



Wellfleet Targeted Watershed Plan
Update – September 29, 2021

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Water Resources Consultant

Goals of Targeted Watershed Plan

- Restoration of Ecosystems & Water Quality
- Compliance with Clean Water Act
- Quicker Results
- Reduced Costs
- Promote Affordable Housing
- Maximize Local Co-Benefits (including jobs)
- Minimize Climate Impacts

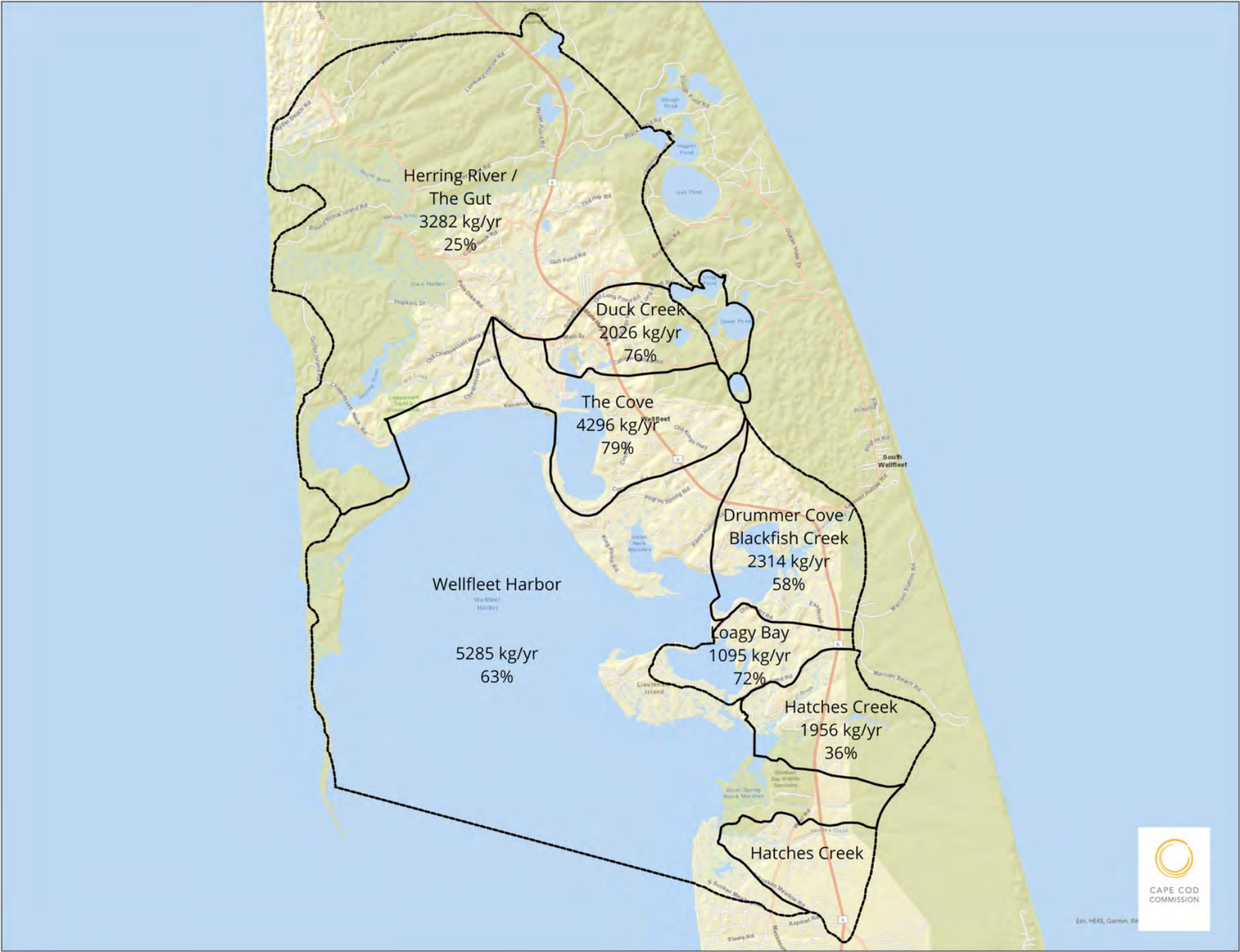
2008 PLAN

