



Dennis Effluent Recharge Site Screening

Town of Dennis, MA



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April 15, 2025





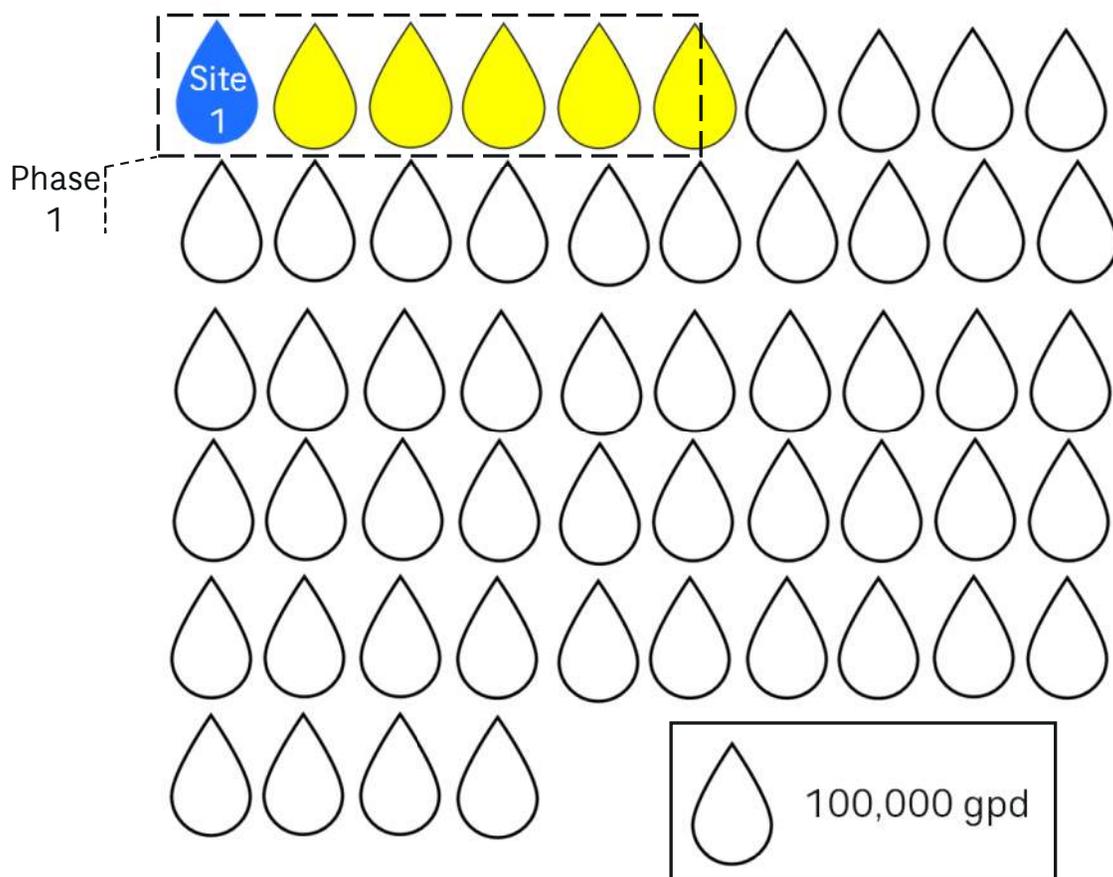
Agenda

1. Background
2. Screening overview
 - a. Site Screening Methodology and Criteria
 - b. Review Top Parcel Groups
3. Next Steps

Town of Dennis' Need for Effluent Recharge

Phase 1: 230,000 gpd Average Daily Flow → 575,000 gpd Max Day/Permit Flow

CWMP Buildout: 2,069,000 gpd Average Daily Flow → 5,360,000 gpd Max Day/Permit Flow



Next site needs to be:

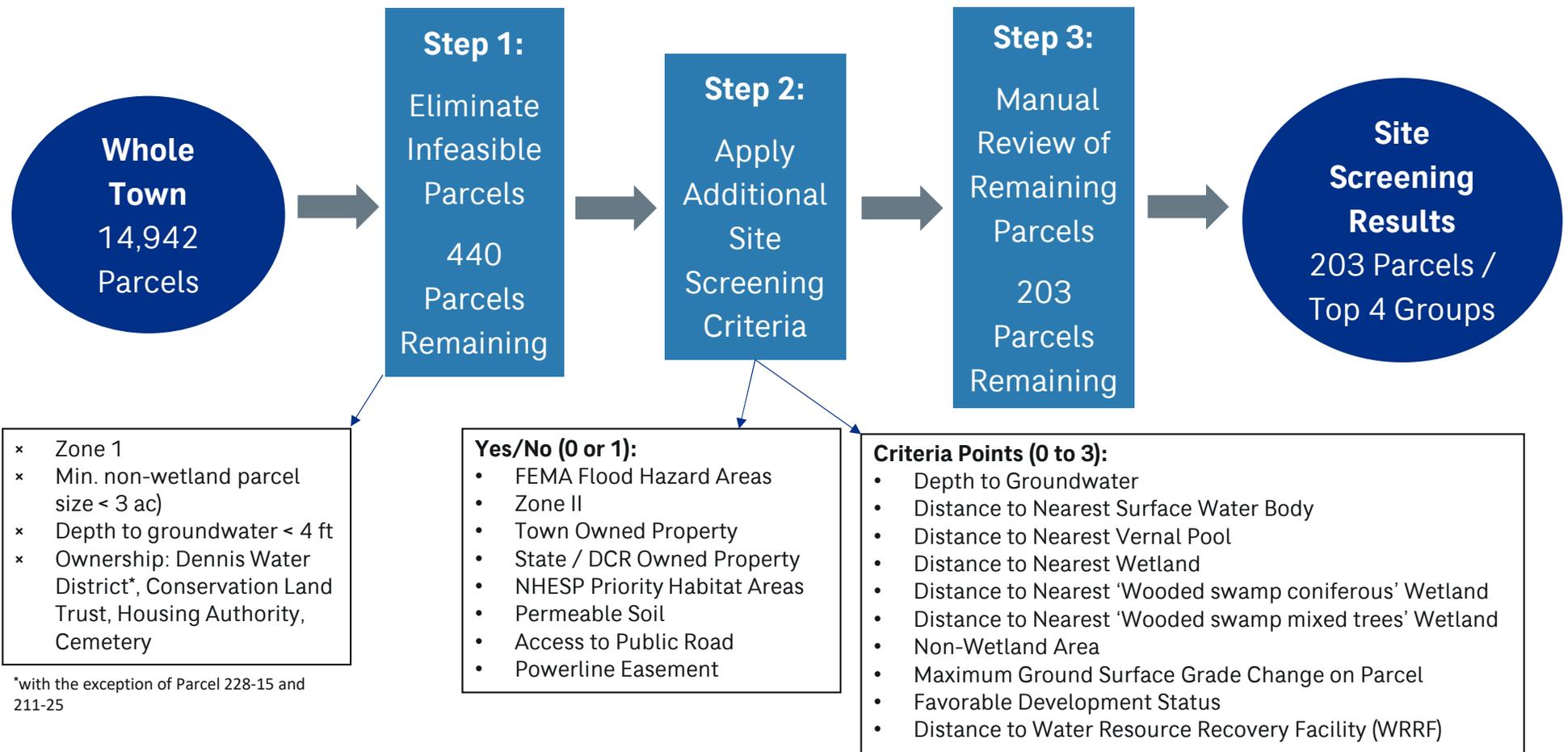
- Selected by June 30, 2025.
- Constructed by December 29, 2028 (per MassDEP).

