

**Summary of Hydrogeological Field Investigation and
Numerical Groundwater Model**
For Proposed Nordic Aquafarms Facility
Belfast, Maine

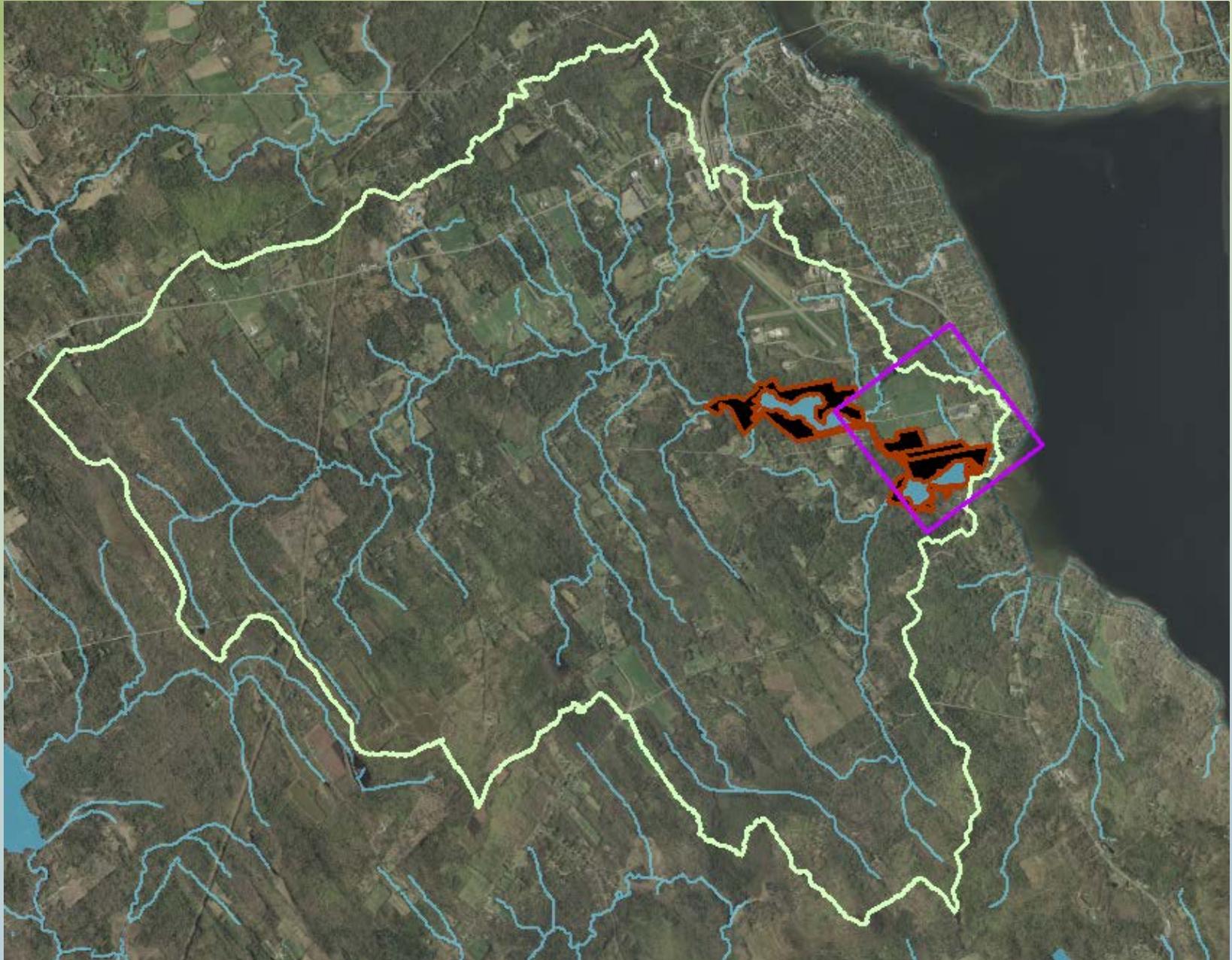
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Ransom Consulting Engineers and Scientists
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Objectives:

- Evaluate potential of site for installation of high yield bedrock wells.
 - *Goal = Total of 1,200 gallons per minute (gpm)
- Install test wells and run hydraulic tests to provide baseline data for numerical groundwater model.
- Create representative model of groundwater system.
- Use model to predict long term drawdown effects.
- Use model to optimize locations and pumping rates of future wells.