Cape Cod Area Wide Water Quality Management Plan Update





- Wastewater
- Existing Water Bodies
- Stormwater
- Regulatory

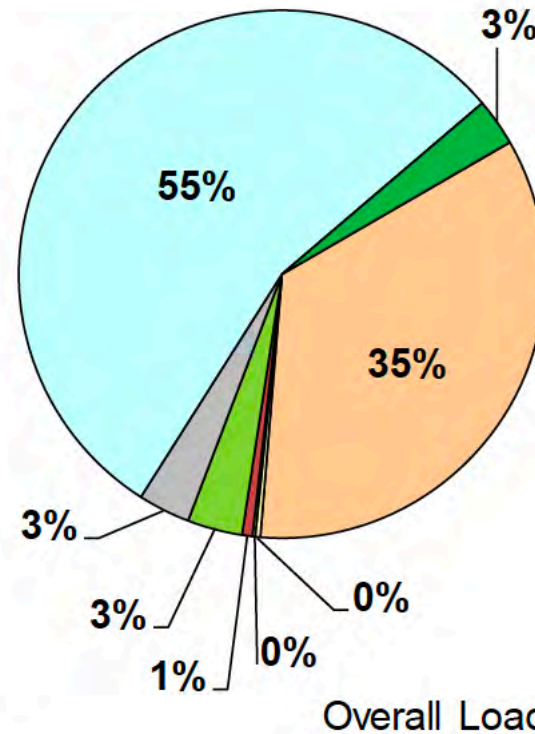


CAPE COD COMMISSION

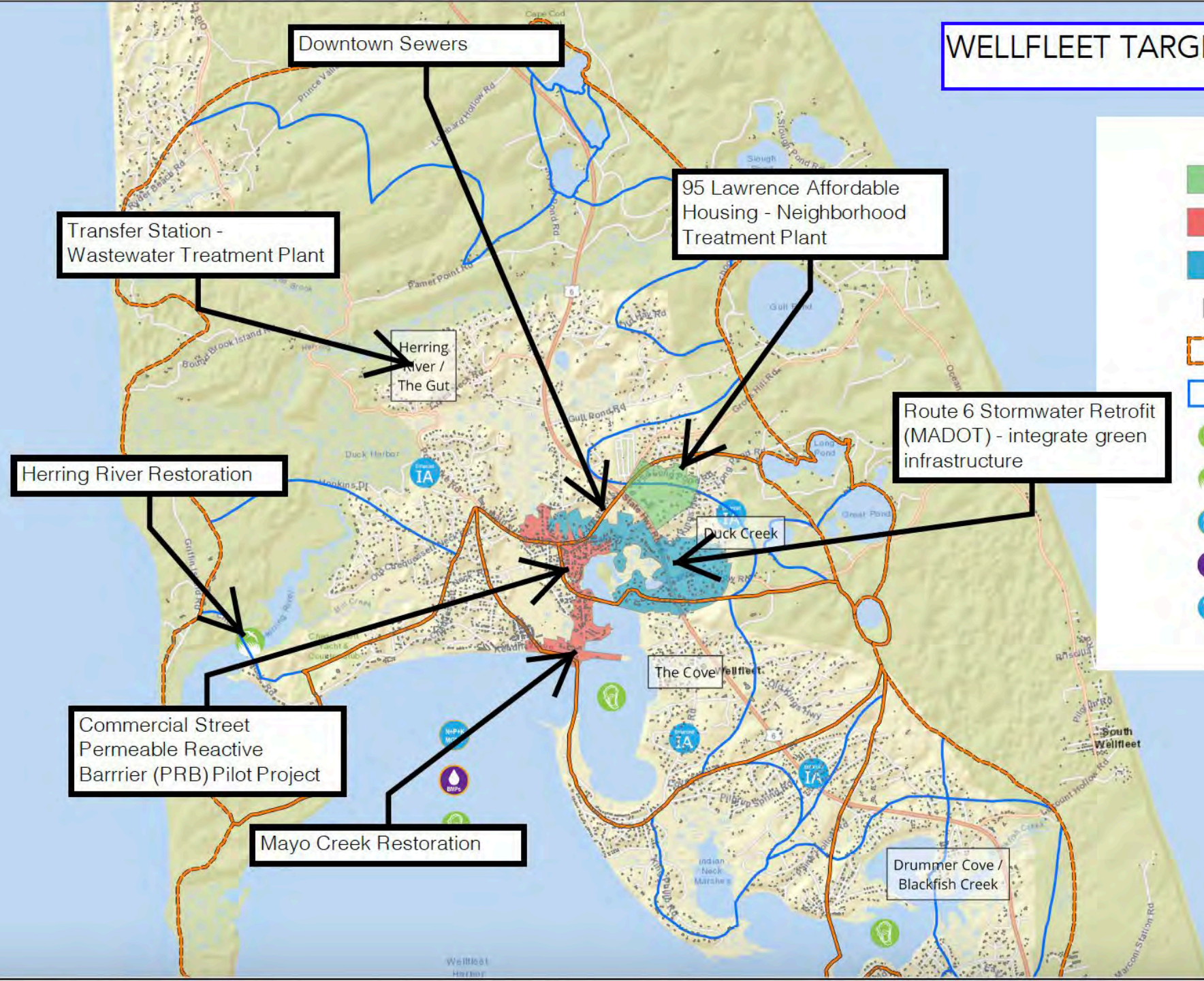
Exit HERE, Gamin, IN

Sources of Nitrogen to Wellfleet Harbor Embayments (MEP, 2017)

- Wastewater
- From WWTF
- Landfill/ Solid Waste
- Farm Animals
- Fertilizers
- Impervious Surfaces
- Water Body Surface Area
- "Natural" Surfaces



