

Critical Success Factors to Locating Acceptable Effluent Recharge Sites

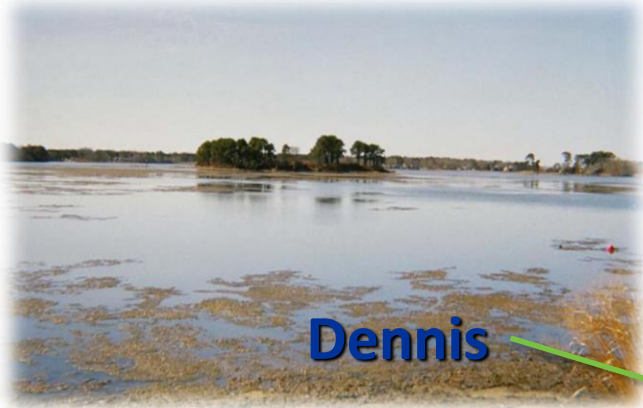
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Jeff Colby, Town of
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January 30, 2019

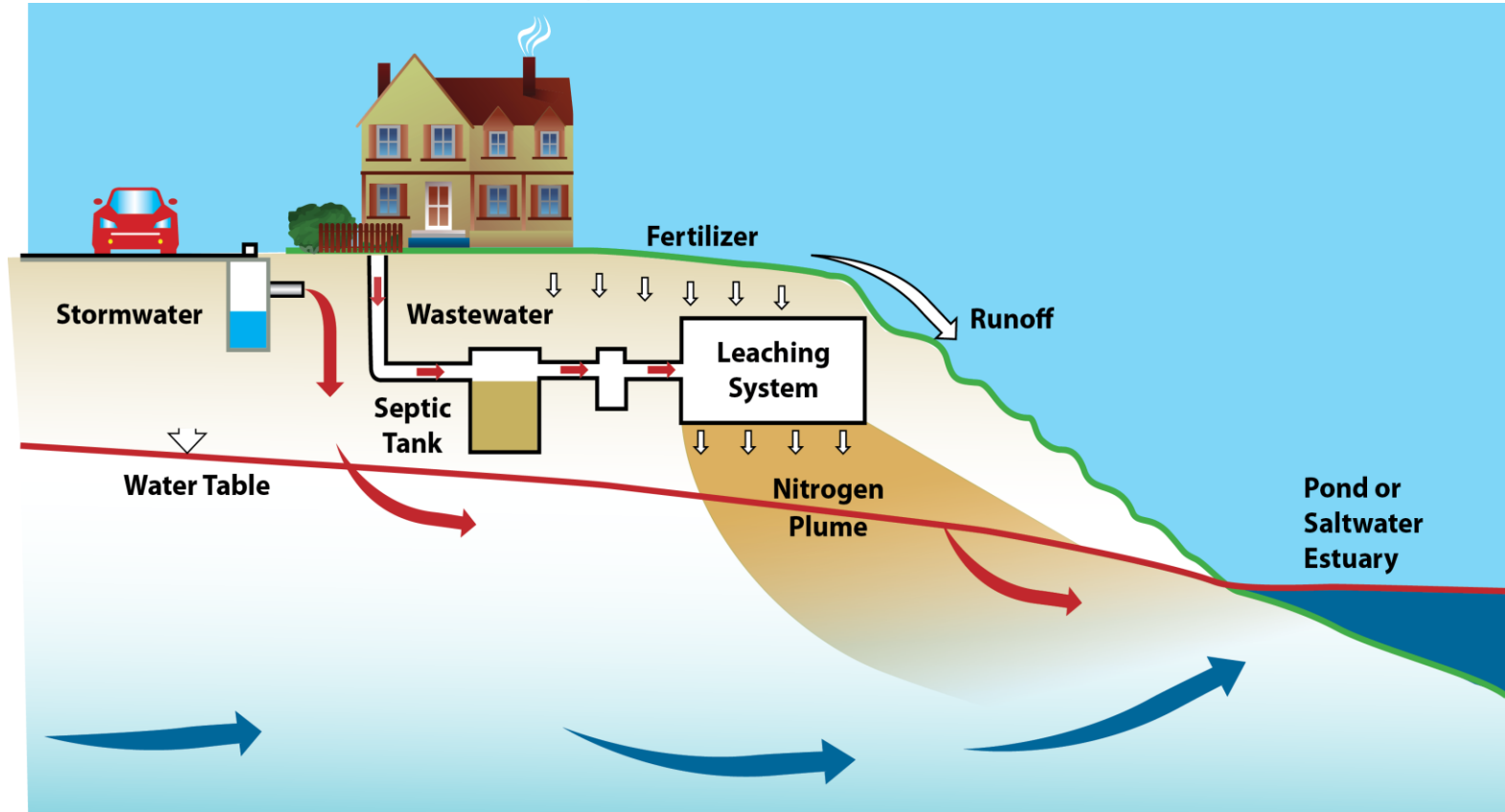


**CDM
Smith**

The Problem: Nutrient Enrichment



The Source: Nitrogen in Groundwater



Wastewater Management Planning

- Public Input
- Ecosystem restoration (science)
- Planned growth (Town)
- State regulations
- Adaptive design