GWDP includes conditions that require for "**additional sites to be approved and constructed by the 4th year of the first 5-year permit (2028)**, an assessment of the impacts of the approved flow of 100,000 gpd at Site 1 and an analysis of the potential for greater discharge flows at Site 1."

Strategies for More Flow:

- More sites
- Request ↑ capacity at Site 1 based on real data
- Working with MassDEP (i.e., seasonal operational conditions)
- Reuse

Overview of Site Screening Methodology



Example Application of Site Screening Criteria

- Maximum Possible Rank Sum = 38 points

Yes/No Criteria Rank Sum + Additional Criteria Rank Sum = Total Rank Sum

Rank	Yes/No Criteria (0 to 1)
+1	Parcel is outside of special flood hazard area
+1	Parcel is outside of Zone II area
+1	Parcel is owned by Town of Dennis
+1	Parcel is not owned by the State or DCR
+1	Parcel area ≥ 3 acres is outside of NHESP Priority Habitat Area
+1	Parcel does not intersect soil categories classified as 'boulder', 'silty loam', or 'muck/peat'
+1	Parcel is adjacent to a Town road
8	Maximum Yes/No Criteria Rank Sum

Rank	Additional Criteria (0 to 3)
+3	Average Depth to Groundwater is greater than 20 ft
+3	Distance to nearest surface water body is greater than 1,000 ft
+3	Distance to nearest vernal pool is greater than 1,000 ft
+3	Distance to nearest wetland is greater than 500 ft
+3	Distance to nearest 'Wooded swamp coniferous' wetland is greater than 2,000 ft
+3	Distance to nearest 'Wooded swamp mixed trees' wetland is greater than 2,000 ft
+3	Non-wetland area is greater than 10 acres
+3	Maximum ground surface change on parcel is between 0 and 10 ft
+3	100% of the parcel is undeveloped
+3	Distance to WRRF is < 1 mile
30	Maximum Additional Criteria Rank Sum

