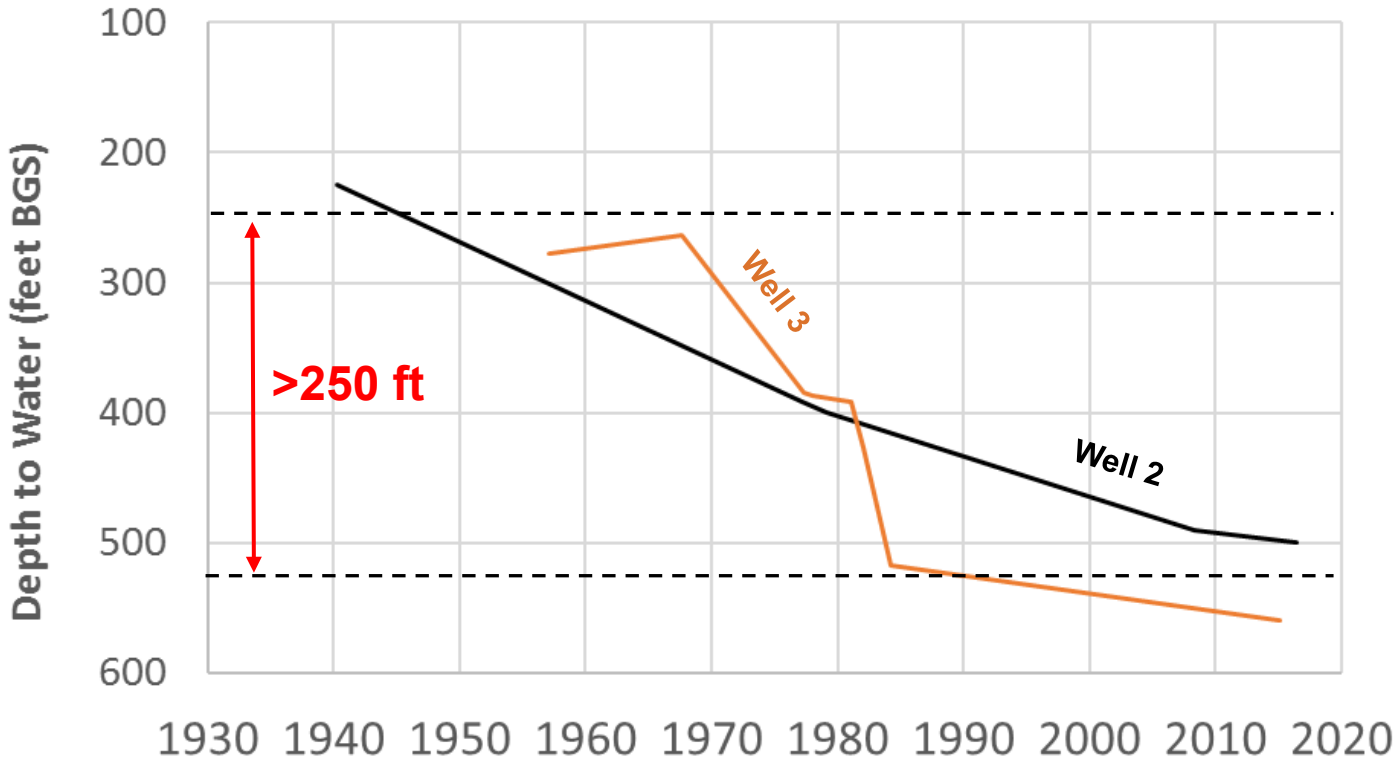
City of Othello, WA



Othello Water Supply Background

Othello Relies on 8 Wells in Wanapum Basalt

- Significant loss in wellfield capacity
- Diminishing return on new sources
- Water Rights Constraints