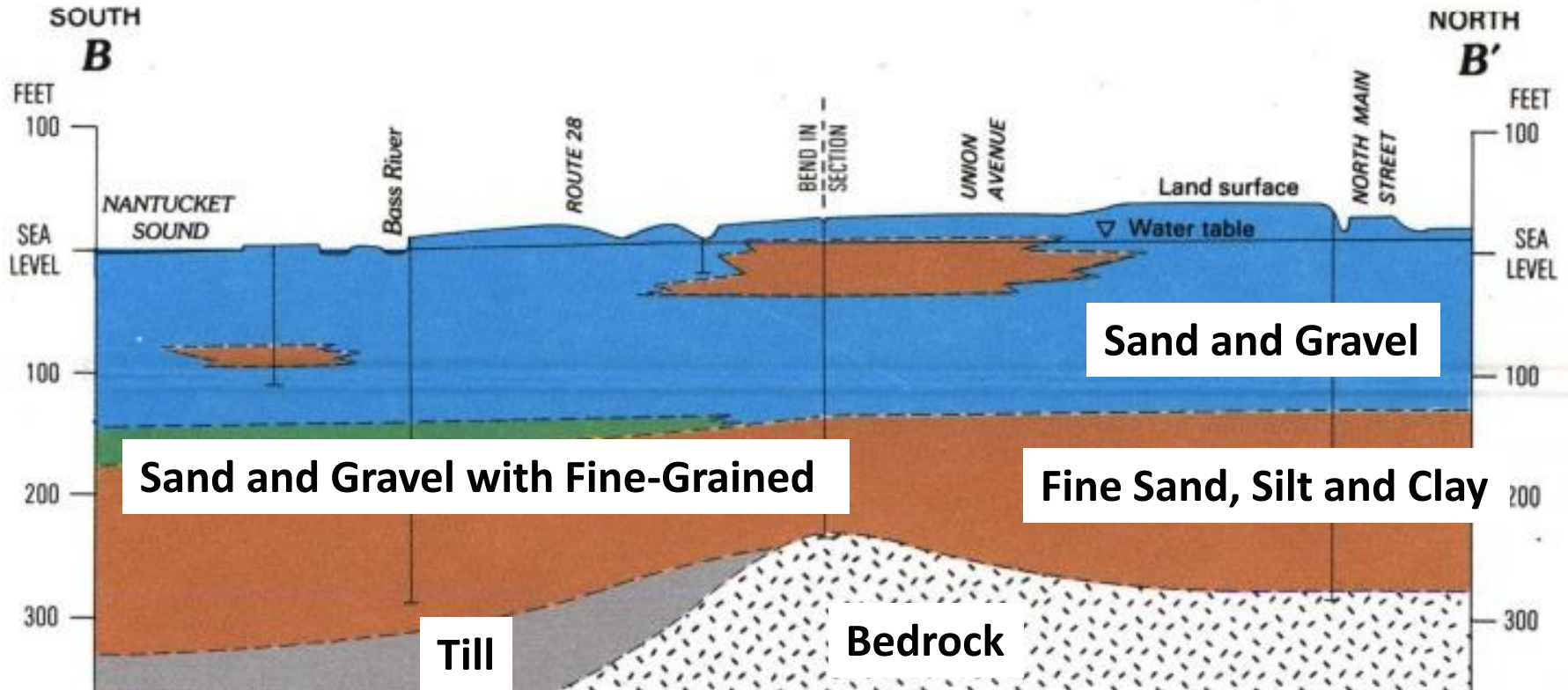
Critical Success Factors

- Technological and Scientific Understanding
- Regulatory and Cost Drivers
- Public Acceptance and Permitting