$$8 + 30 = 38$$

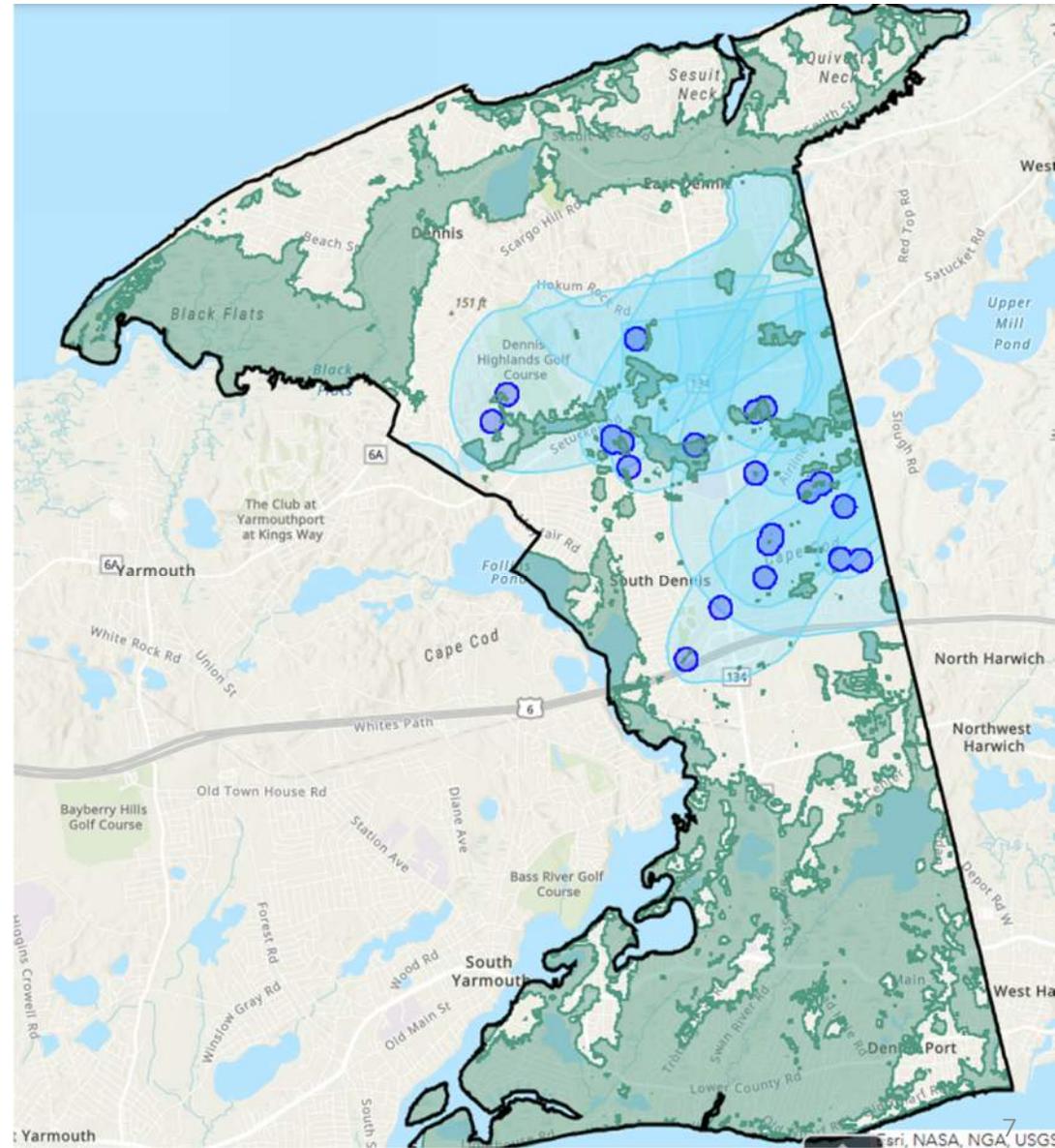


Manual Review of Remaining Parcels

Description of Workflow Change	Count of Parcels
Manually excluded due to residential land use restriction	74
Manually excluded due to Conservation Restriction in progress per Dennis Director of Natural Resources	42
Manually excluded due to adjacent area excluded during screening process	125
Manually excluded due to 2-Year Zone of Contribution from Drinking Water Wells Cross-Check	1
Manually excluded due to town feedback regarding infeasibility for recharge	102
Manually added back into analysis after town comments	52
Manually excluded due to DWD comments following meeting on 1/14/2025	8
Manually added back in due to DWD comments following meeting on 1/14/2025	1