Little River Watershed



Flow Characteristics:

Drainage Basin Area = 16.7 square miles

**Mean Annual Flow Rate = 34.7 cubic feet per second⁽¹⁾
(more than 15,000 gpm)**

**Projected Need for Aquaculture Facility:
1,200 gpm is less than 8% of the mean annual flow rate.**

(1) U.S. Geological Survey, 2012, The StreamStats program for Maine



Resistivity Survey

Area 1 Line Location Map Draft

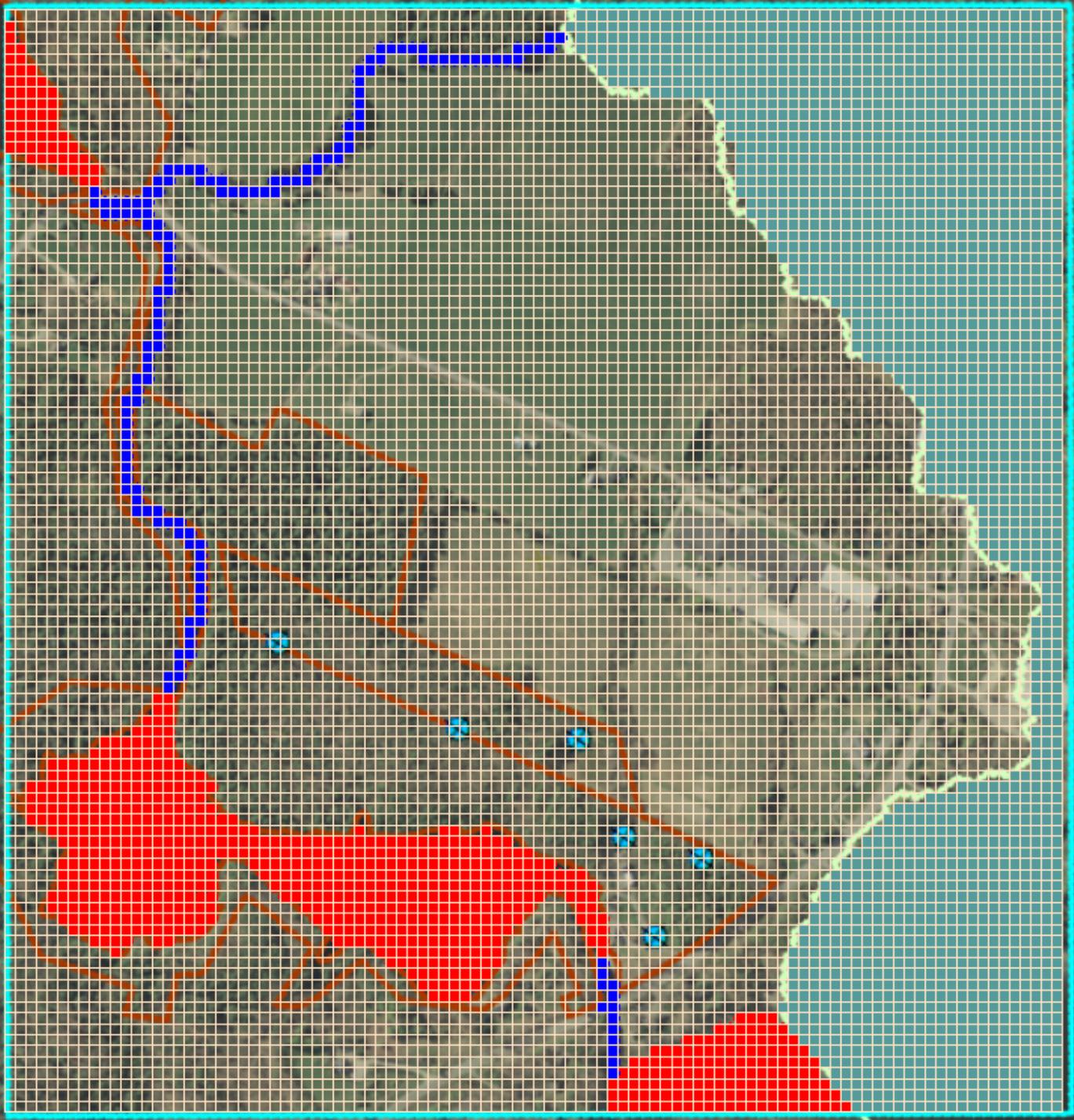


Drilling and Hydraulic Testing



Well Drilling Locations



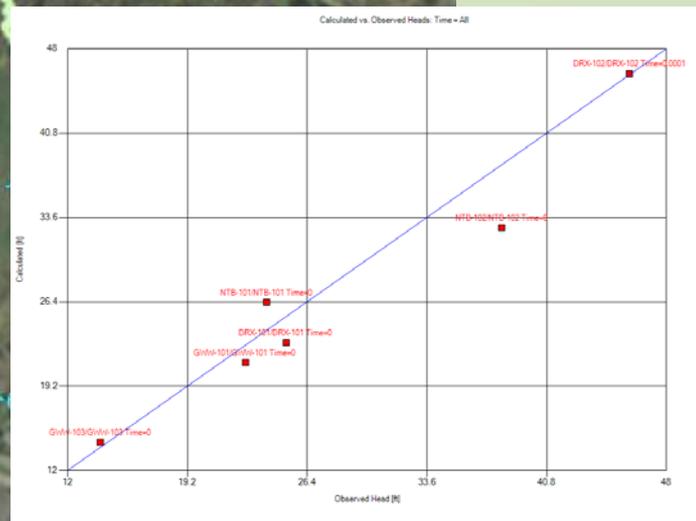


Calibrated Water Table (No Pumping)