Technological and Scientific Understanding



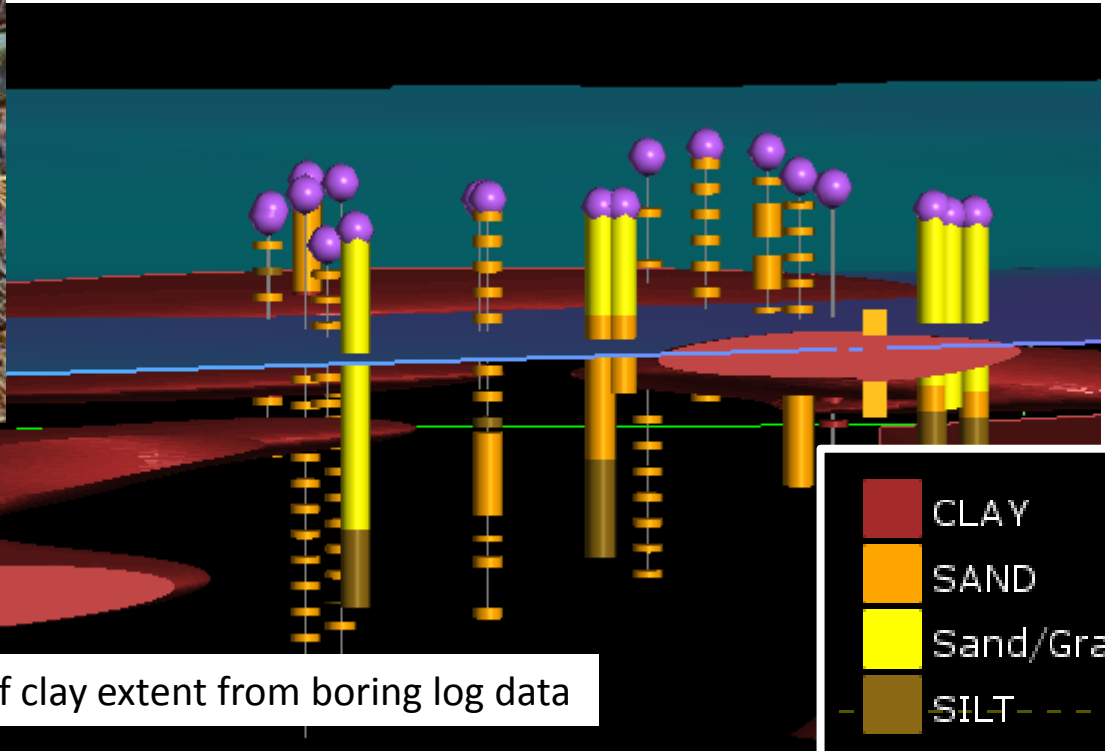
Regional hydrogeology



Site subsurface features



Clay from on-site borings



Estimate of of clay extent from boring log data

- CLAY
- SAND
- Sand/Gravel