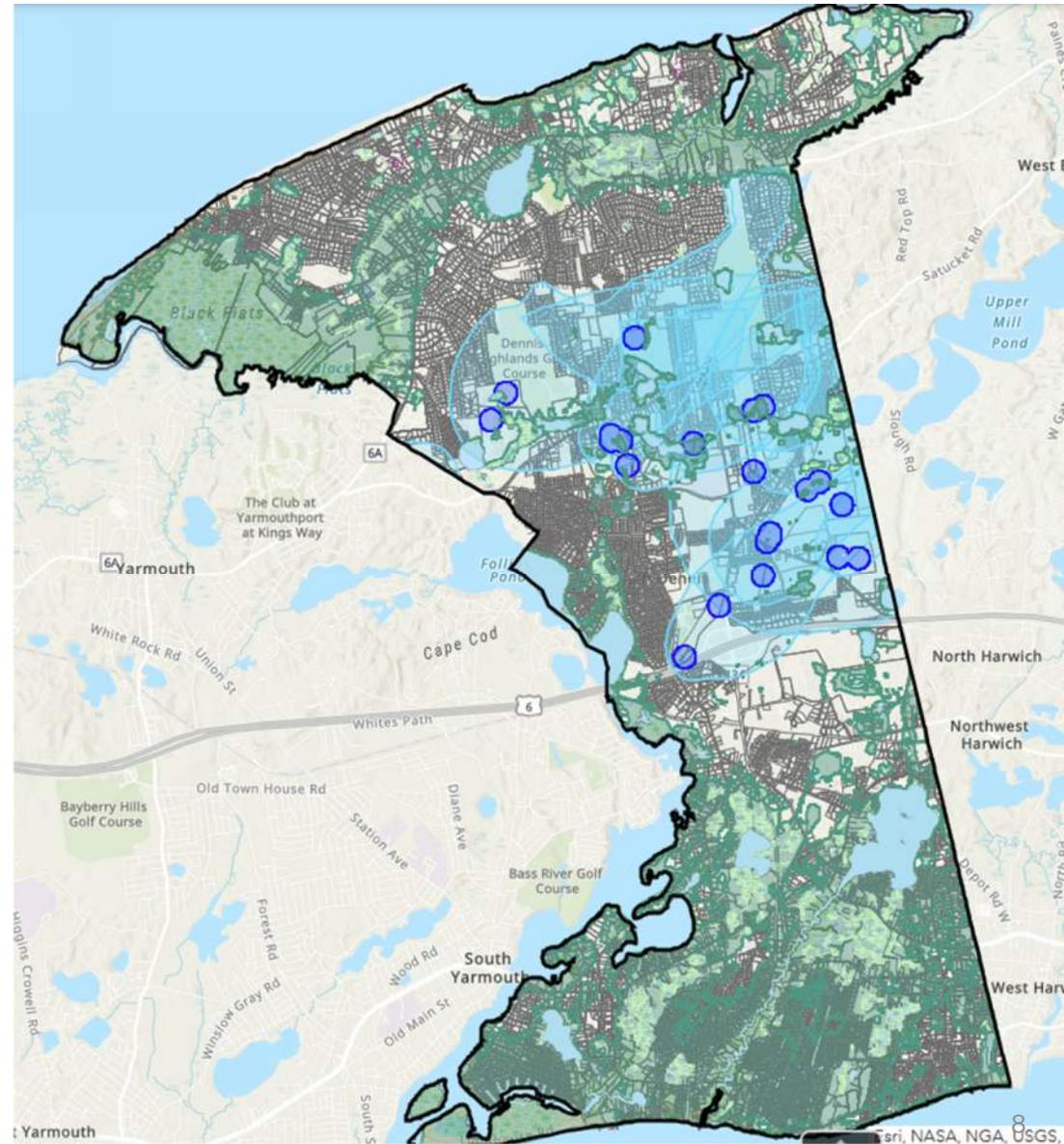
Limitations to Recharge

- Drinking Water Zones I & II
- Wetlands
- Depth to Groundwater <10 feet



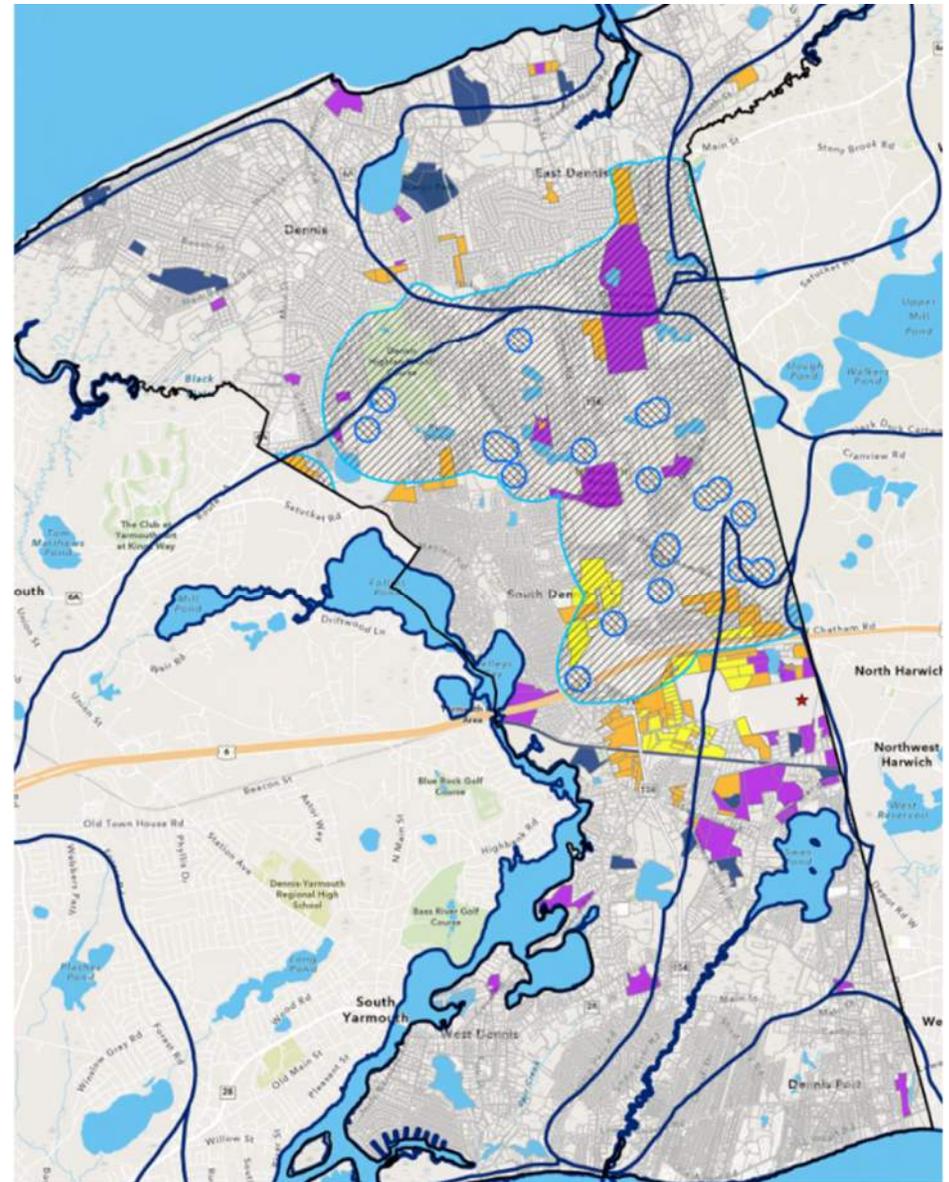
Limitations to Recharge

