



Bob Crowell Road Model Results



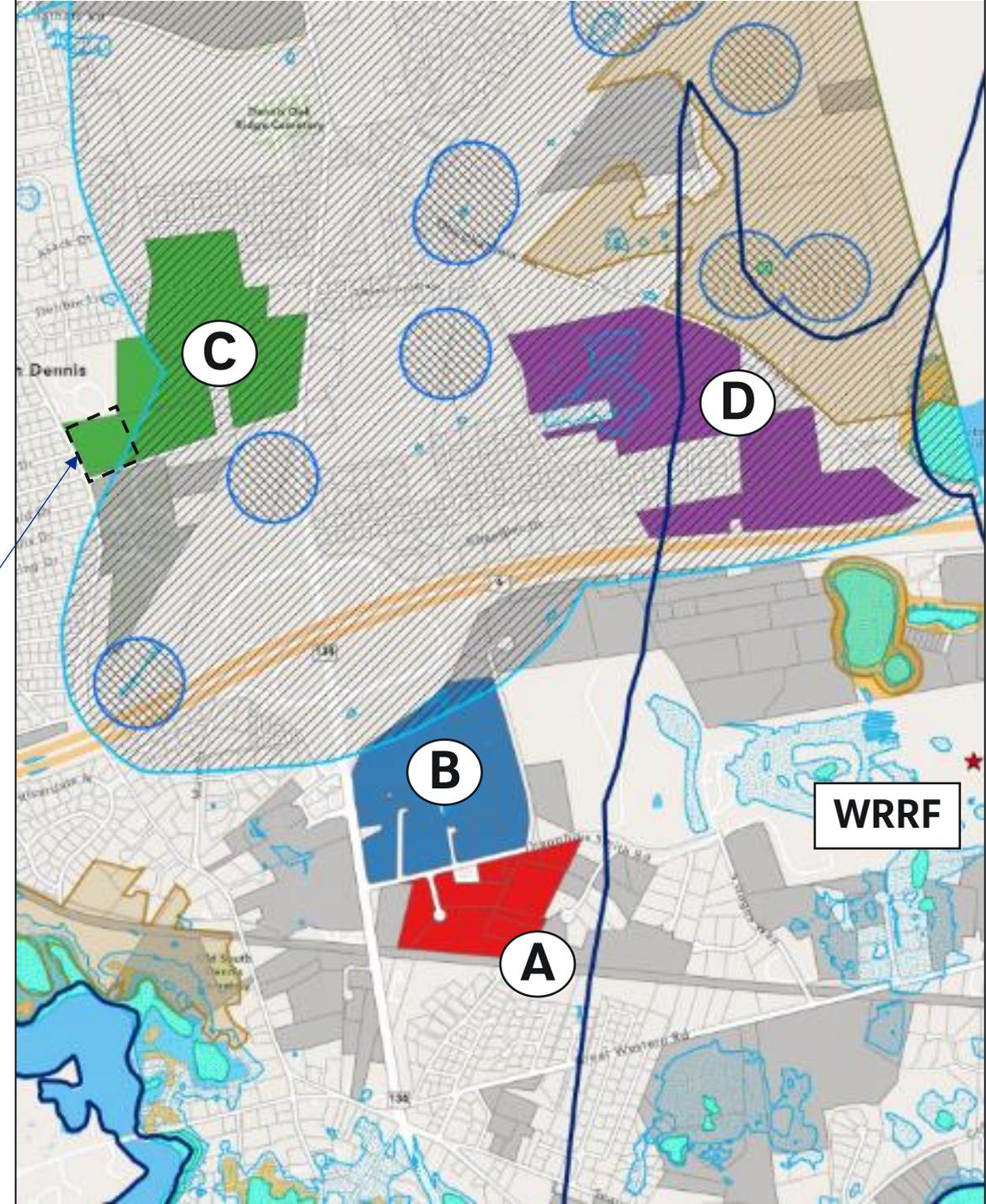
Karilyn Heisen

June 3, 2025

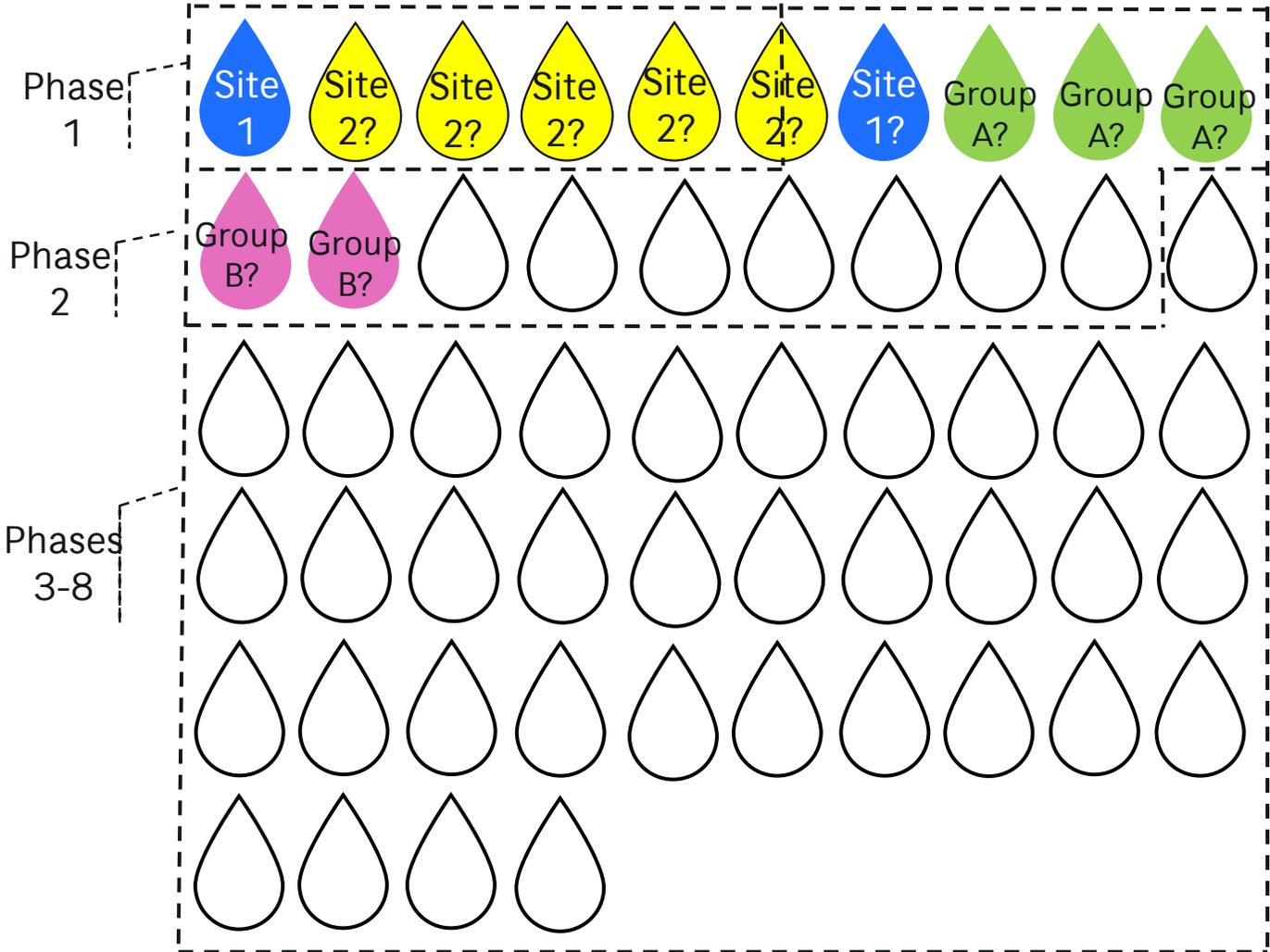


Next Steps

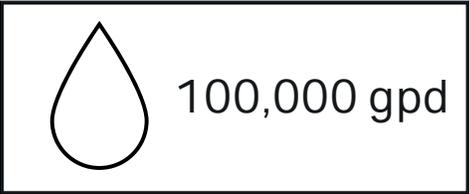
- Continue modeling coordination and aquifer management with DWD
- MassDEP NRNSA Grant coordination
- **Groups A and B:** Town to pursue discussions with private landowners
- **Group C:**
 - Follow up with MassDEP on open application for Hydrogeologic Evaluation Report approval for portion of Group C (Site 2 - dashed area)
 - Design recharge site and submit groundwater discharge permit application with MassDEP
- **Group D:** Defer