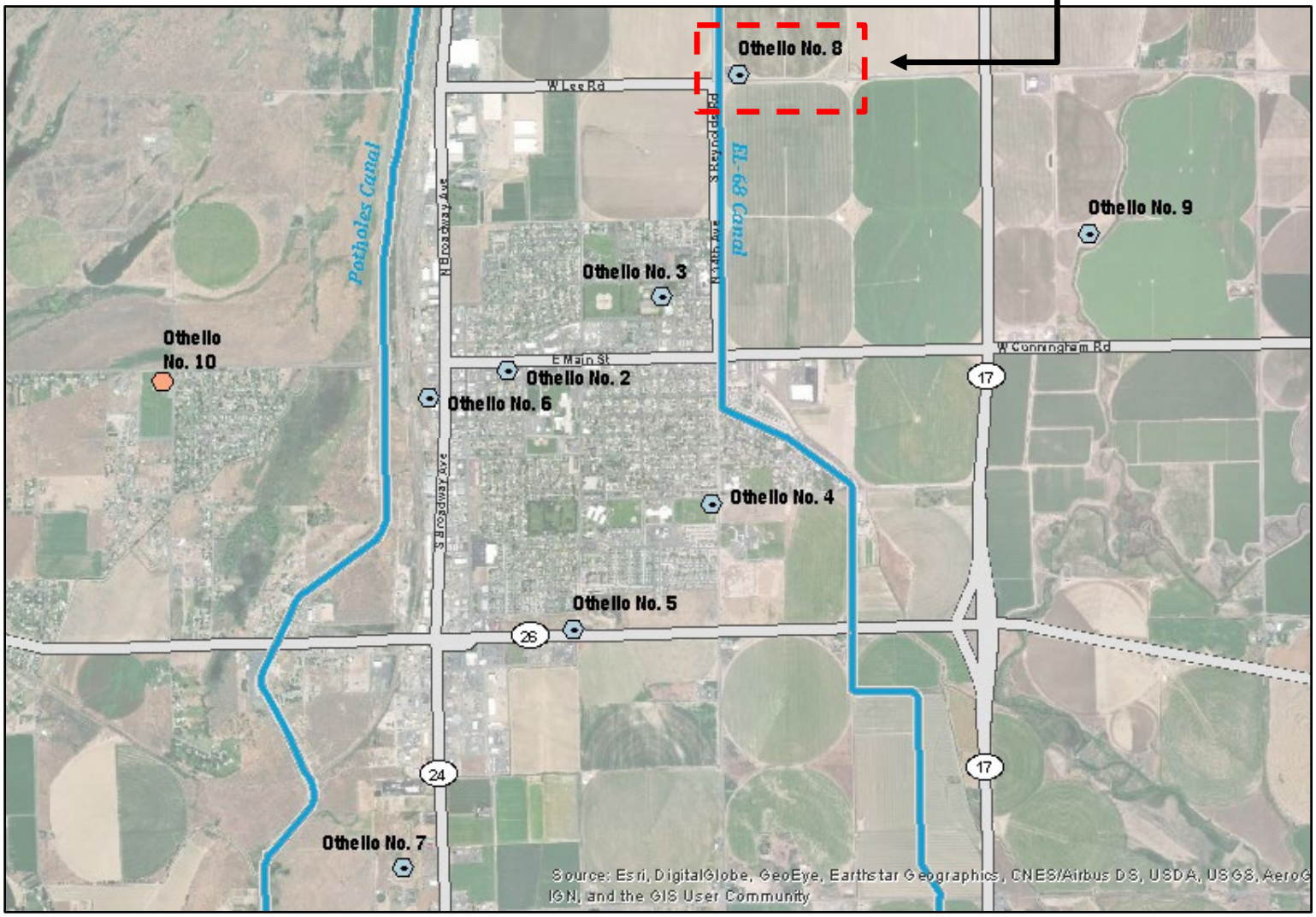


Demonstration-Scale Test

- Follow-up to FS and Phase 1 Test
- Divert up to 500 a-f from BoR Canal
- Treat with Mobile MF System
  - Assess Water Quality
- Recharge Deep Basalt Aquifer
- Store Water, Monitor, then Recover