- Residential and other zoning restrictions

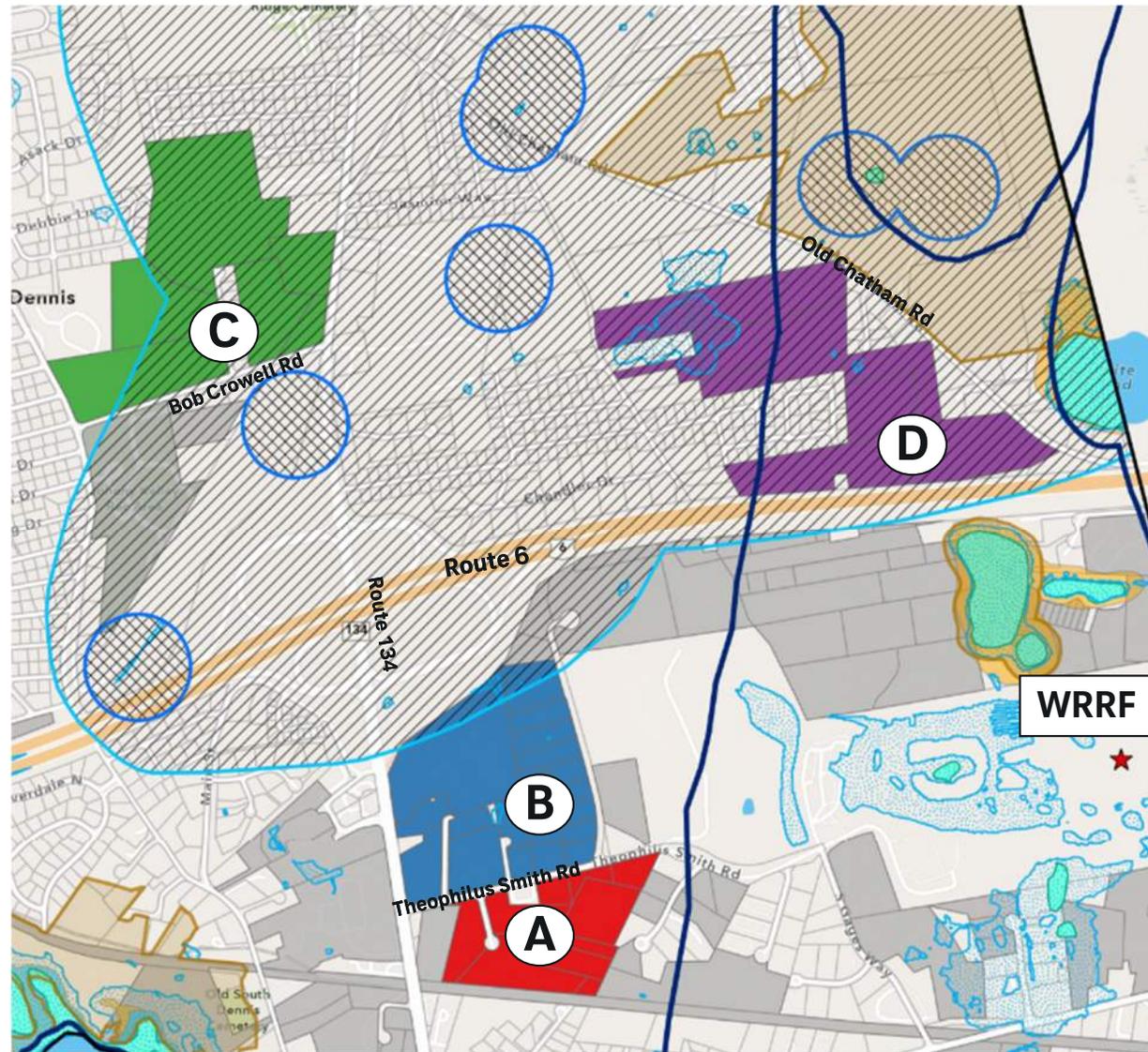


Remaining Potential Areas for Recharge

- 203 Parcels Remaining
- ~25% of remaining parcels fall within the Top Four Parcel Groups