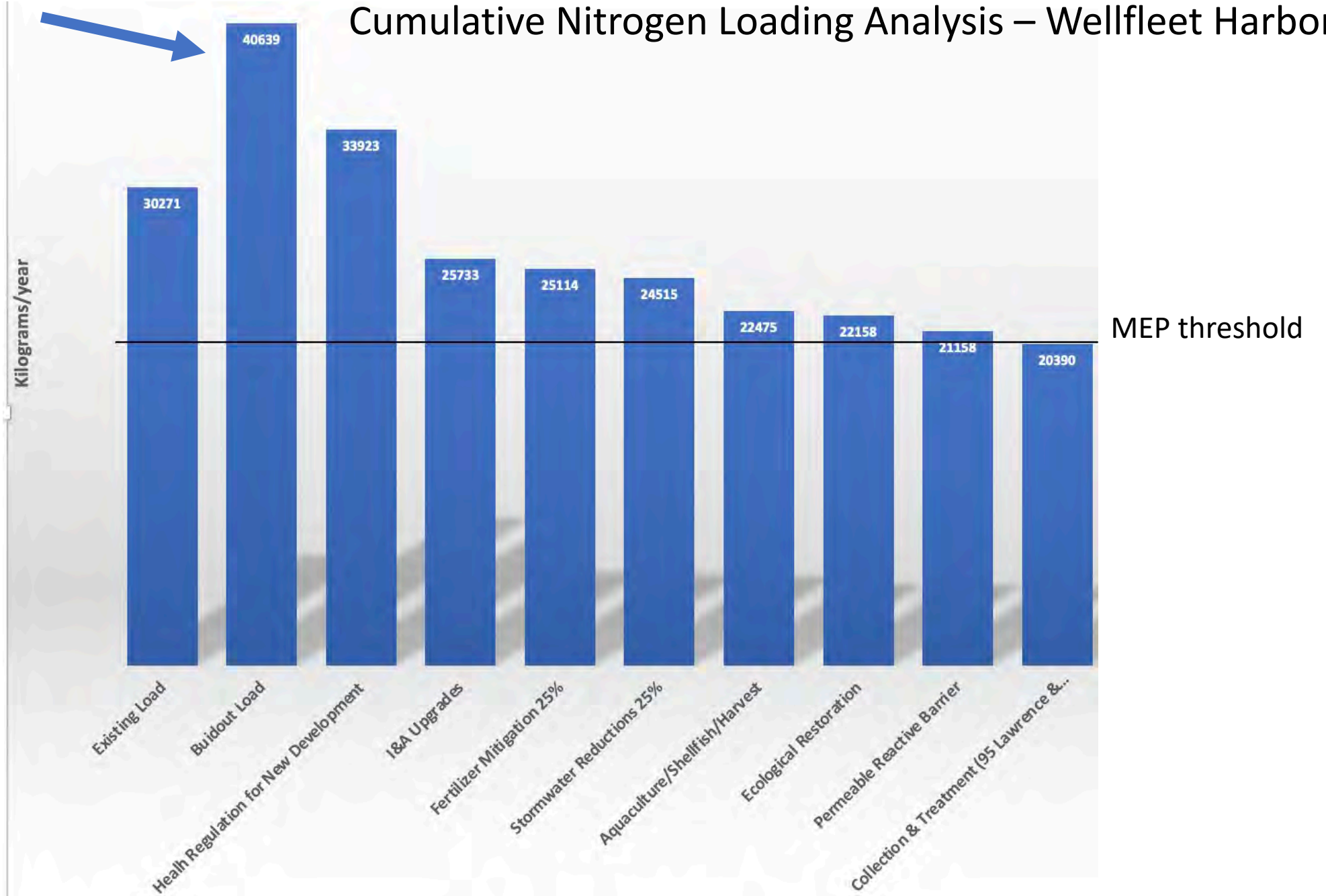
WELLFLEET TARGETED WATERSHED PLAN

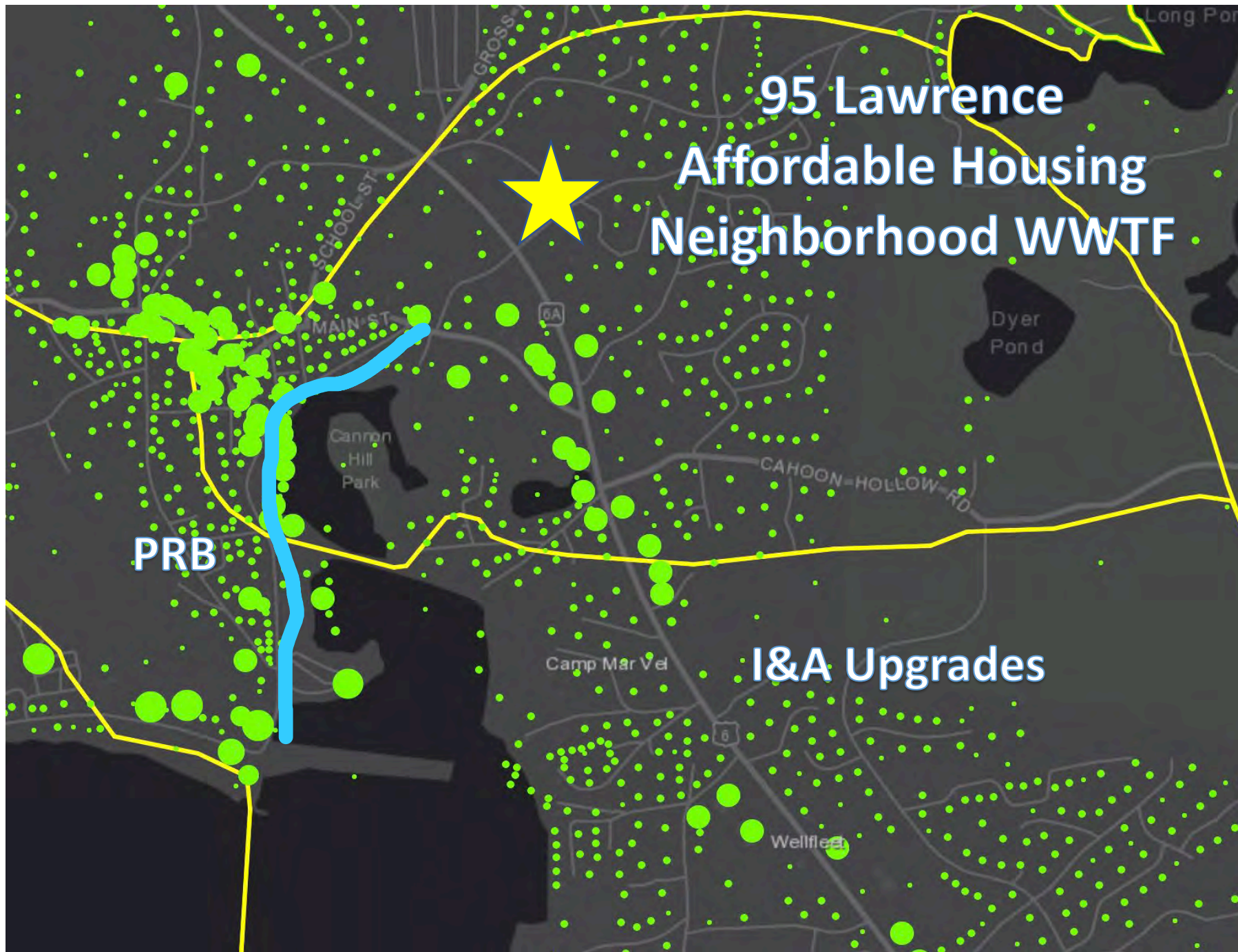


- 95 Lawrence Project