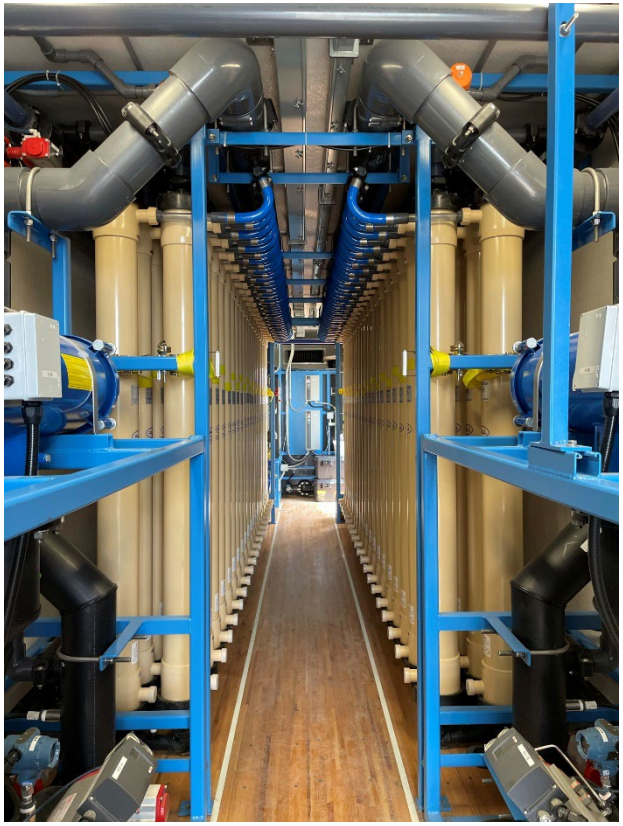
City Wells

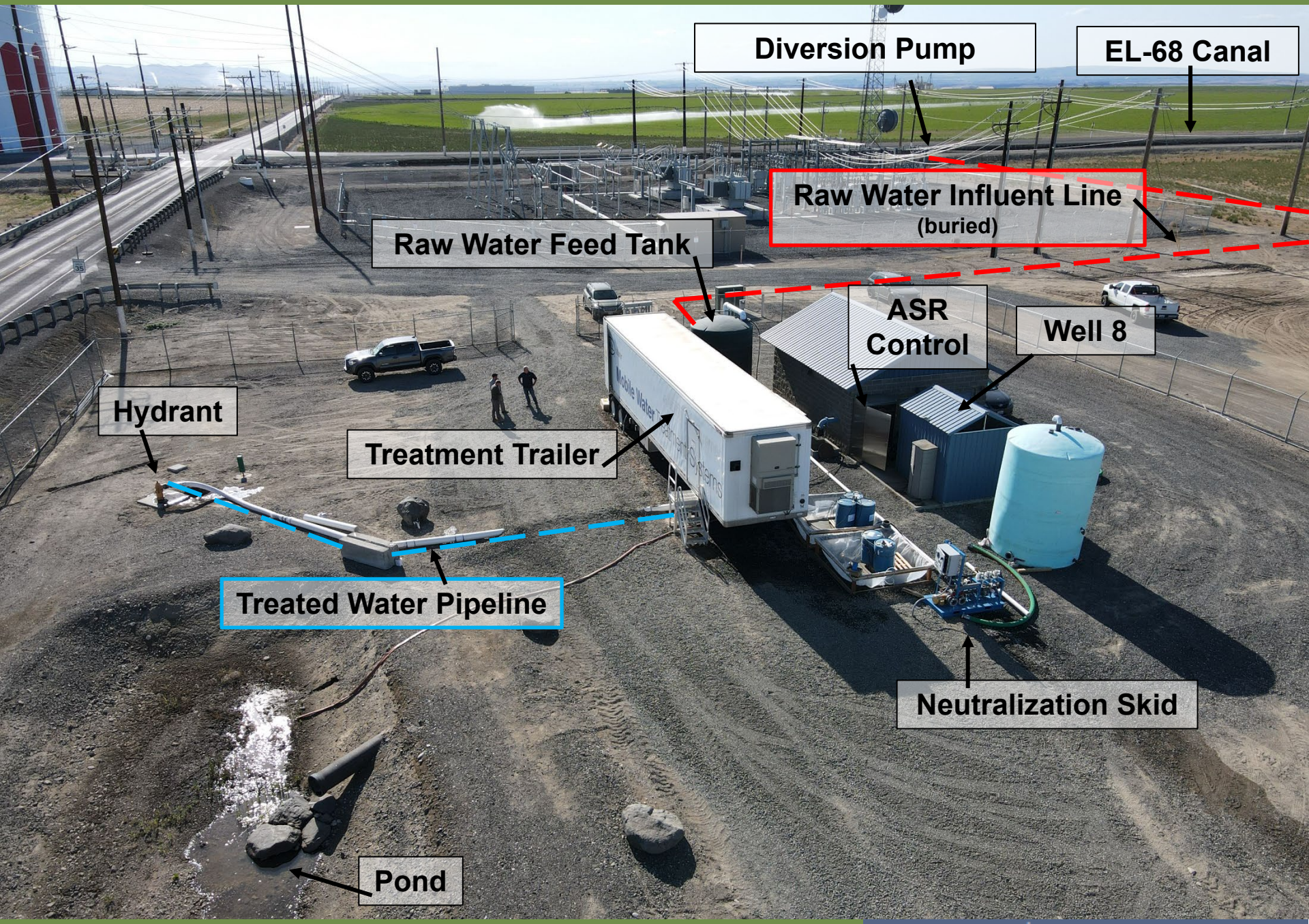
ASR Phase II Pilot Test Injection Site



Treatment System

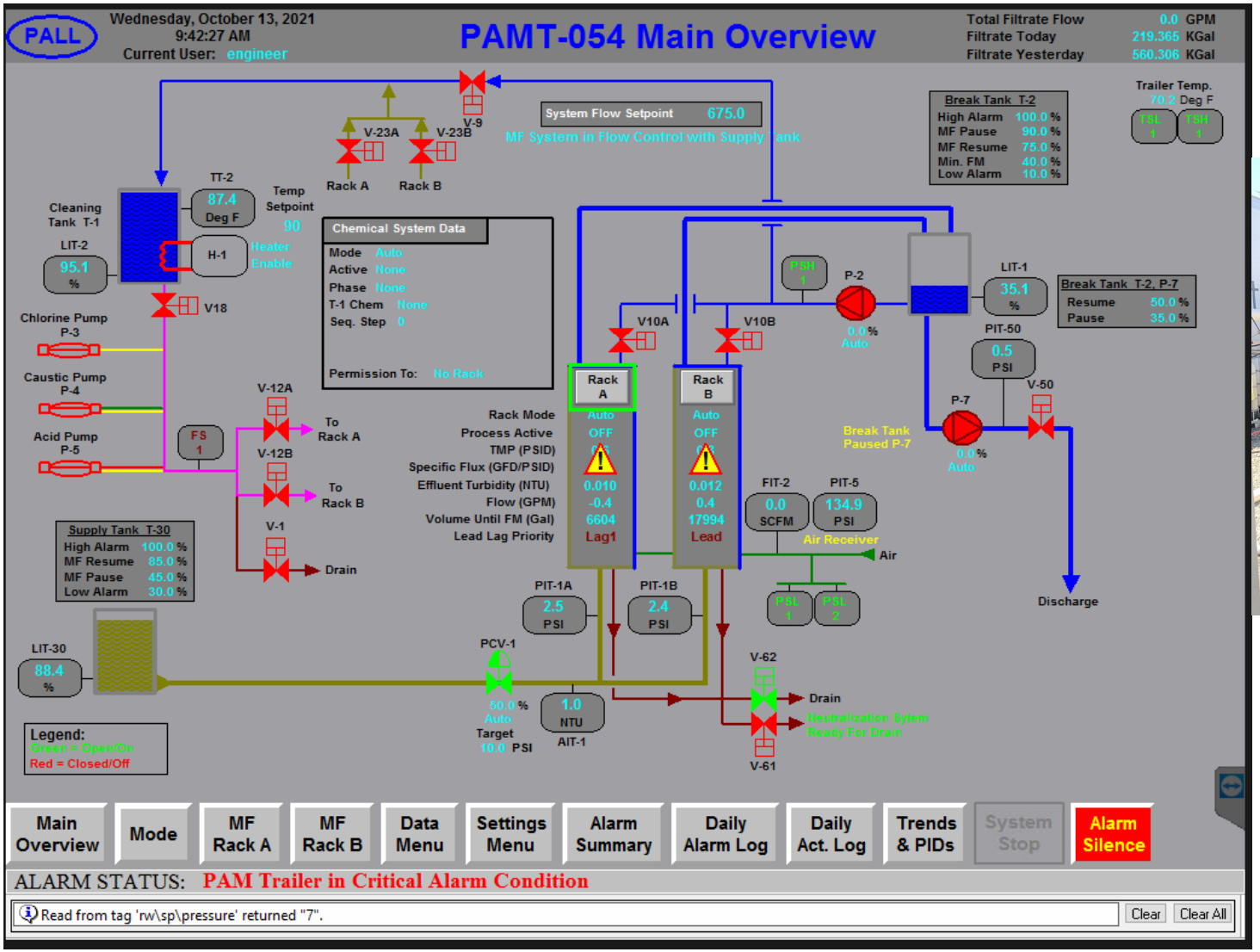
- 1.06 MGD, Leased from Pall Water
- Backwash every 20 to 40 minutes
- EFM every 48 hours
- CIP every 30 days (or after event)
- Monthly Chemical Demand:
  - 60 gallons NaOCl (12.5%)
  - 25 gallons NaOH (25%)
  - 43 gallons Citric Acid (50%)
  - 6 gallons NaHS03 (38%)




