



Town of Bourne Comprehensive Wastewater Management Plan

Draft Recommended Plan Update



Agenda

- Alternatives Analysis Recap
- Draft Recommended Plan
 - Overview
 - Changes to Alternatives
 - Draft Cost Estimates
- Next Steps





Alternatives Analysis Process

- Remove nitrogen based on the goals set in our Needs Assessment
 - TMDLs
 - 25% Reduction across Nitrogen Impaired Watersheds
- Process
 - Drafted and Reviewed Analysis with Wastewater Advisory Committee (Spring 2022)
 - Reviewed and Approved Final Report with Board of Sewer Commissioners (December 2022)

Watersheds	Total Nitrogen Load Values, kg-N/year		Bourne Nitrogen Removal Goal (kg-N/yr.)
	Wastewater	Total	
Megansett-Squeteague Harbor	7,611	11,658	564
Phinneys Harbor	5,948	8,730	1,706
Buttermilk Bay	4,058	5,610	1,402
Pocasset Harbor	7,958	12,479	3,120
Pocasset River	3,762	5,157	1,289
Buzzards Bay	16,830		TBD
Cape Cod Canal	164,028		TBD
Total			8,072

Alternatives Analysis Conclusions

- Traditional
 - Core Sewer Area
 - Buzzards Bay WWTF in Bourne
 - General Use I/A Onsite Systems
- Non-Traditional (Top 3)
 - Pilot and Provisional I/A Systems
 - Formerly Enhanced I/A
 - I/A Hybrid (2+ systems)
 - Stormwater Best Management Practices (BMPs)
 - Compact and Open Space Development
 - To be utilized for compatible developments as applicable
 - Not recommended for nitrogen credit yet

#	Technology	Type	Weighted Total
1	Cluster Treatment System	Source Reduction	⚠ 3.48
2	Aquaculture	Source Reduction	✗ 3.07
3	Fertilizer Management	Source Reduction	⚠ 4.06
4	<i>Remediation of Existing Development</i>	Source Reduction	⚠ 4.34
5	<i>Compact and Open Space Development</i>	Source Reduction	✓ 4.64
6	<i>Transfer of Development Rights</i>	Source Reduction	✗ 3.42
7	Innovative/Alternative (I/A)*	Source Reduction	✓ 4.35
8	I/A Hybrid or Enhanced Systems (2+ technologies)*	Source Reduction	✓ 4.42
9	Coastal and Wetland Habitat Restoration	Restoration	⚠ 3.85
10	Dredging and Maintenance	Restoration	⚠ 3.95
11	Phytoremediation	Groundwater Remediation	⚠ 4.12
12	Permeable Reactive Barriers (PRBs)	Groundwater Remediation	⚠ 3.90
13	Stormwater BMPs - Policy	Groundwater Remediation	✓ 4.49

From Appendix A of Alternatives Analysis

Draft Recommended Plan

For your feedback

Overview

- All costs are conceptual (-50% to +100%)
- All plans prioritize Tier 1 Watersheds Implementation first (beginning Year 1)
 - Megansett-Squeteague Harbor and Phinney's Harbor
 - aka Nitrogen Total Maximum Daily Limit (TMDL) Watersheds
 - aka Current Natural Resource Nitrogen Sensitive Areas (NSAs)
- Next, Tier 2 Watersheds (beginning in Year 6)
 - Buttermilk Bay, Pocasset Harbor, Pocasset River
- Finally, there are two different approaches:
 - Title 5 (default timeline)
 - All Tier 1 watersheds completed by Year 5 (2029)
 - Watershed Permit (opt in for Tier 1 watersheds)
 - Spread out Tier 1 implementation over 20-year period (2044)



Example Title 5 Implementation – General Use I/A

Watershed	Years 1 – 5	Years 6 - 10	Years 11 – 15	Years 16 - 20
Megansett-Squeteague Harbor	285	0	0	0
Phinney's Harbor	1,133	0	0	0
Buttermilk Bay	0	125	125	125
Pocasset Harbor	0	483	483	483
Pocasset River	0	217	217	217
Subtotal # Installations	1,418	825	825	825