- SILT

Data availability



Environmental receptors

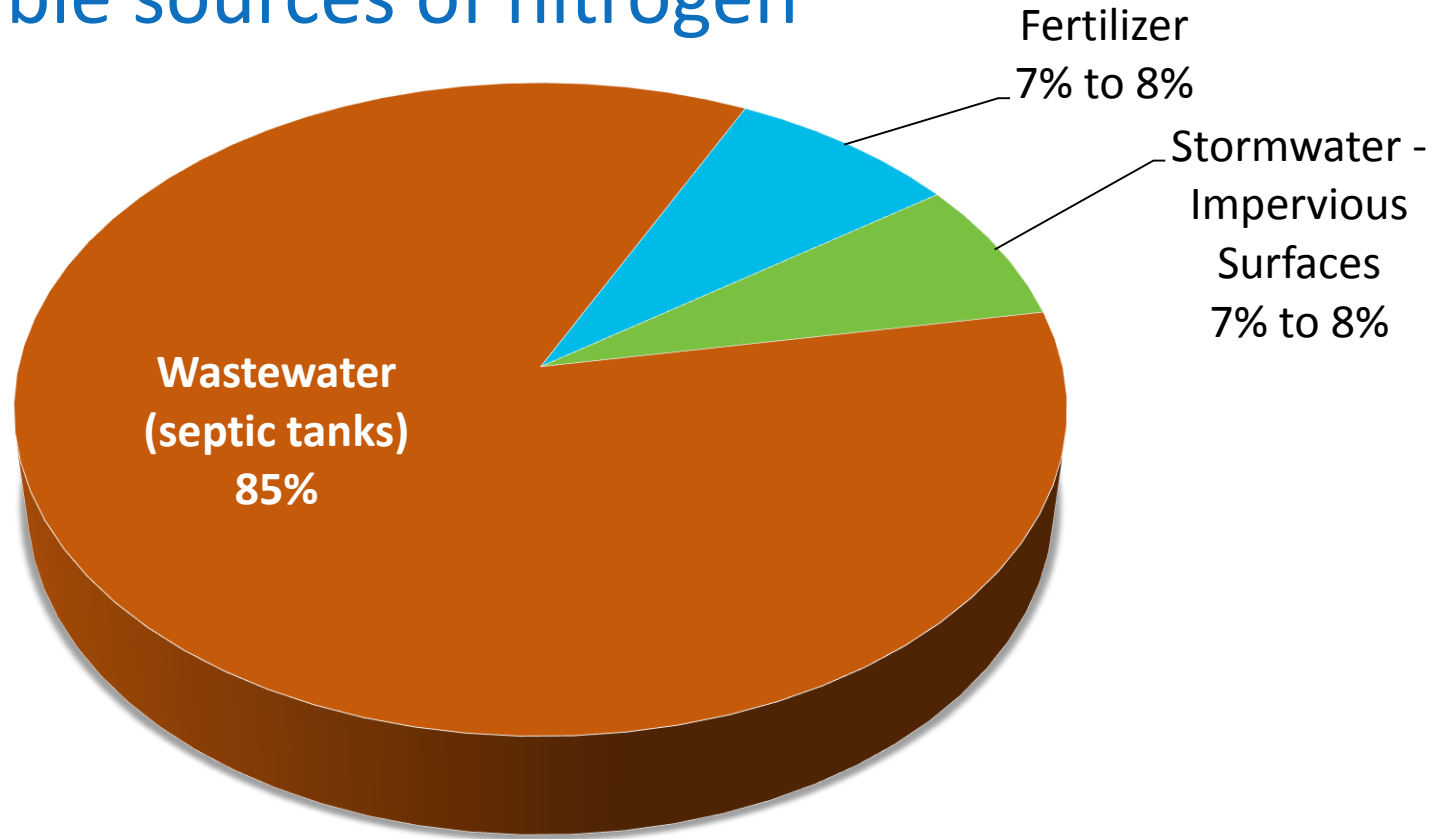


Potential vernal pool

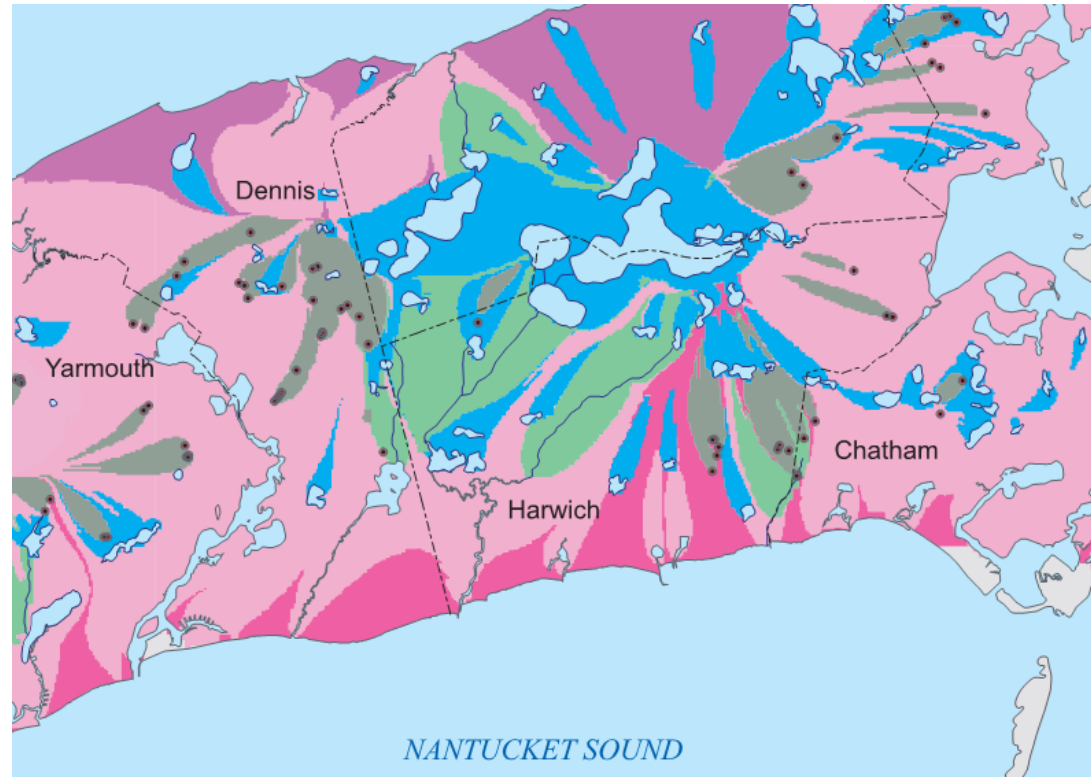


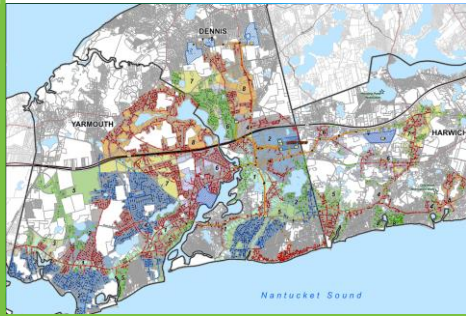
Salamander egg mass
(indicator species)