Diversion Pump
EL-68 Canal
Raw Water Influent Line
(buried)
Raw Water Feed Tank
ASR
Control
Well 8
Hydrant
Treatment Trailer
Treated Water Pipeline
Neutralization Skid
Pond

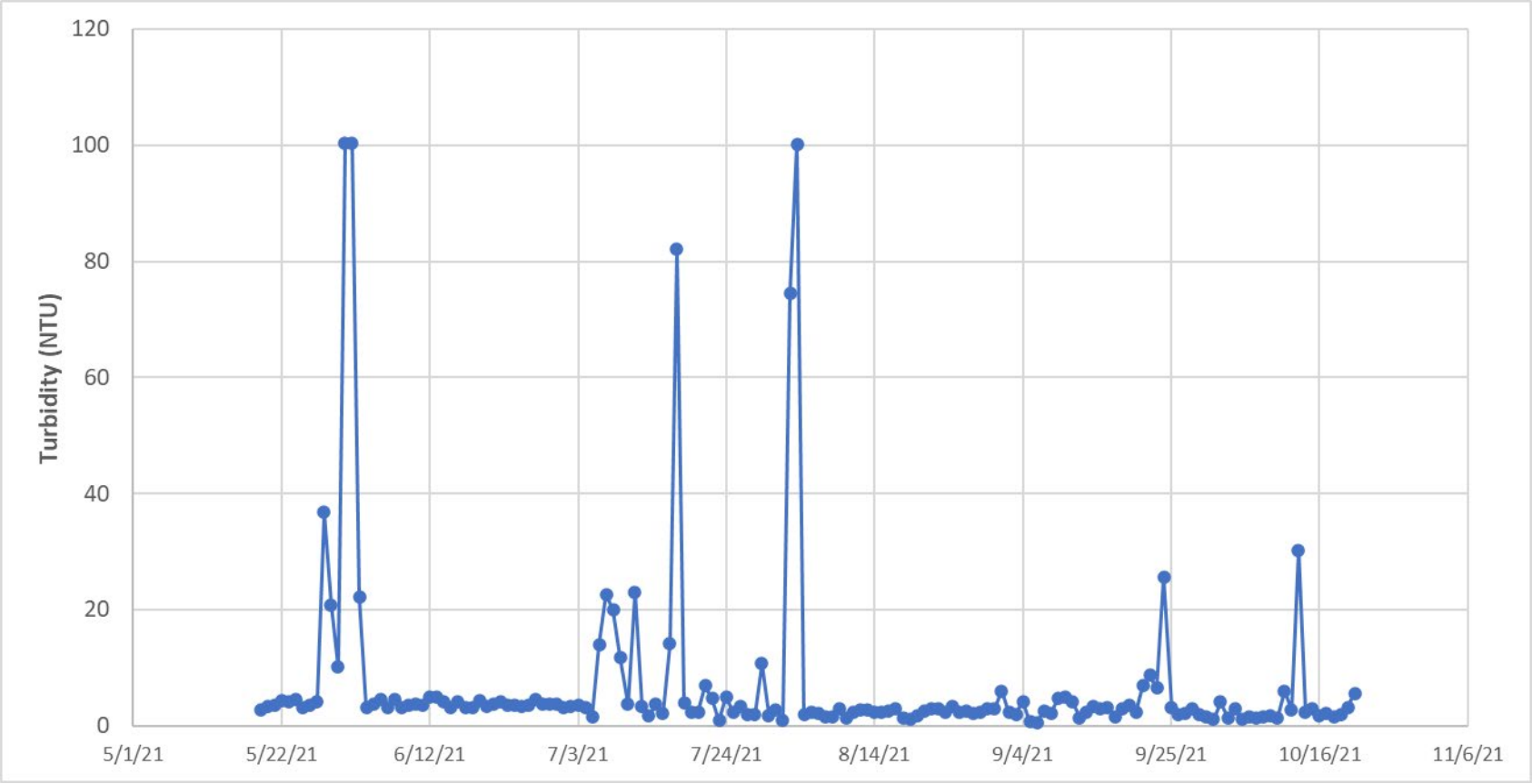
Backwash & Neutralization

Remote Dashboard



Lessons Learned….