Next Steps: Finding Recharge Sites for Remaining Phases

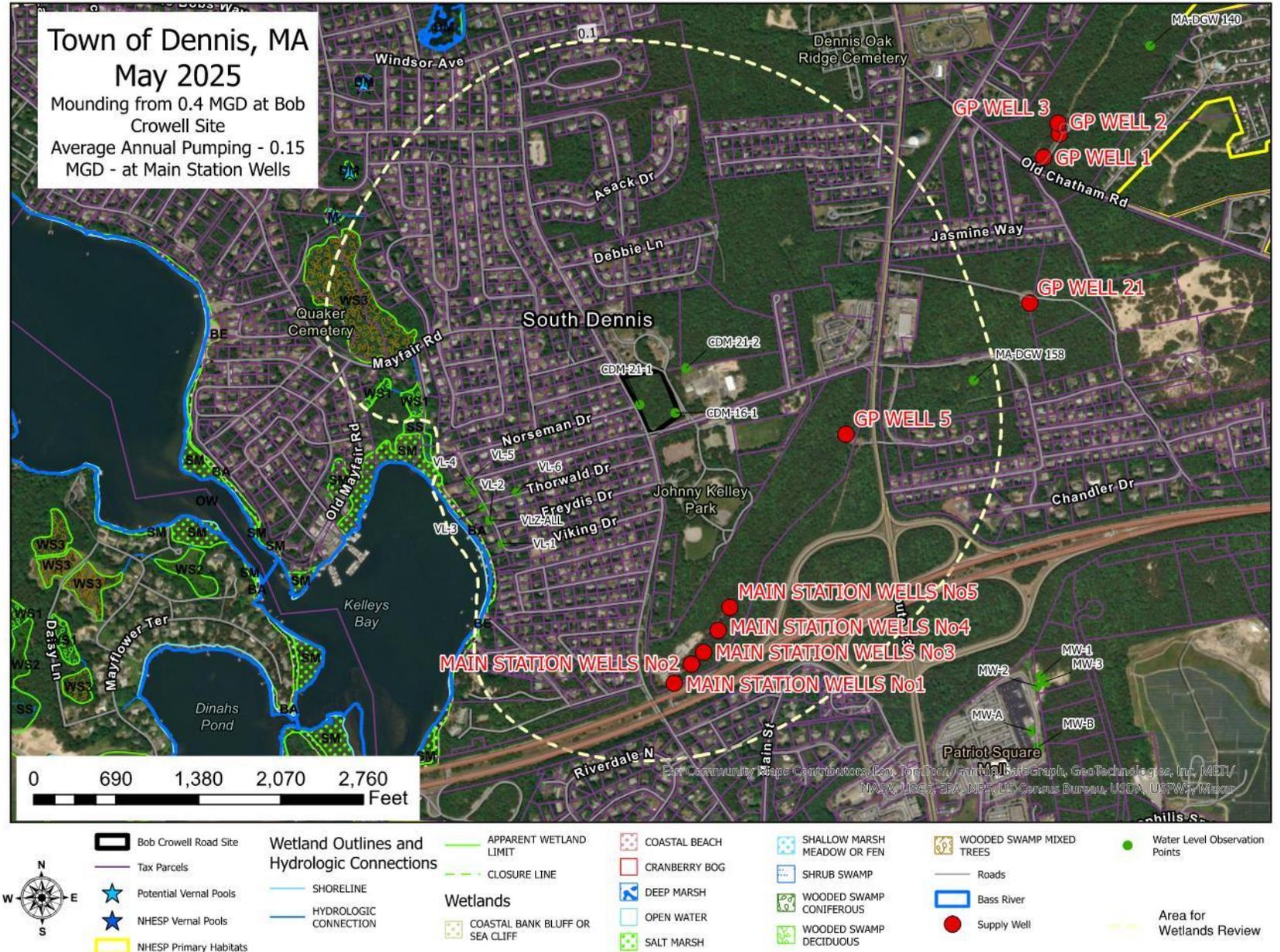


- Schedule:**
- Phase 1: 2023-2027
 - Phase 2: 2028-2032
 - Phase 3: 2033-2037
 - Phase 4: 2038-2042
 - Phase 5: 2043-2047
 - Phase 6: 2048-2052
 - Phase 7: 2053-2057
 - Phase 8: 2058-2062