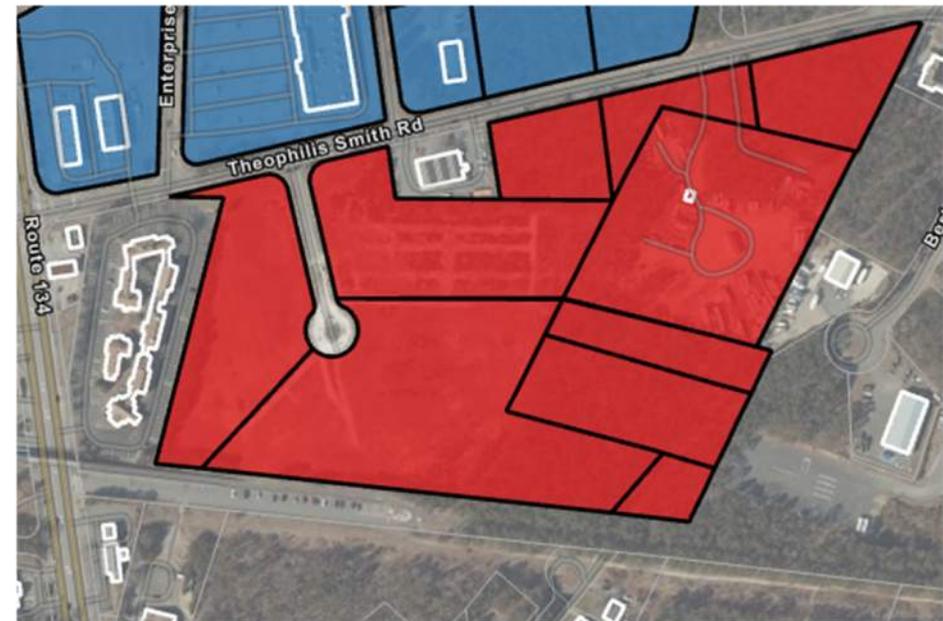
Top Four Parcel Groups



Group A - South of Theophilus Smith Road

Adjacent Parcels	10
Approximate Acreage	23.5 ac
Average Rank Sum	34.6

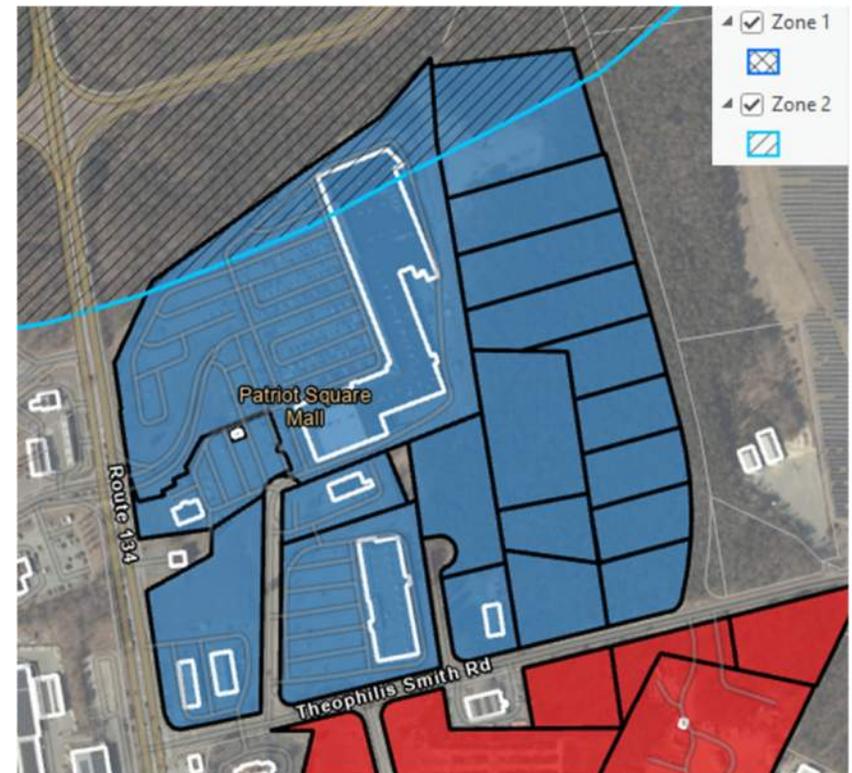
Advantages	Disadvantages
<ul style="list-style-type: none"> • <1 mile from WRRF • Bass River Watershed • Majority undeveloped • Depth to groundwater • Outside of wetlands, Zone II, flood zones and priority habitats • Additional suitable parcels located nearby • ~2 ac of Town-owned land 	<ul style="list-style-type: none"> • Potential conservation restriction on Town-owned parcel • Majority of land is privately owned • Negotiations with multiple property owners



Group B - North of Theophilus Smith Road

Adjacent Parcels	19
Approximate Acreage	46 ac
Average Rank Sum	33.5

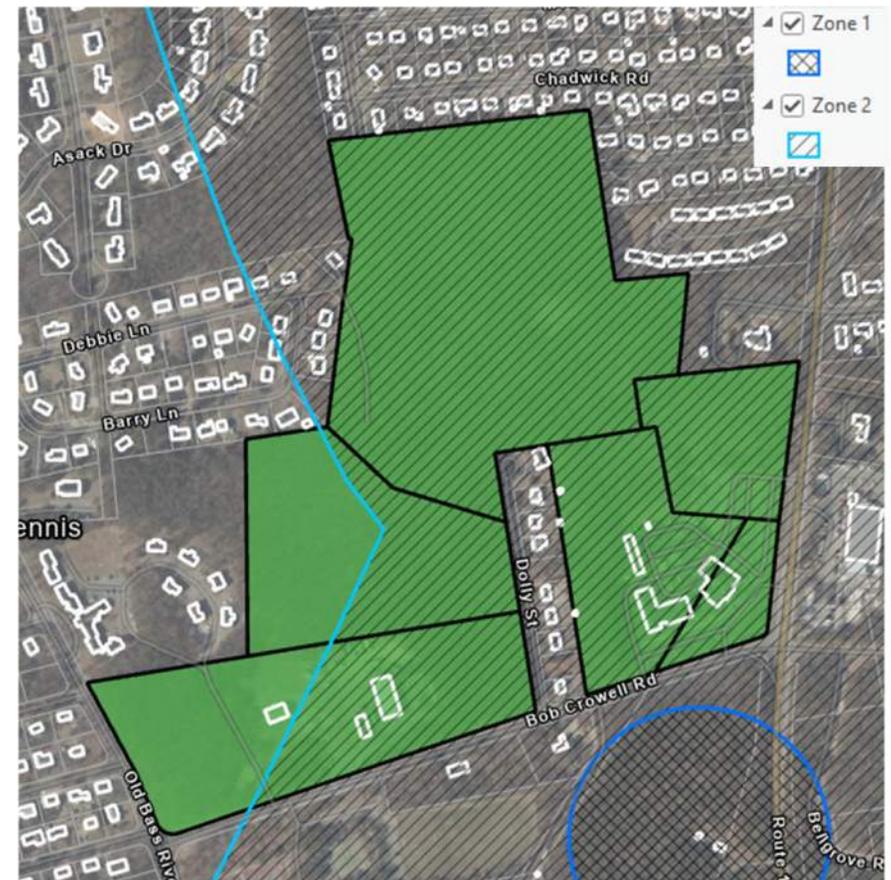
Advantages	Disadvantages
<ul style="list-style-type: none"> • < 1 mile from WRRF • Bass River Watershed • Depth to groundwater • Outside of wetlands, flood zones and priority habitats • Option for subsurface recharge below parking lots 	<ul style="list-style-type: none"> • Potential Zone II impacts • All parcels are privately owned • Negotiations with multiple property owners