Watch the Weather…



Communication Protocols…

EAST COLUMBIA BASIN IRRIGATION DISTRICT

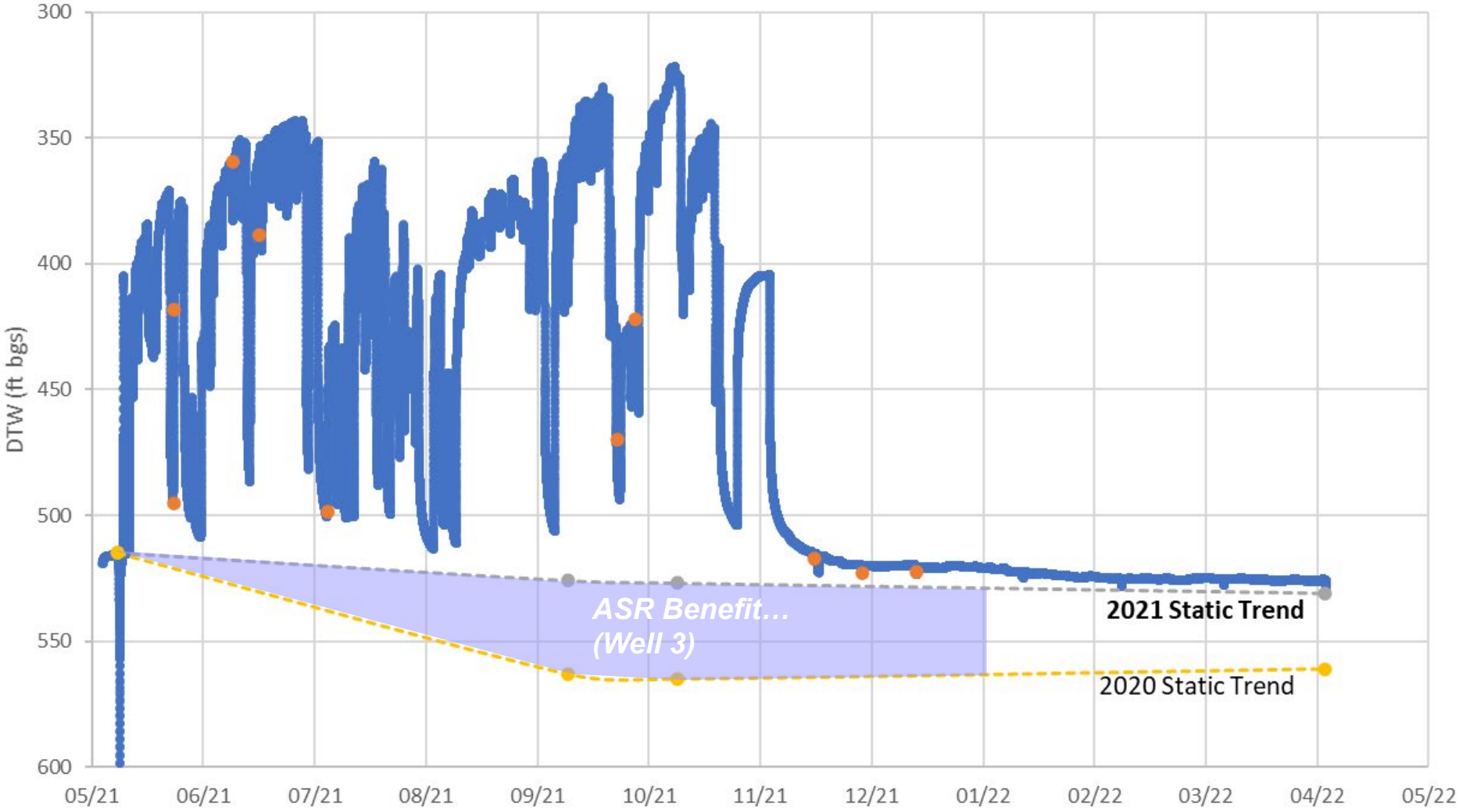
Organic Debris

Pre-Treatment Strainer

Test Results

- Recharge: May 11 to Oct 21 *(163 days)*
- 141 days of Recharge
- Average Rate: 493 gpm
- Max Daily Rate: 674 gpm
- **Total Recharge: 330 acre-feet**

Summer Water Level Trends



- **78% Reduction in Declining Trend** in 2021

Water Quality

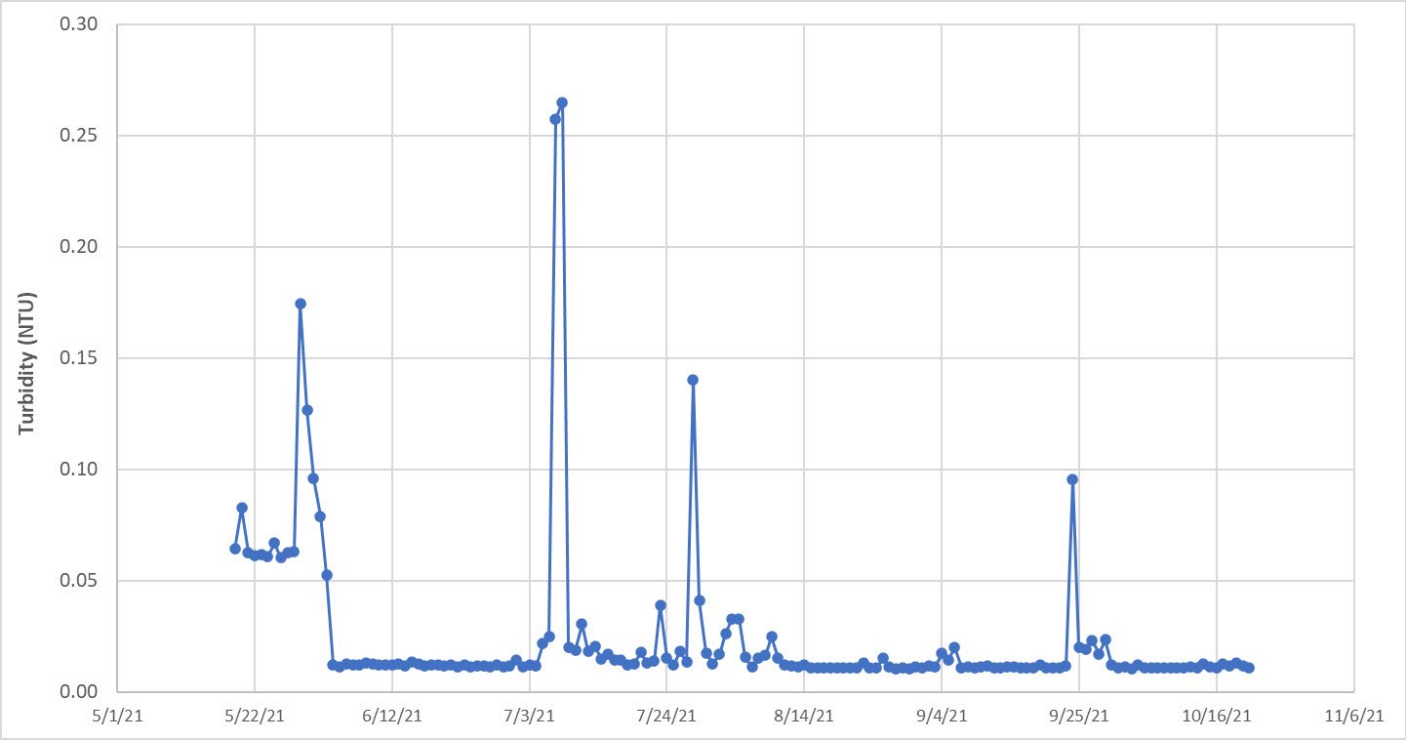
- No SVOCs ever detected in EL-68 source water or background
- Source Water Generally Better Quality than Groundwater
  - Lower TDS and Temperature
- Treatment System Met All Performance Criteria
  - Bacteria Filtered
- Successful Coordination with ECBID on Weed Control
- Spike in Al, Fe, Mn, Pb, Cu During Storage