- Woodard & Curran Phase 1
- Woodard & Curran Phase 2
- Structure Footprint
- SubEmbayment Boundary
- Subwatershed Boundary
- Aquaculture
- Coastal Habitat Restoration
- Fertilizer Management
- Stormwater Projects
- Enhanced I/As

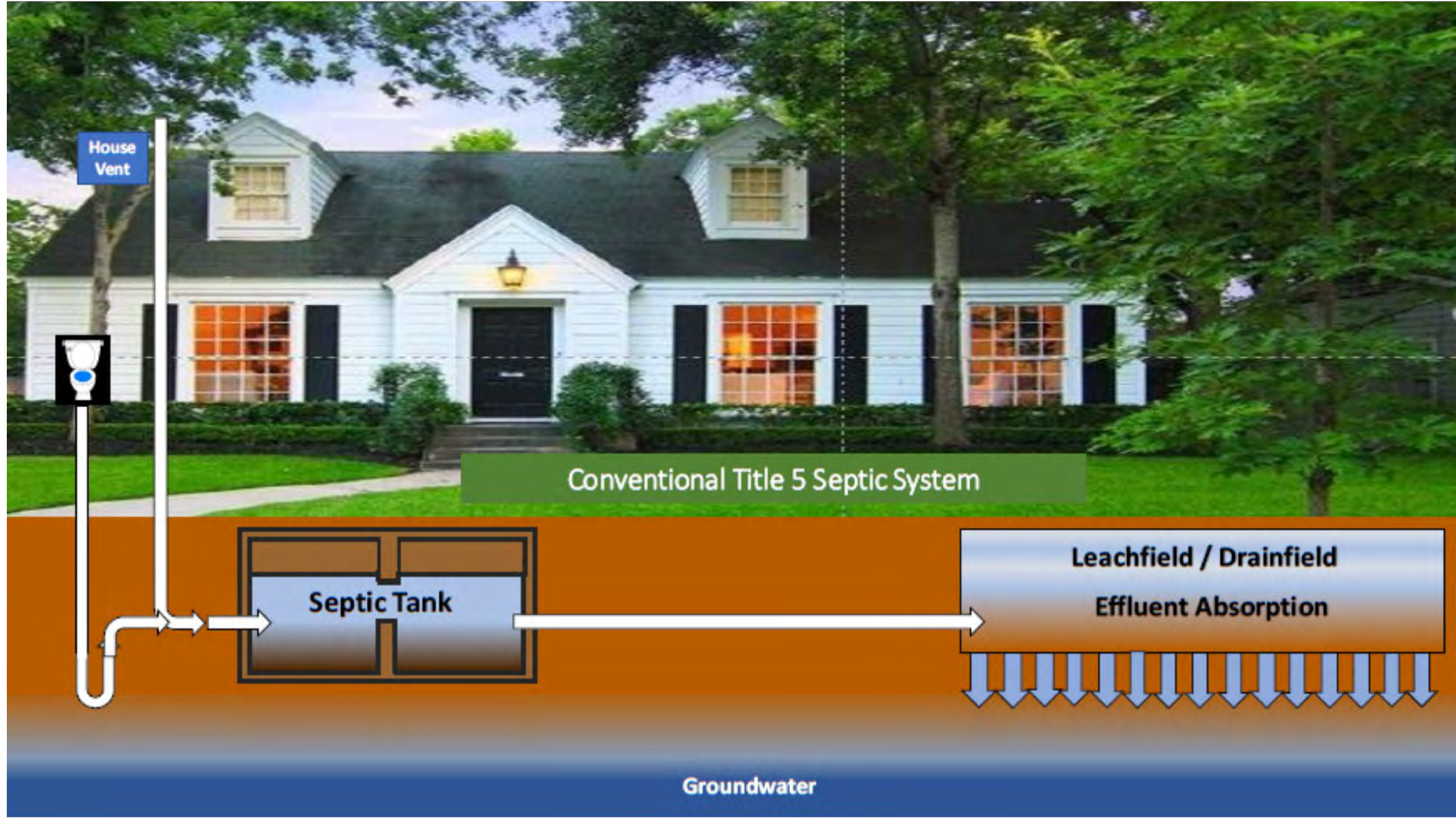
Continued Use
of Conventional
Title 5 Systems