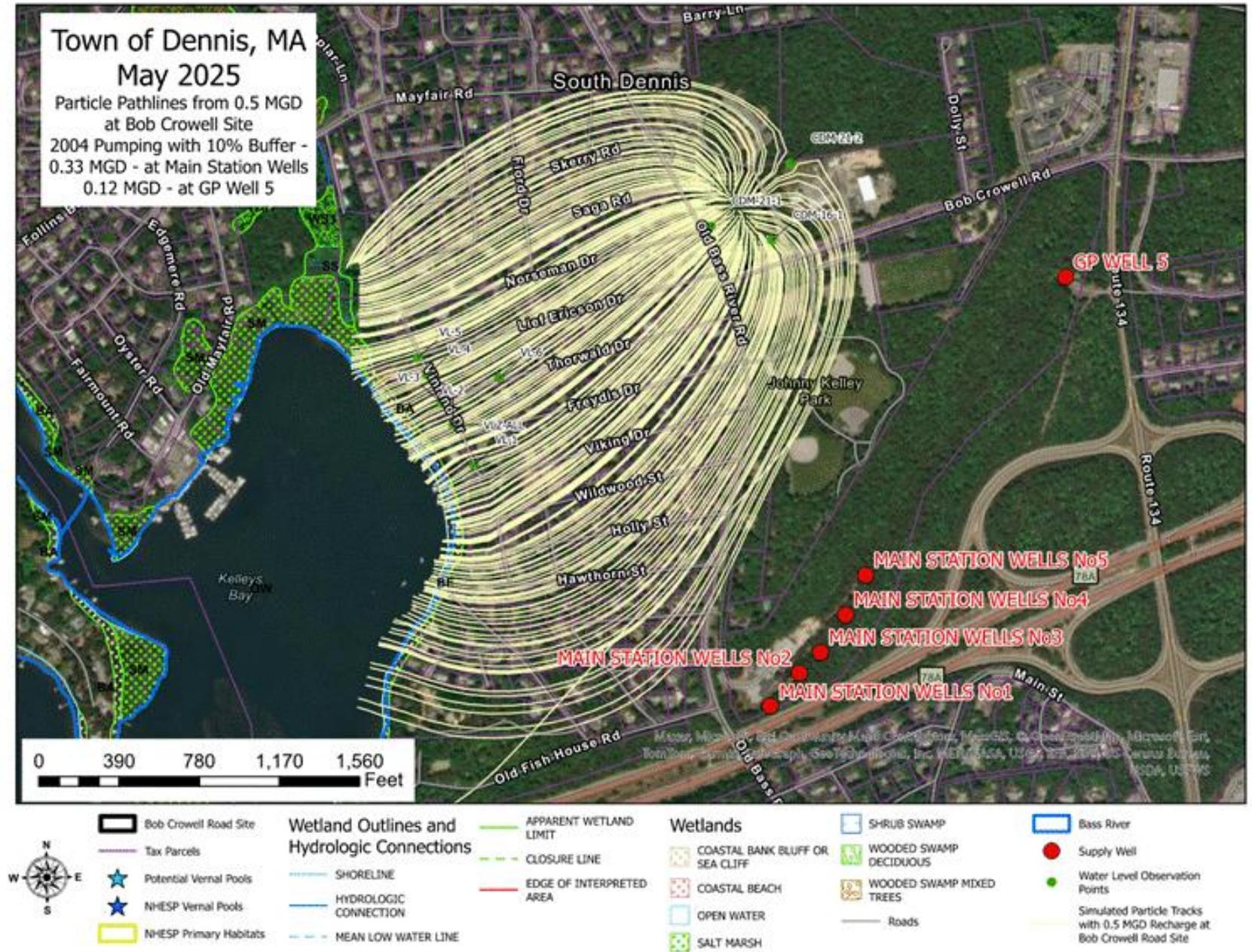
Wetland Review Area

- Defined by MassDEP as mounding > 0.1 foot from 80% of recharge after 90 days
- Site walk with MassDEP found no potential for likely adverse impacts