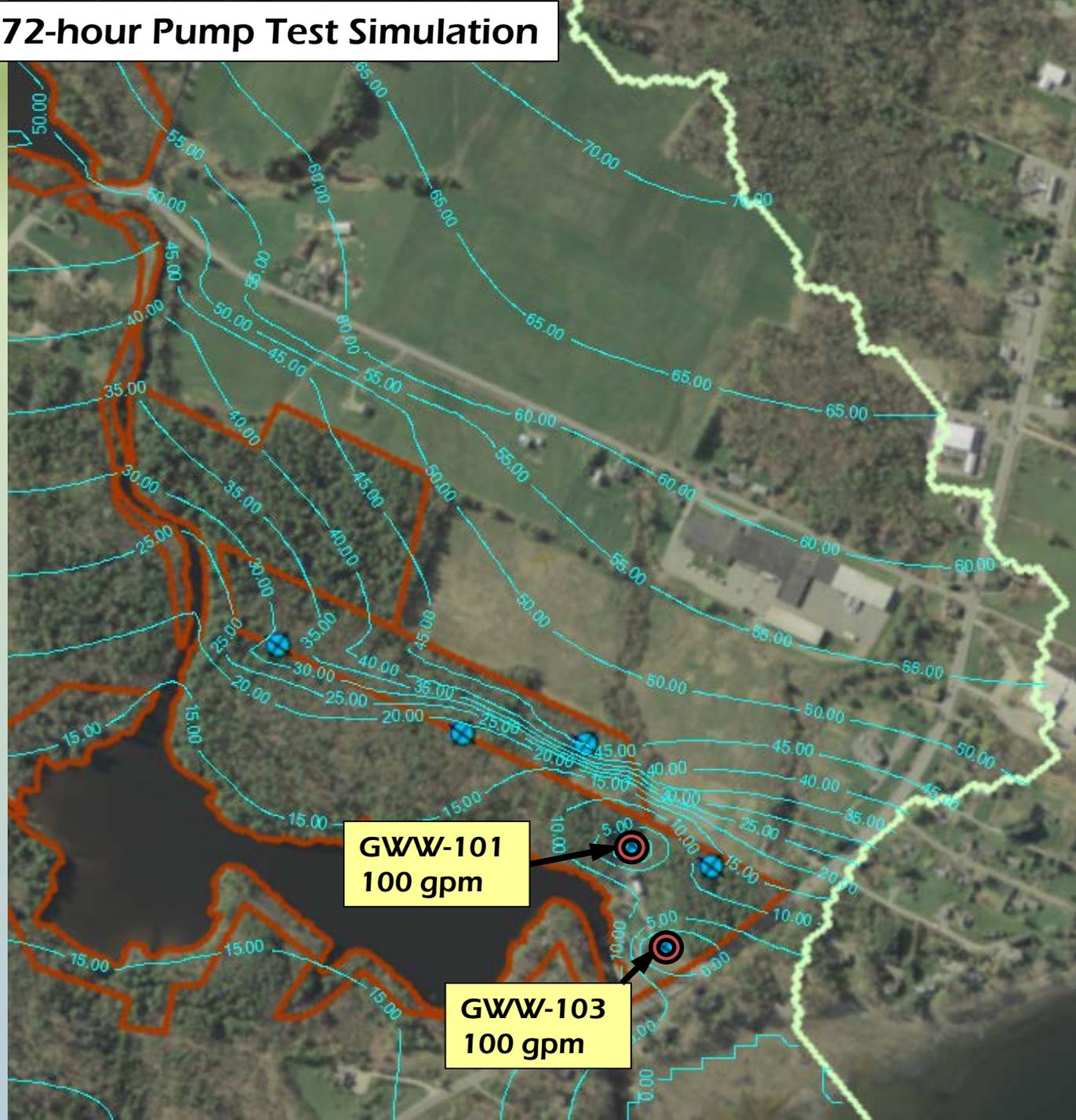
Little River

Lower Reservoir

Belfast Bay



April 2018 72-hour Pump Test Simulation