Group C - Bob Crowell Road

Adjacent Parcels	6
Approximate Acreage	56 ac
Average Rank Sum	33.8

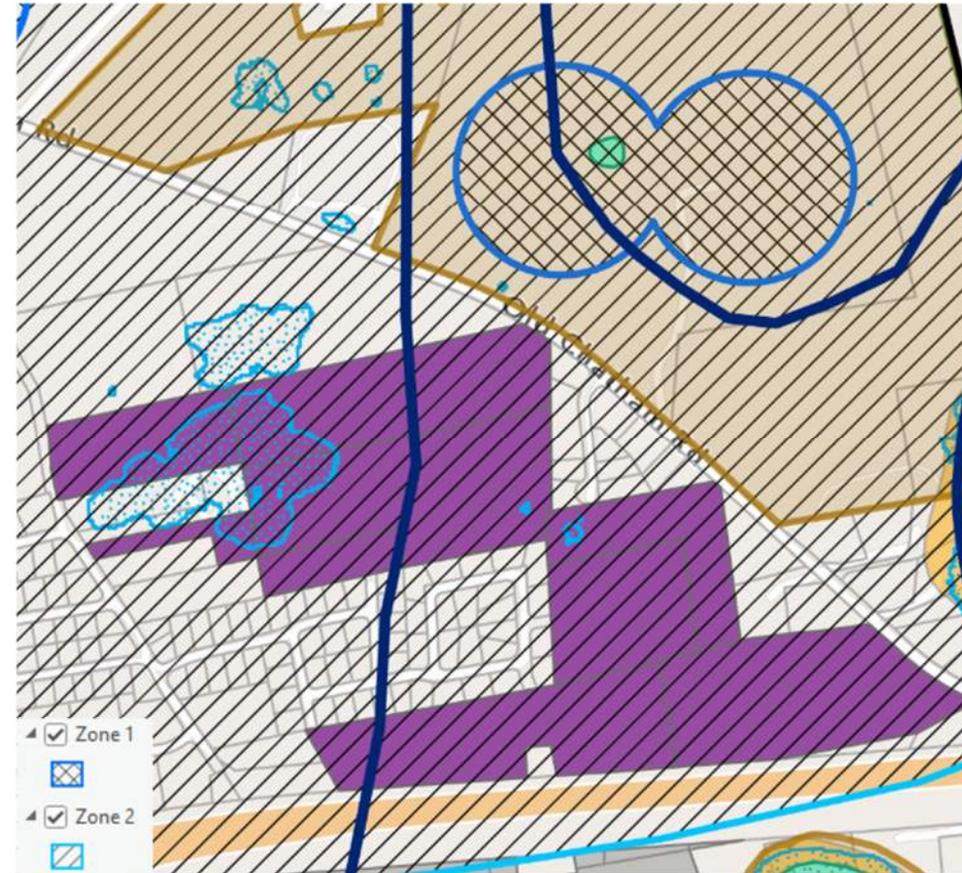
Advantages	Disadvantages
<ul style="list-style-type: none">• Bass River Watershed• Majority undeveloped• Majority of parcels are Town-owned• Depth to groundwater• Outside of wetlands, flood zones and priority habitats• Hydrogeologic Evaluation under review with MassDEP• Town has made prior financial investment in engineering studies	<ul style="list-style-type: none">• ~1.5 mile from WRRF• Potential Zone II impacts• Proximity to Zone I



Group D - Old Chatham Road

Adjacent Parcels	9
Approximate Acreage	57.5 ac
Average Rank Sum	31.4

Advantages	Disadvantages
<ul style="list-style-type: none">• ~1 mile from WRRF Location• Majority undeveloped• Outside of wetlands, flood zones and priority habitats• ~11 ac of Town-owned land	<ul style="list-style-type: none">• Potential discharge to Swan Pond Watershed• Highly likely to impact Zone II• Proximity to Zone I• Depth to groundwater• Some privately owned parcels





Aquifer Management Coordination with the Dennis Water District

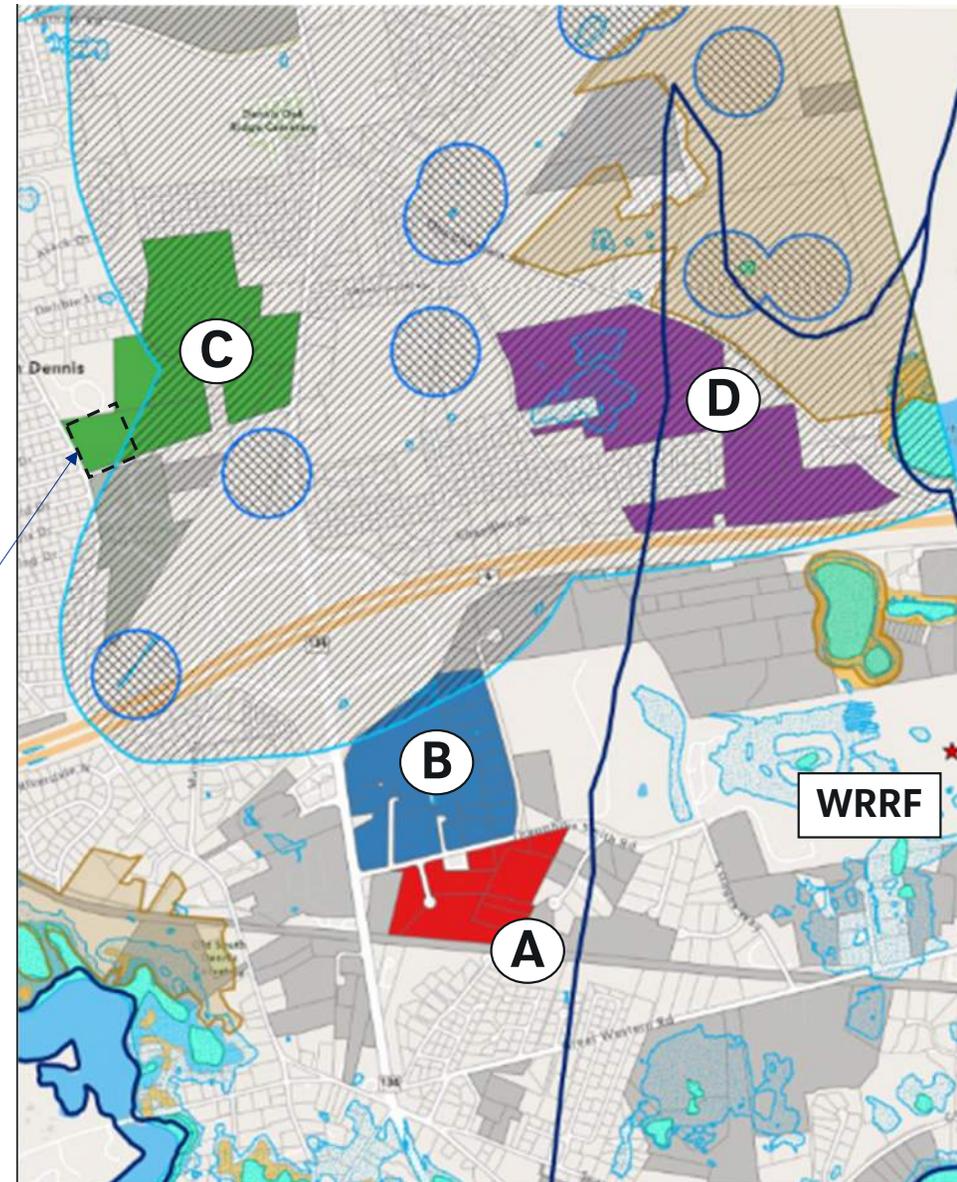
- Final Site Screening Memo incorporates DWD parcel comments. 3 parcels owned by DWD remain in the screening:
 - Parcel ID 228-15: Score of 28 out of 38
 - Low Rank for Yes/No Criteria - located in Zone II, not town property, partially located in powerline easement
 - Low Rank for Other Criteria - priority habitat area, distance to nearest surface water body, elevation change, distance to WWRF
 - Parcel ID 211-25: Score of 28 out of 38
 - Low Rank for Yes/No Criteria - located in Zone II, not town property, partially located in powerline easement
 - Low Rank for Other Criteria - priority habitat area, distance to nearest 'Wooded swamp mixed trees' Wetland, elevation change, distance to WRRF
 - Parcel ID 133-5: Score of 26 out of 38
 - Low Rank for Yes/No Criteria - not town property
 - Low Rank for Other Criteria - nearest wetland is on site (but non-wetland area > 10 ac), elevation change