Filtration Performance

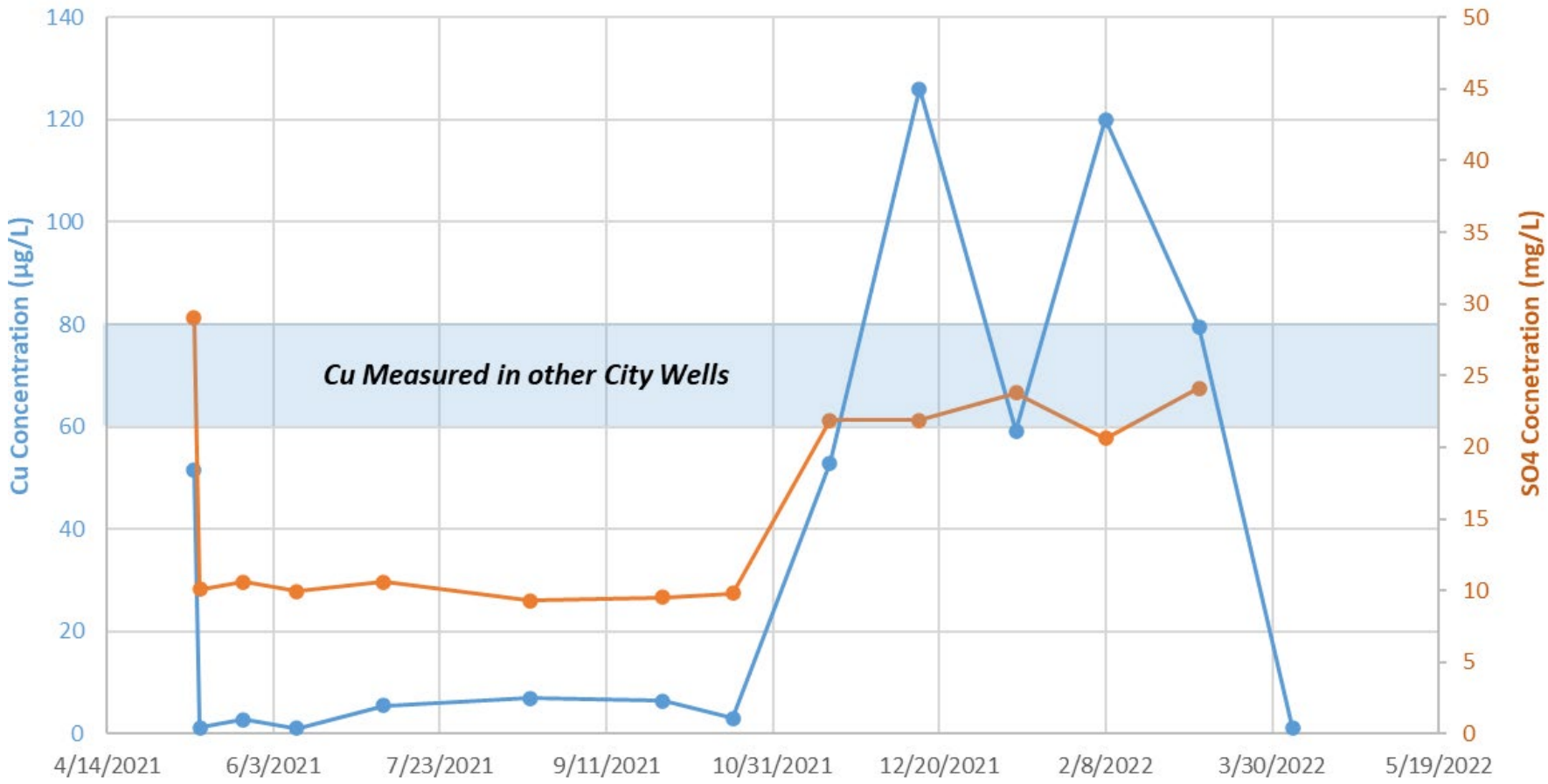
Analysis	Result	Flag
2105210-01: Raw Canal Water (Potable)		
E. Coli	Present	U
Total Coliform	Present	U

Analysis	Result	Flag
2105218-01: Recharge (Potable)		
E. Coli	Absent	U
Total Coliform	Absent	U