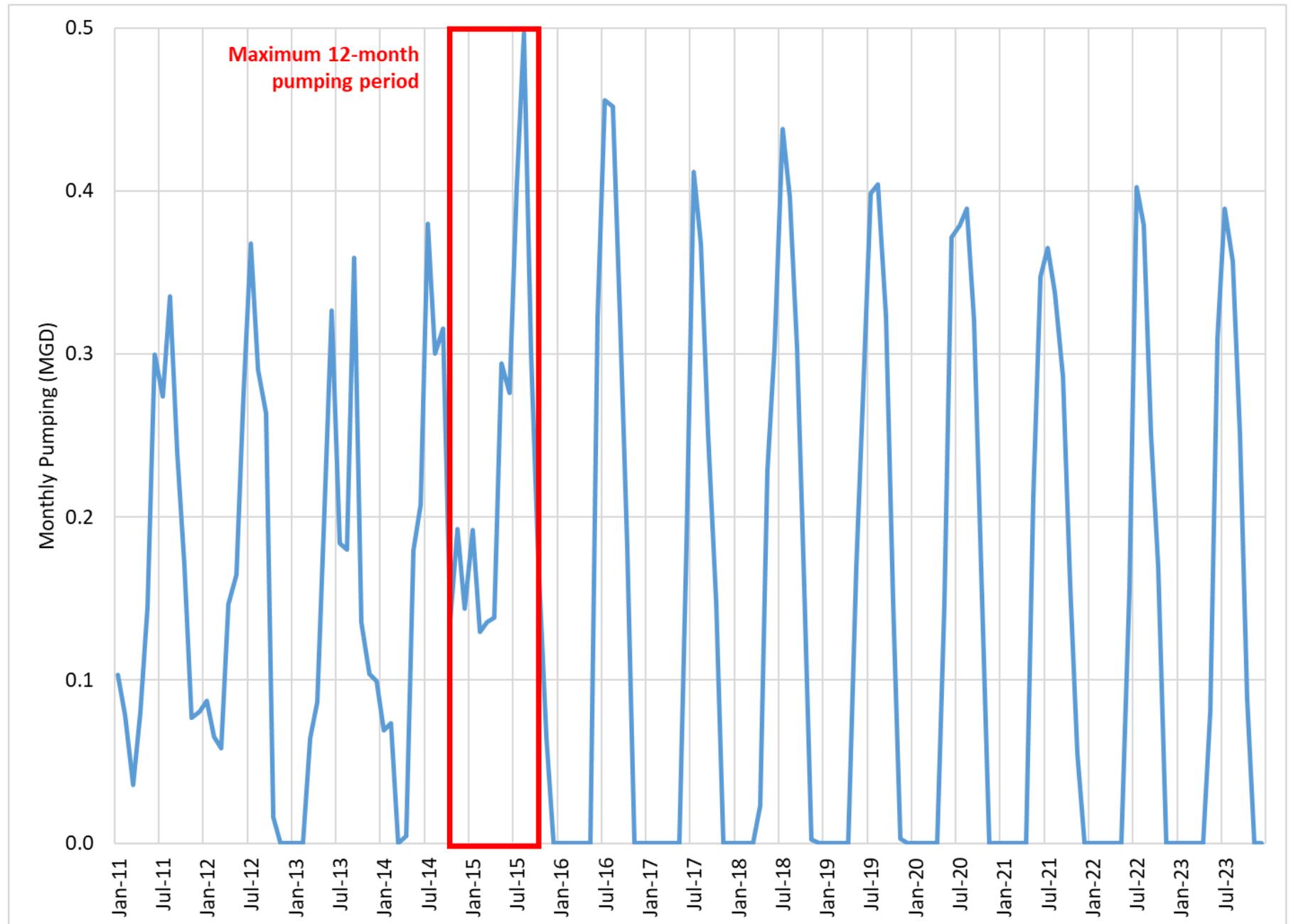
DWD Requested Run

- 2004 Pumping at Main Station Wellfield + 10% buffer (0.33 MGD)
- 2004 Pumping at Well 5 + 10% buffer (0.12 MGD)
- Average annual pumping at all other DWD wells
- Maximum recharge rate at proposed site (0.5 MGD)
- Particles not captured by public water supply wells
- Particle tracks show discharge to Kelleys Bay (Bass River)