Controllable sources of nitrogen



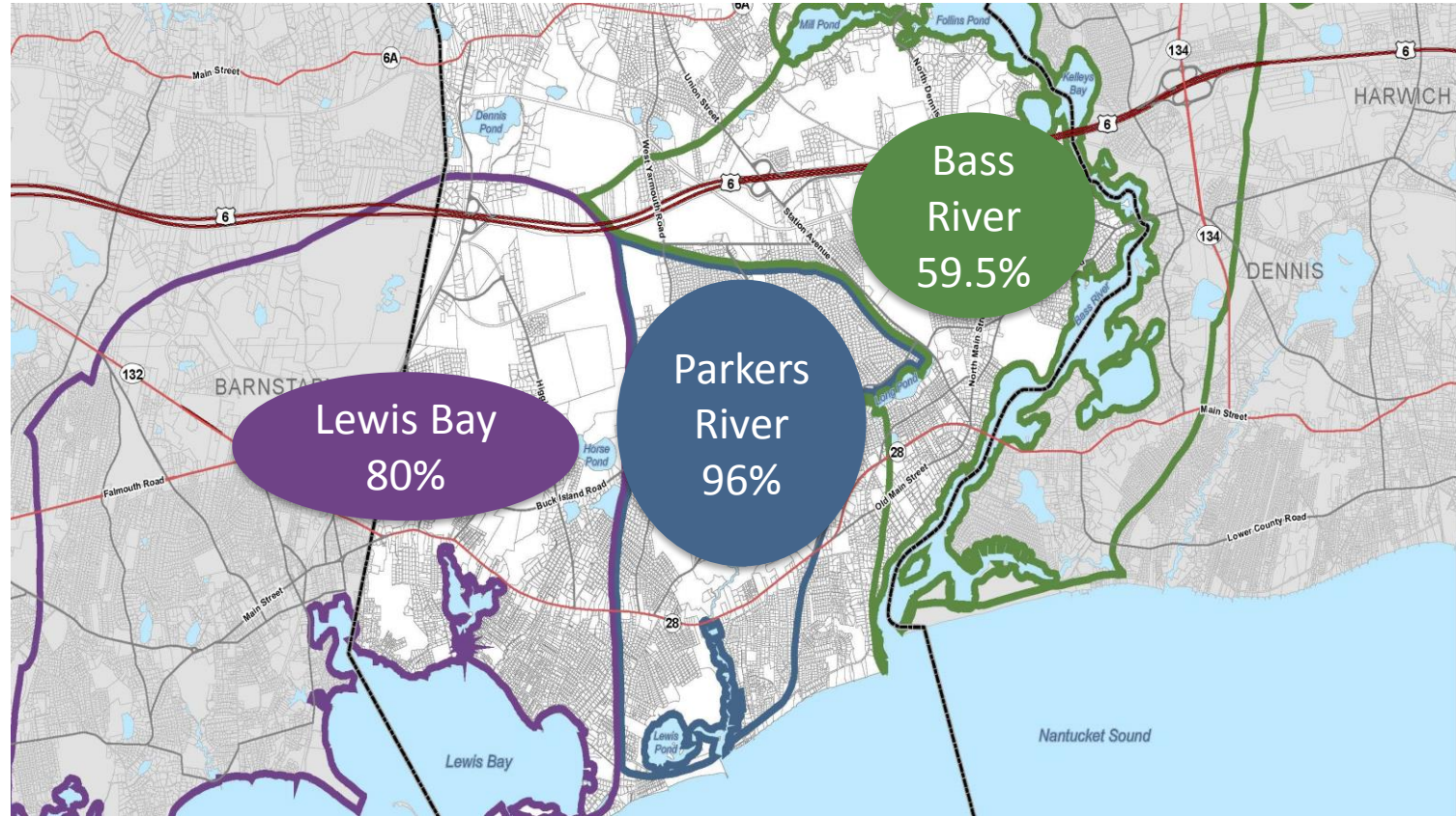
Sole source aquifer



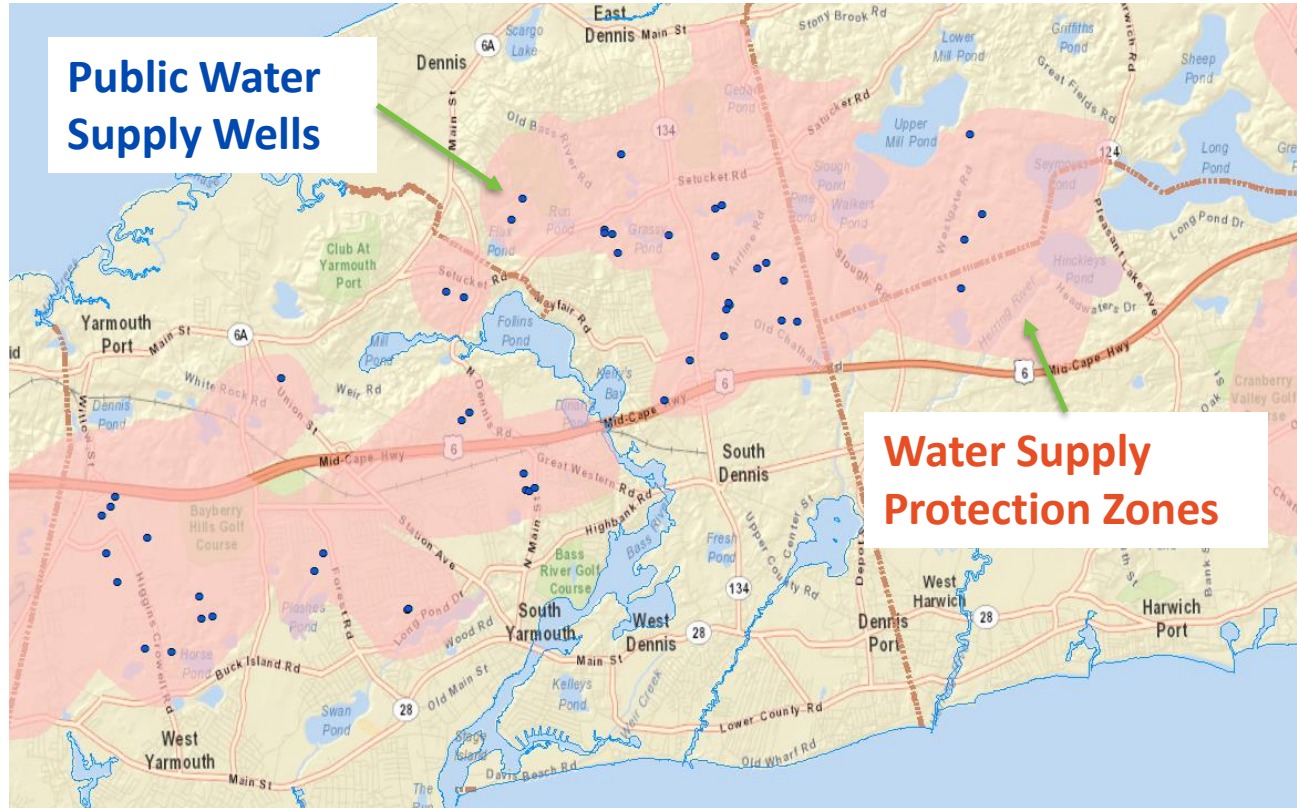


Regulatory and Cost Drivers

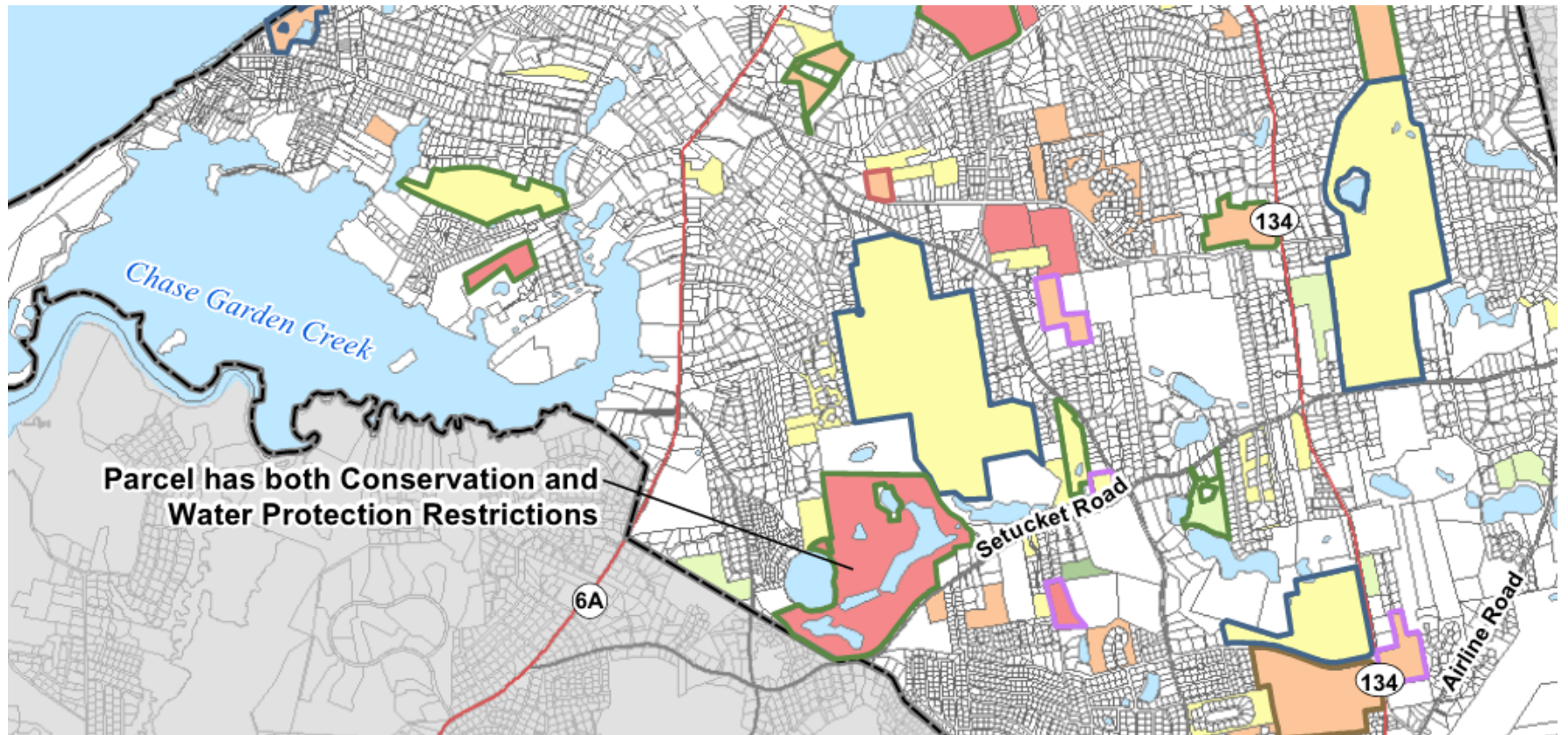