- Bacteria non-detect
- Recharge water: 0.07 ntu
- 4-log reduction at 3 µm

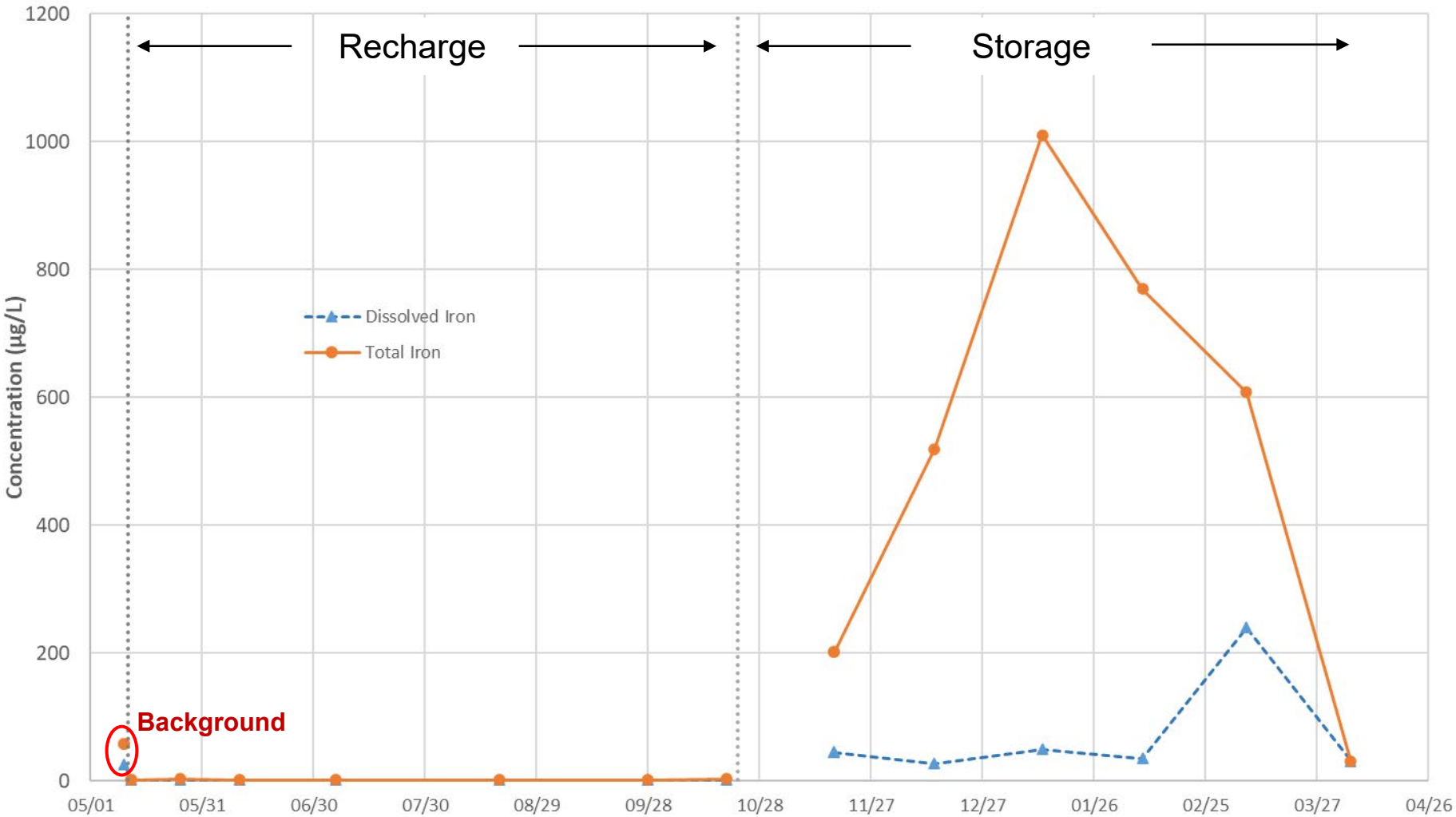


Copper Sulfate



- Modeling does not support increase in Cu

Iron



- Dissolved fraction consistent with background
- Suggests “slug” of suspended iron

Water Quality

- All Constituents below:
  - MCL/SMCL
  - Groundwater Quality Criteria
- Storage Results Still Coming In
  - Sampling next week

Next Steps

- DOH Approval for Direct Reuse *(disinfection plan)*
- Recovery (May 2022)
- Pilot Test Report
- Pursue Future Funding for Treatment

Questions?