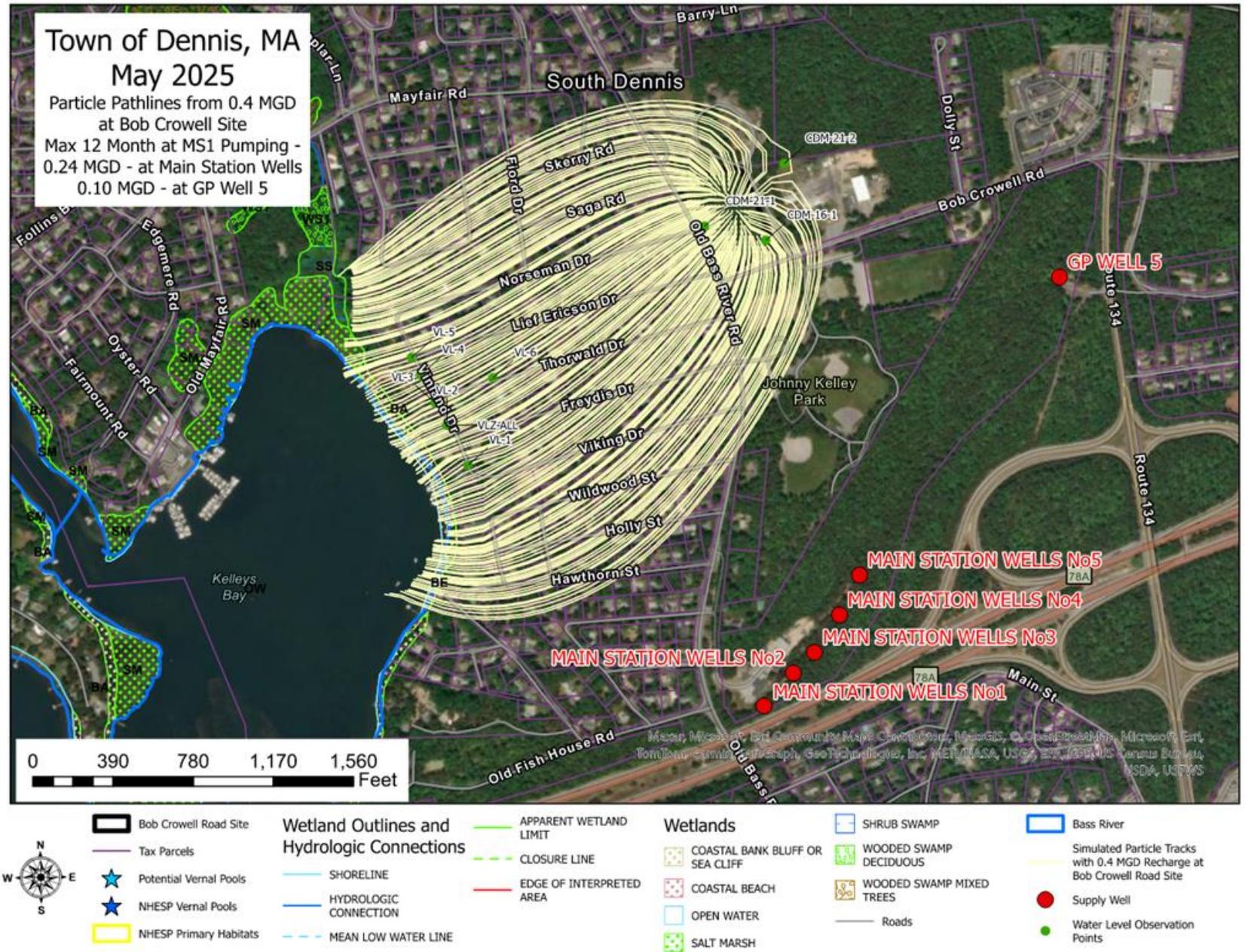
Main Station Wellfield Monthly Pumping

- Data provided by DWD from 2011 through 2023
- Maximum permitted average annual pumping = 0.58 MGD
- Maximum 12-month period = 0.24 MGD
- Maximum month = 0.50 MGD
- 2004 Pumping at Main Station Wellfield + 10% buffer = 0.33 MGD