Required septic system nitrogen removal



Water supply protection



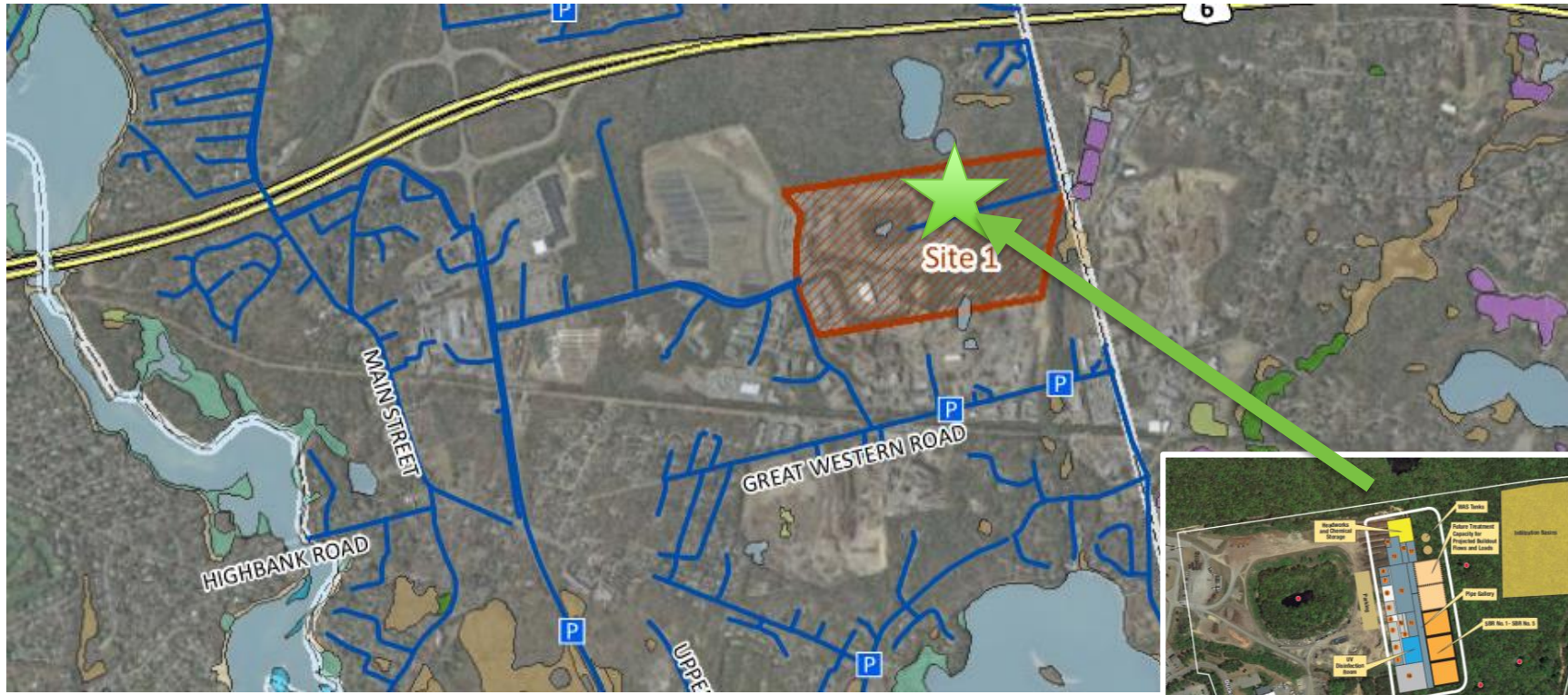
Site ownership and current uses



Historic site activities (archeological artifacts)