Next Steps

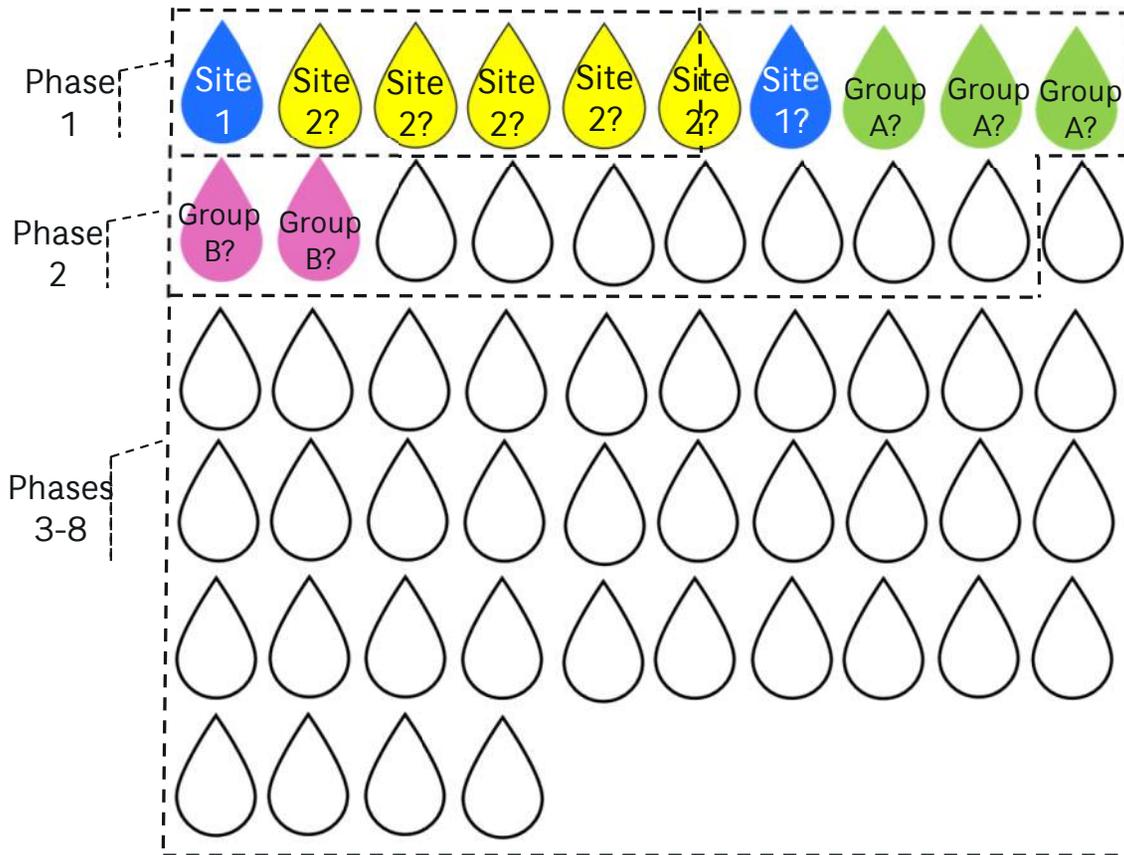
- Continue modeling coordination and aquifer management with DWD
- MassDEP NRNSA Grant coordination
- **Groups A and B:** Town to pursue discussions with private landowners
- **Group C:**
 - Follow up with MassDEP on open application for Hydrogeologic Evaluation Report approval for portion of Group C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

Next site needs to be:

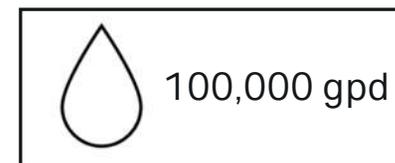
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Next Steps: Finding Recharge Sites for Remaining Phases



- 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





Discussion