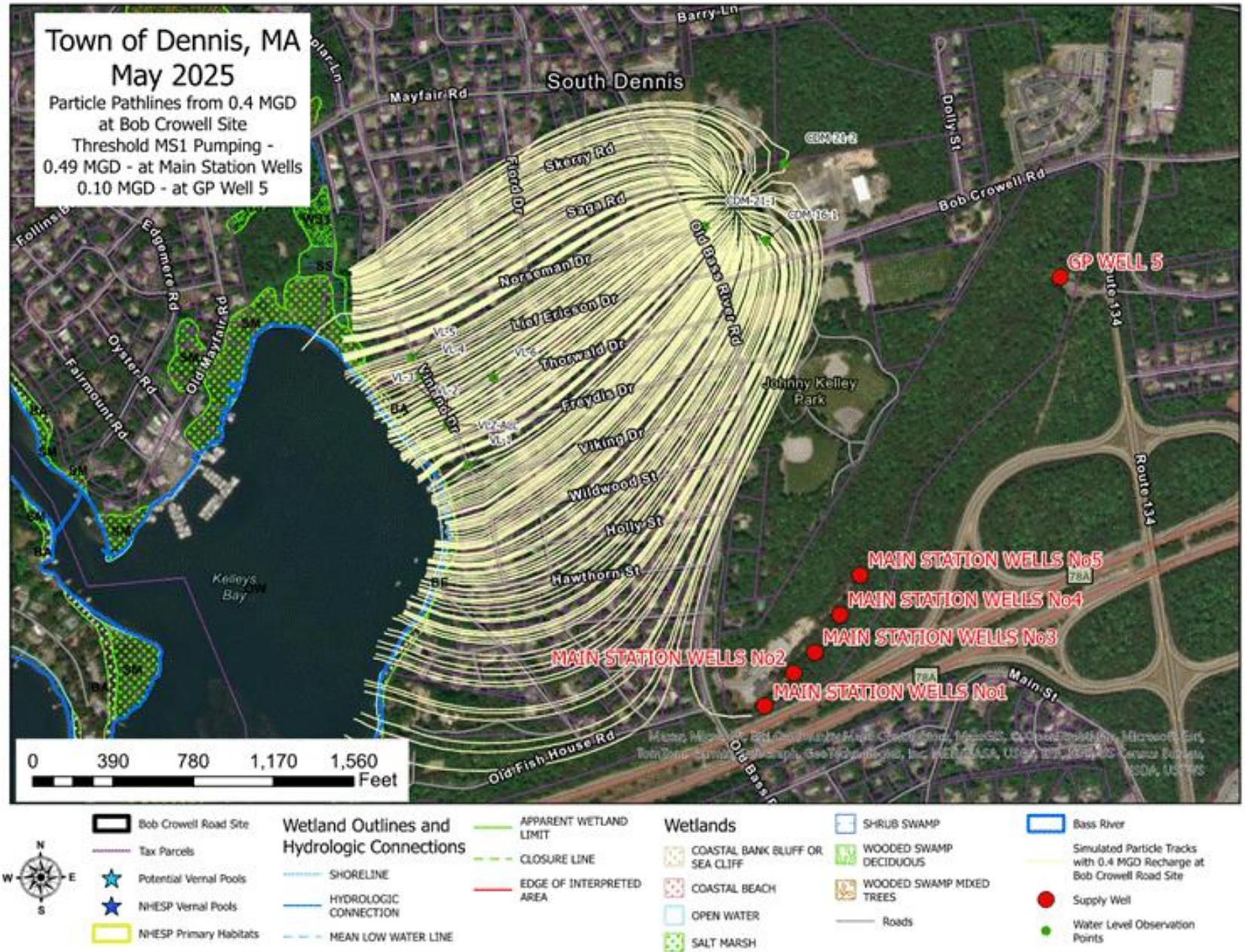
Conservative pumping conditions

- Based on monthly pumping data provided by DWD from 2011 through 2023
- Maximum 12-month period = 0.24 MGD
- Particle tracks show discharge to Kelleys Bay (Bass River)



What simulated conditions show a potential impact?

- Pumping rate for 1 particle to reach Main Station Wellfield = 0.49 MGD
- 99.5% of particles discharge to Kelleys Bay
- Time of travel to Main Station Well = 3.4 years
 - Well must be pumped for 0.49 MGD for over 3 years
- Maximum month pumping at Main Station Wellfield between 2011 and 2023 = 0.5 MGD



Groundwater Monitoring Plan

Coordinate with DWD

- Determine sentinel well locations and screened intervals
- Determine sample frequency and water quality analysis