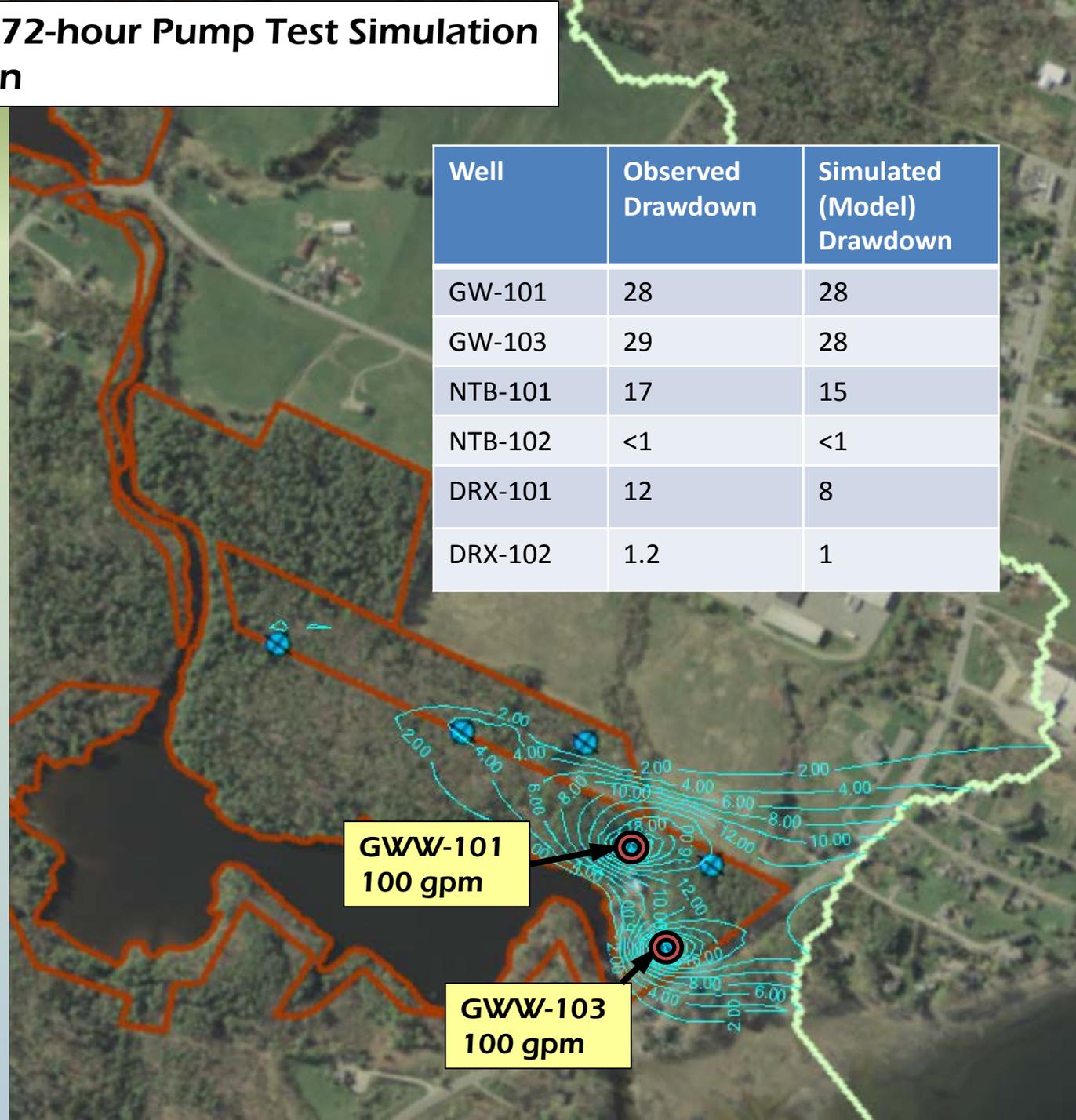


GWW-101
100 gpm

GWW-103
100 gpm

April 2018 72-hour Pump Test Simulation - Drawdown

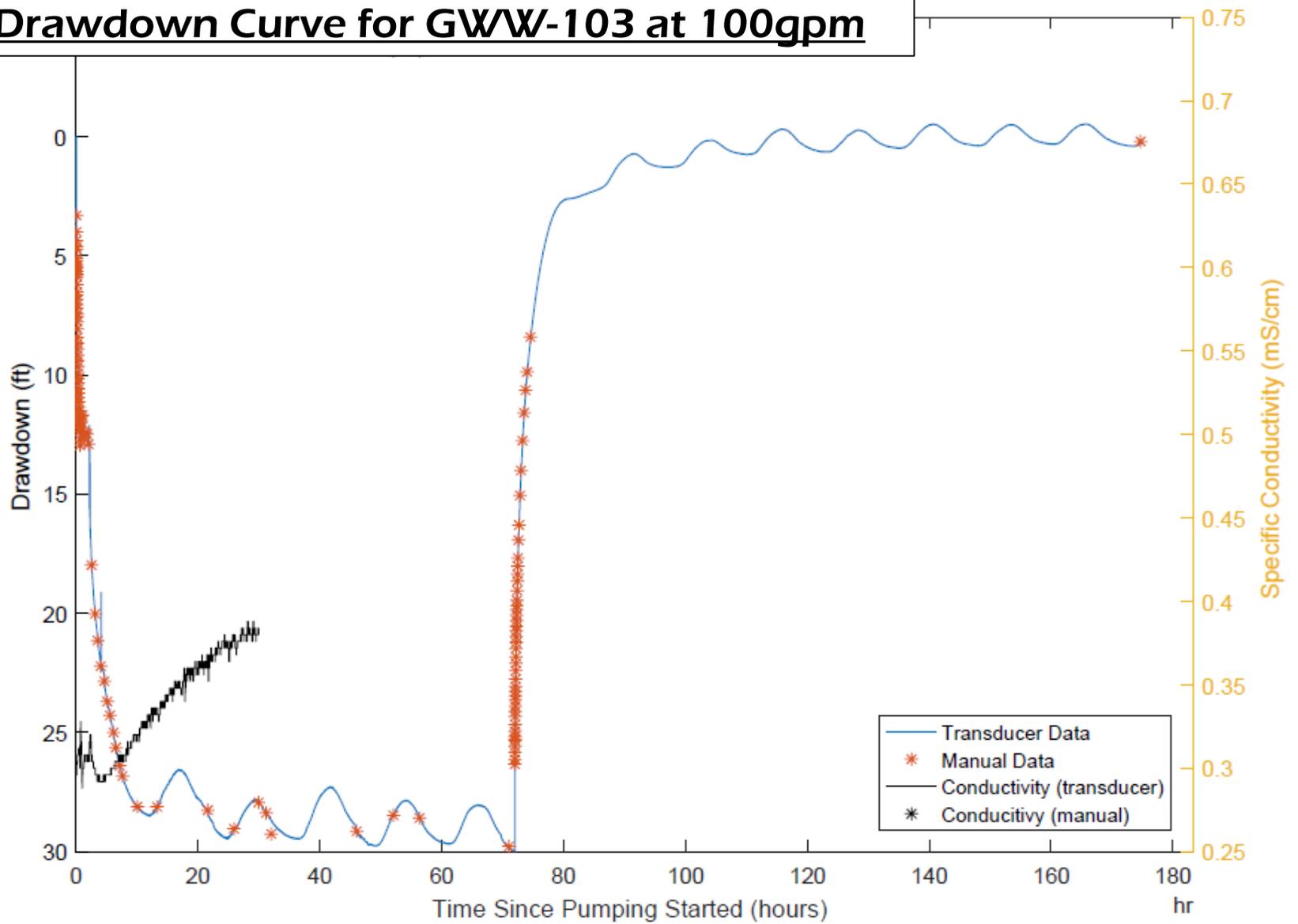
Well	Observed Drawdown	Simulated (Model) Drawdown
GW-101	28	28
GW-103	29	28
NTB-101	17	15
NTB-102	<1	<1
DRX-101	12	8
DRX-102	1.2	1