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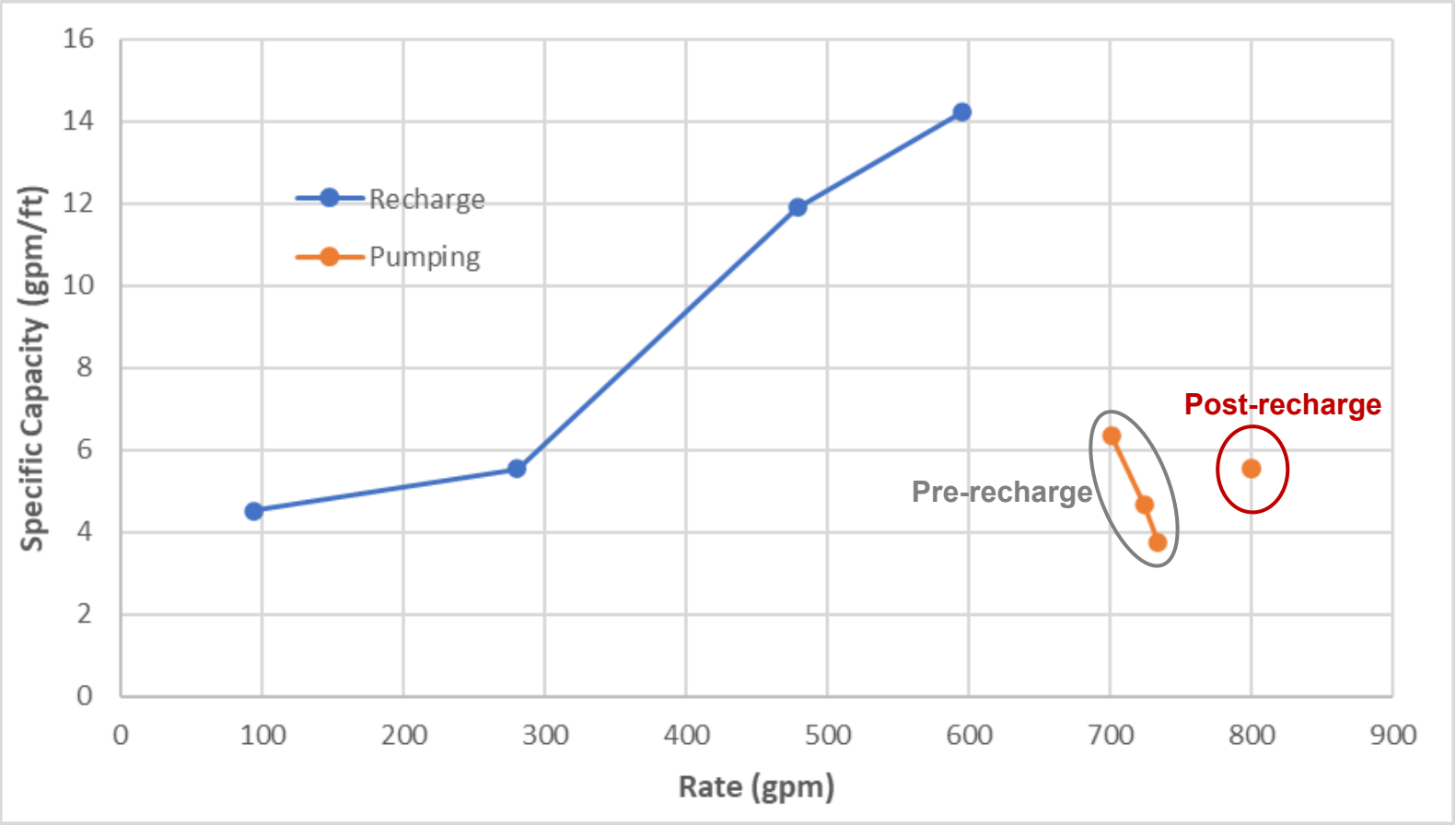
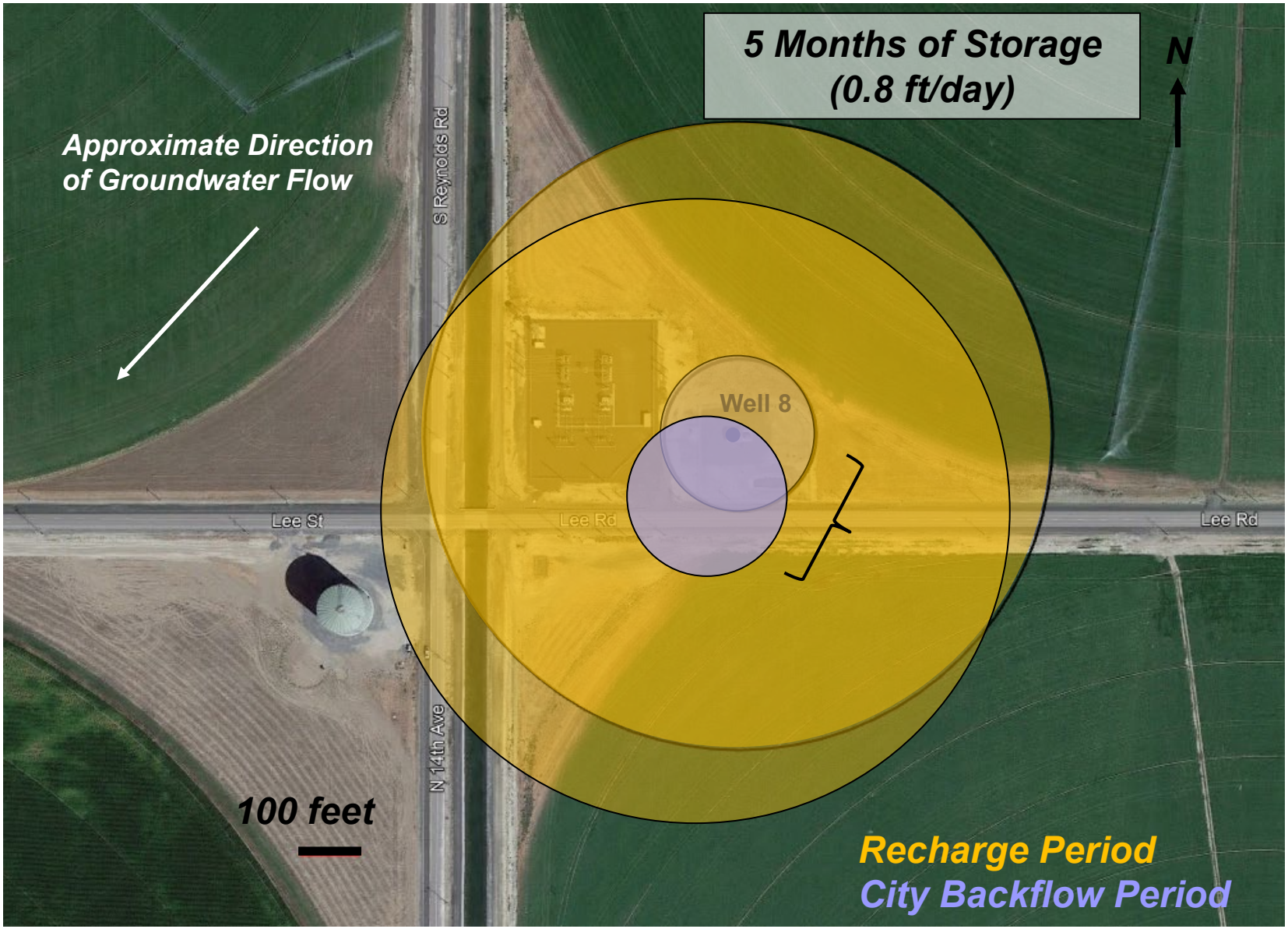
Well Performance



- Specific capacity remains slightly elevated during storage
- No indications of well fouling


5 Months of Storage
(0.8 ft/day)
N
Approximate Direction
of Groundwater Flow
S Reynolds Rd
Well 8
Lee St
Lee Rd
Lee Rd
N 14th Ave
100 feet
Recharge Period
City Backflow Period

PhreeqC Water Quality Modeling

- 2018 FS model updated
- Model predicted low to moderate dissolution of iron-oxide and manganese-oxide minerals (e.g., geothite, hematite, birnessite) and low-to-moderate precipitation of aluminum-oxide and iron-sulfide minerals (e.g., gibbsite and pyrite).
- Observed metal concentrations in stored water could not be replicated by modeling.