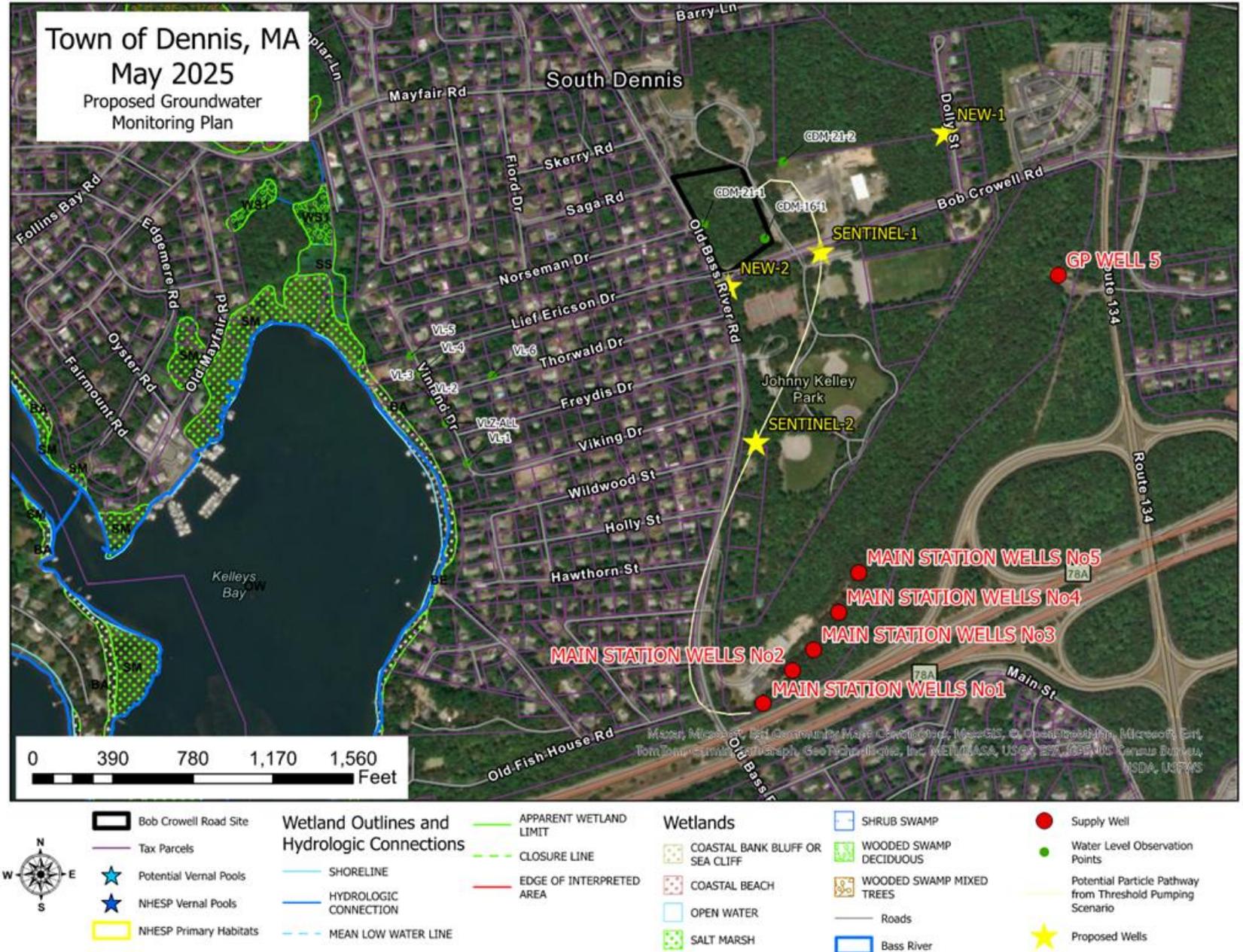
Water Levels (Monthly)

Water Quality Samples (Quarterly)

- Specific Conductance
- pH
- Nitrate-Nitrogen (NO3)
- Total Nitrogen (NO3+NO2+TKN)
- Total Phosphorus

Water Quality Samples (Annually)

- Volatile Organic Compounds



Model Simulated Scenarios

#	Description	BCR Recharge Rate (MGD)	Main Station Wellfield Pumping (MGD)	Well GP-5 Pumping (MGD)	Time of Travel to Main Station Wellfield	Percentage of Particles Captured by Main Station Wellfield
0	Baseline	0	0.15	0.10	No impact	No impact
1	Baseline + 0.4 MGD @ BCR	0.4	0.15	0.10	No impact	No impact
2	Max. 12-month at MS1	0.4	0.24	0.10	No impact	No impact
3	Threshold Main Station Wellfield	0.4	0.49	0.10	3.4 years	0.5%
4	Max. month at Main Station Wellfield	0.4	0.50	0.10	3.1 years	1.0%
Model Scenarios Requested by Dennis Water District						
DWD0	2004 Pumping	0	0.30	0.11	No impact	No impact
DWD1	2004 Q + 10% buffer	0.5	0.33	0.12	No impact	No impact

Notes:

Model simulated pumping total at all other DWD wells uses average annual pumping

No impact - All particles which originate at the Bob Crowell Road Site discharge to Kelley's Bay

Maximum permitted average annual pumping at the Main Station Wellfield = 0.58 MGD