Example Watershed Permit Implementation – General Use I/A

Watershed	Years 1 – 5	Years 6 - 10	Years 11 – 15	Years 16 - 20
Megansett-Squeteague Harbor	72	72	72	72
Phinney's Harbor	283	283	283	283
Buttermilk Bay	94	94	94	94
Pocasset Harbor	363	363	363	363
Pocasset River	163	163	163	163
Subtotal # Installations	975	975	975	975



Changes to Alternatives Analysis

- Buttermilk Bay Core Sewer Area
 - Requires more treatment capacity at Buzzards Bay WWTF
 - As of December 2022, all remaining flow was allocated for economic development purposes
- Three updated options for Buttermilk Bay:
 - Switch from Core Sewer Area to Enhanced I/A Pilot Project
 - Keep Core Sewer Area – Sewer Alternative 1
 - Requires Buzzards Bay WWTF Capacity Upgrades and modification of existing Groundwater Permit
 - Add more sewer – Sewer Alternative 2
 - Requires moving to a Regional WWTF option or building another Bourne WWTF



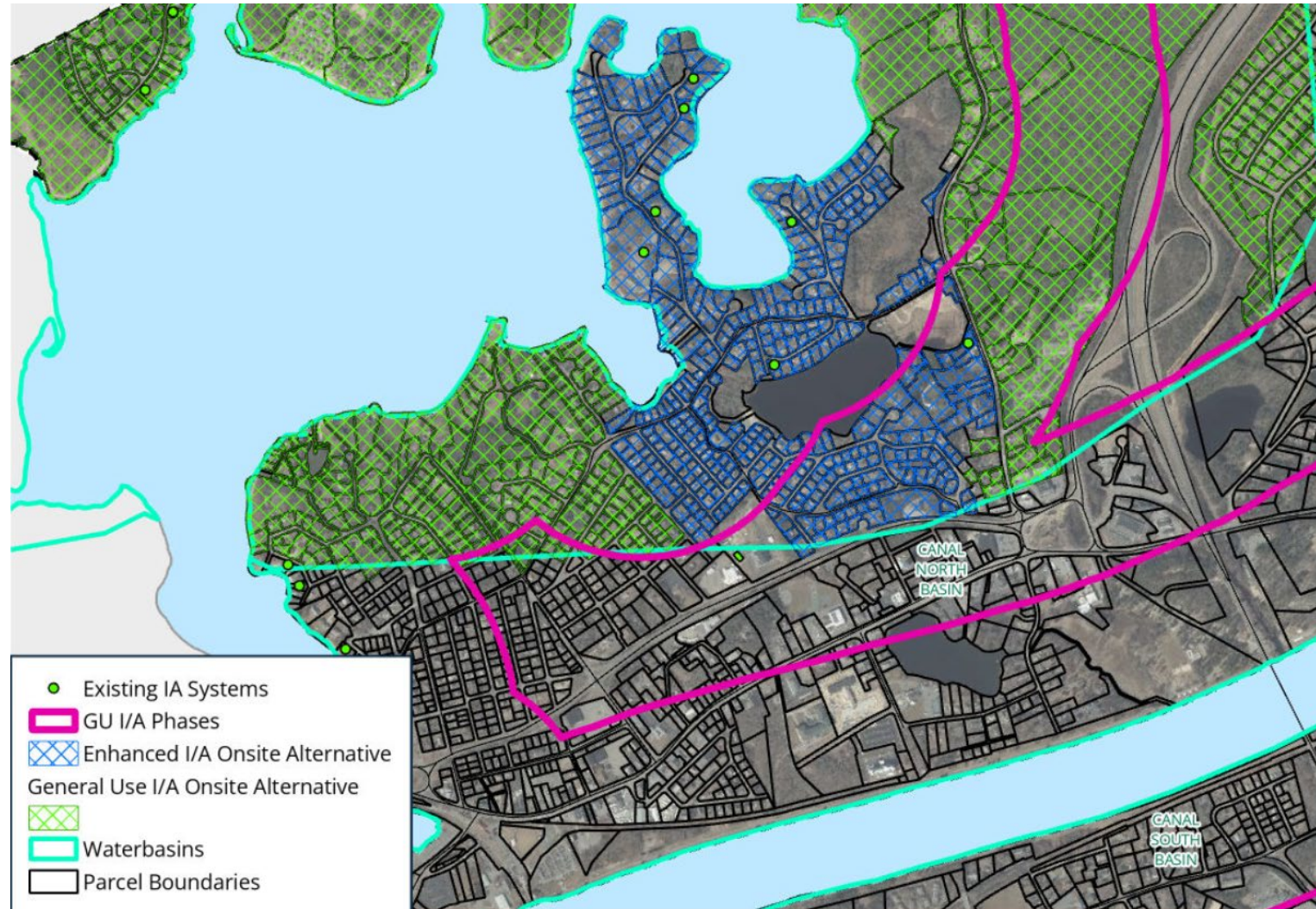
Draft Recommended Plan – Nitrogen Removal Summary