Conveyance and treatment costs



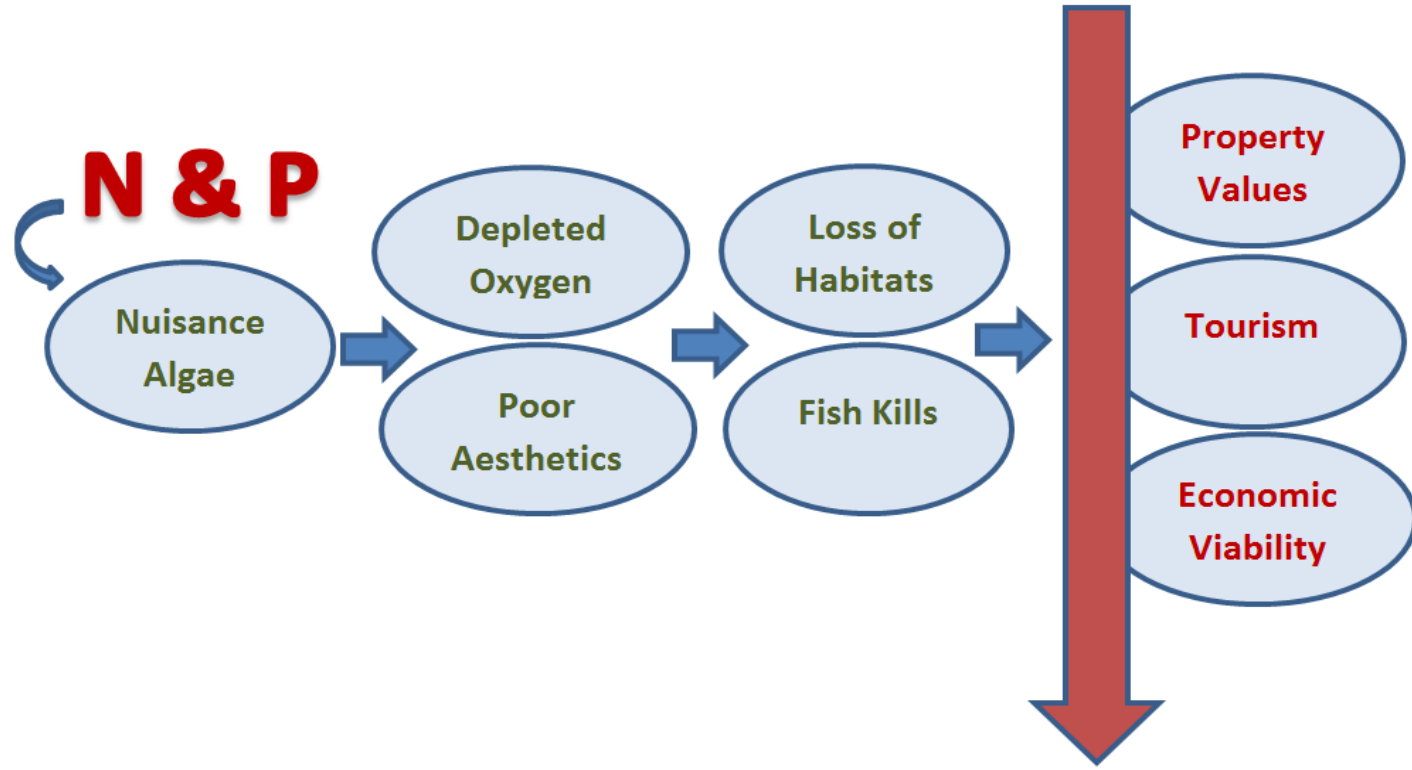
Public Acceptance and Permitting



Public acceptance

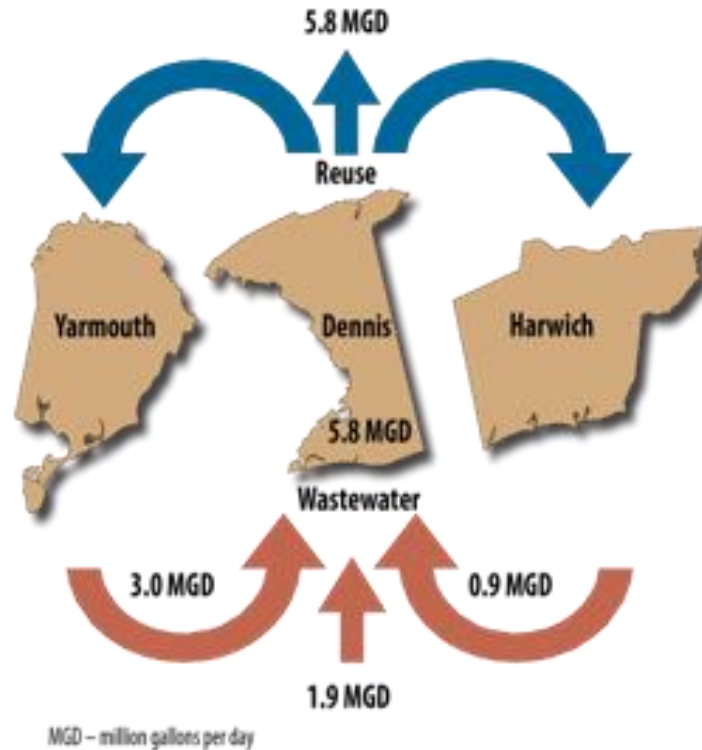


Public education on impacts



Community partnership approach

Community Partnership – Dennis, Harwich, and Yarmouth



Environmental permitting



Example Site: Bass River Golf Course in Yarmouth



Example Site: Bass River Golf Course (BRGC)



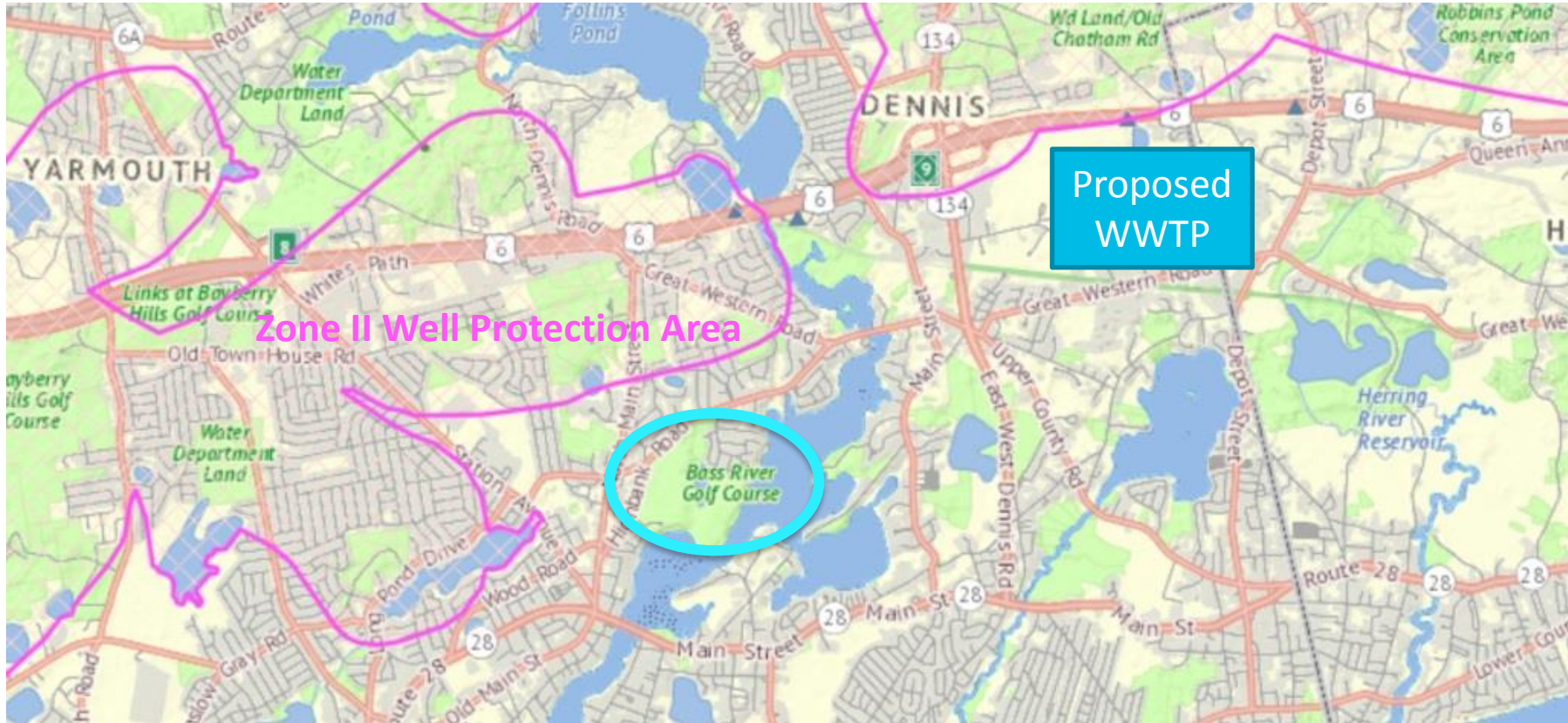
BRGC: Hydrogeology and environmental receptors



BRGC: Data availability



BRGC: Cost, location and ownership



BRGC: Public acceptance and permitting



Summary

- Critical Success Factors
 - Technological and Scientific Understanding
 - Regulatory and Cost Drivers
 - Public Acceptance and Permitting
- Adaptive Design Approach
 - Back-up Recharge Sites
 - Cooperative Approaches

Acknowledgements

- Town of Yarmouth
- Town of Dennis
- Town of Harwich
- CDM Smith Team