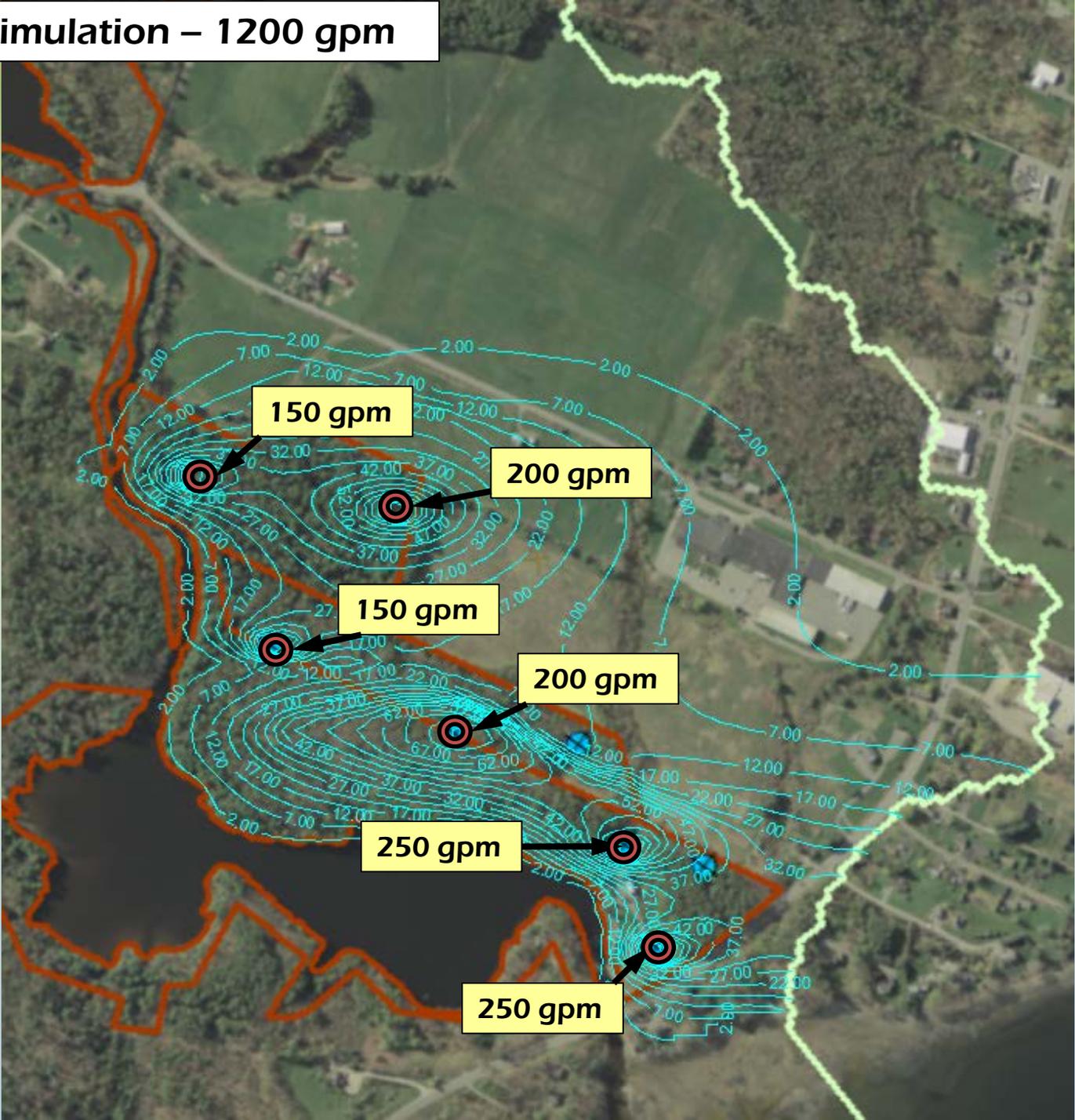
GWW-101
100 gpm

GWW-103
100 gpm

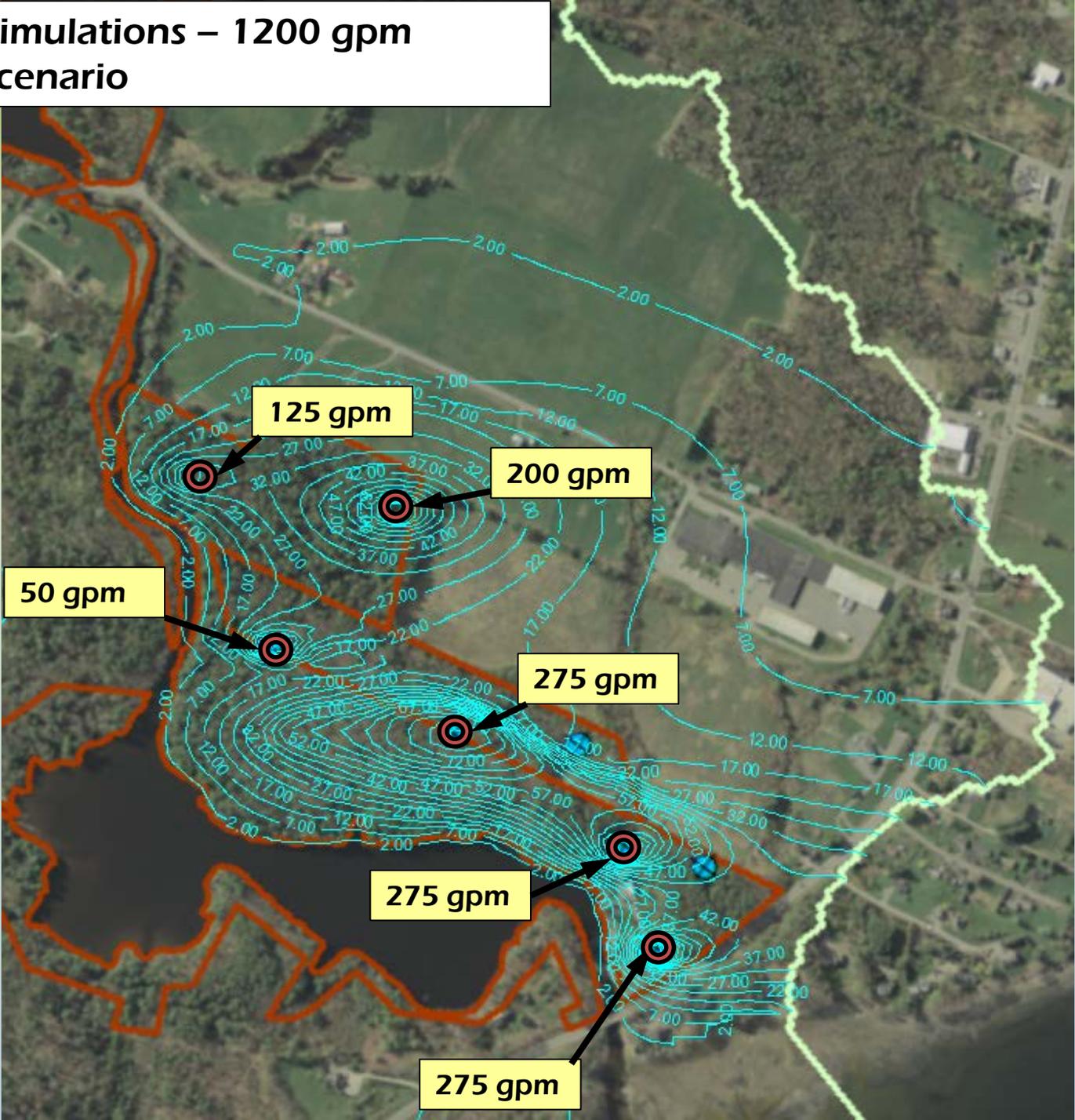
Drawdown Curve for GW/W-103 at 100gpm



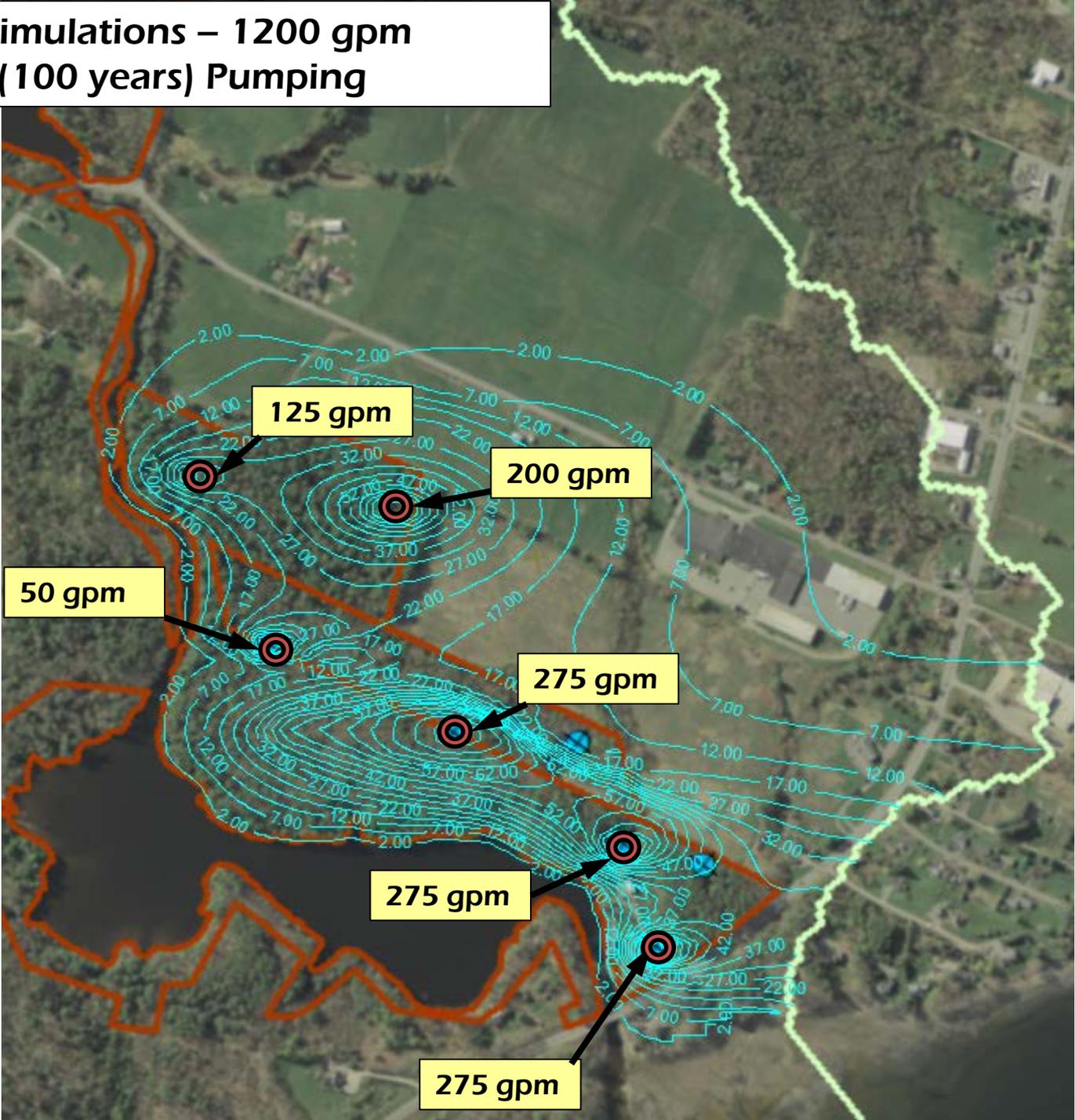
Predictive Simulation – 1200 gpm



Predictive Simulations – 1200 gpm - Drought Scenario



Predictive Simulations – 1200 gpm Long Term (100 years) Pumping



Conclusions and Recommendations:

- **Bedrock is capable of high yields (greater than 200 gpm).**
- **Wells can be installed and pumped at this site with a sustainable combined yield of 1,200+ gpm.**
- **Future wells should be of at least 8 inches in diameter, and installed to a depth of at least 500 feet below ground.**
- **Monitoring program to include measuring flow in Little River at outlet of Lower Reservoir, local streams and any private water supplies within ½ mile of site.**
- **Expect to see increasing salinity in pumping wells GWW-101 and GWW-103.**



Questions?

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