Embayment	Nitrogen Removal Goal (Kg-N/yr.)	Estimated Traditional Nitrogen Removal (kg N/yr.)	Estimated Non-Traditional Nitrogen Removal (kg N/yr.)	Total Estimated Removal	Goal Met?
Megansett-Squeteague Harbor	564	504 - 631	113	617 - 744	Yes
Phinneys Harbor	1,706	2,001 – 2,182	341	2,342 – 2,523	Yes
Buttermilk Bay ¹ .	1,402	588	1,084	1,672	Yes, with EIA Pilot
Pocasset Harbor	3,120	2,562	624	3,186	Yes
Pocasset River	1,289	1,148	258	1,406	Yes
Total	8,072	6,803 – 7,768	1,616	9,223 – 9,531	Yes

1. If Pilot EIA Program does not provide intended results, then General Use I/A Assumed for implementation, estimated to remove 517 kg N/year. The watershed removal totals 1,385 kg N/year, falling less than 20 kg N/year short of the 25% removal goal for the watershed.



Buttermilk Bay – Enhanced I/A Pilot Area



Draft Recommended Plan – Total Annual Cost by Technology

Alternative	Total Annual Cost (\$M)	Individual Total Annual Costs	Estimated Nitrogen Removal (kg-N/yr.)	Approximate Cost per Kg N removed
General Use I/A Onsite System	\$22.5M	\$5,800 ¹ .	6,800 – 7,800	\$2,900- \$3,300
Buttermilk Bay Sewer Alternative 2	\$10.46M	\$16,830	3,000	\$3,490
Core Sewer Area - Alternative 1	\$6.1M	\$9,642	1,160	\$5,260
Pilot EIA Onsite System	\$3.5M	\$10,800	803	\$4,359
Stormwater BMP	\$1.45M	N/A ² .	1,616	\$897

1. For General Use, individual costs are cost per parcel. For sewer alternatives, cost is cost per user (total users, including new and existing users).
2. Stormwater BMP individual costs are not applicable as Bourne does not have a stormwater utility.



Draft Recommended Plan – Total Annual Cost by Watershed

Alternative	Total Annual Cost (\$M)	Estimated Nitrogen Removal (kg-N/yr.)	Approximate Cost per Kg N removed
Megansett-Squeteague Harbor	\$1.98M	617 (min. required)	\$3,200
Phinney's Harbor	\$7.22M	2,342 (min. required)	\$3,080
Buttermilk Bay – EIA Pilot	\$5.99M	1,672	\$3,580
Pocasset Harbor	\$9.02M	3,186	\$2,831
Pocasset River	\$4.02M	1,406	\$2,863



Next Steps



General Use Innovative and Alternative (I/A) Onsite Systems are still the primary technology



Buttermilk Bay Preferred Alternative is now General Use I/A and an Enhanced I/A Pilot instead of Core Sewer Area



Feedback needed to determine cost-sharing and timeline preferences

Next Steps: Project Team

Spring 2024

- Draft Recommended Plan
- File MEPA EENF

Summer 2024

- Joint Review by MEPA and Cape Cod Commission
- Public Comment Period

Fall 2024

- Incorporate Feedback into Final Plan
- Town Meeting Action
- Begin Plan Implementation

THANK YOU

ENVIRONMENTAL
 PARTNERS
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