Cumulative Nitrogen Loading Analysis – Wellfleet Harbor





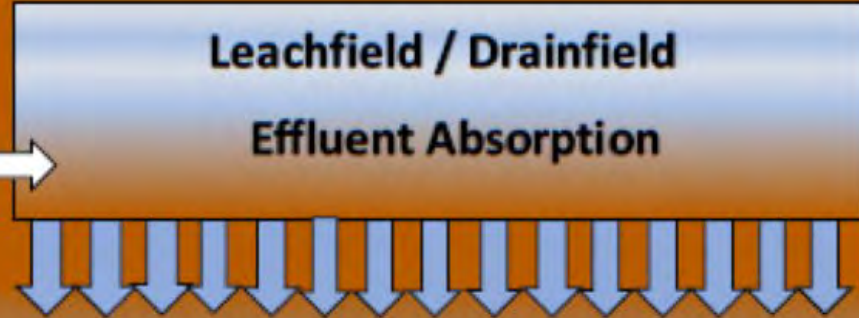
Pilot Projects
funded at Wellfleet
Town Meeting 2021



House Vent



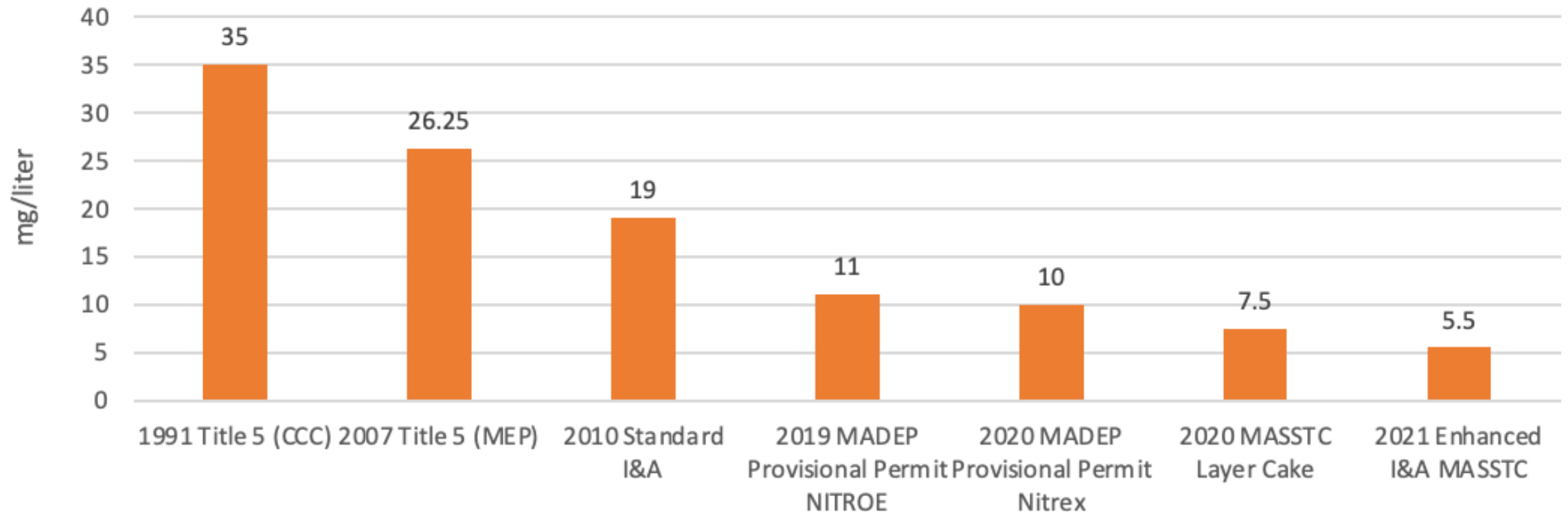
Conventional Title 5 Septic System



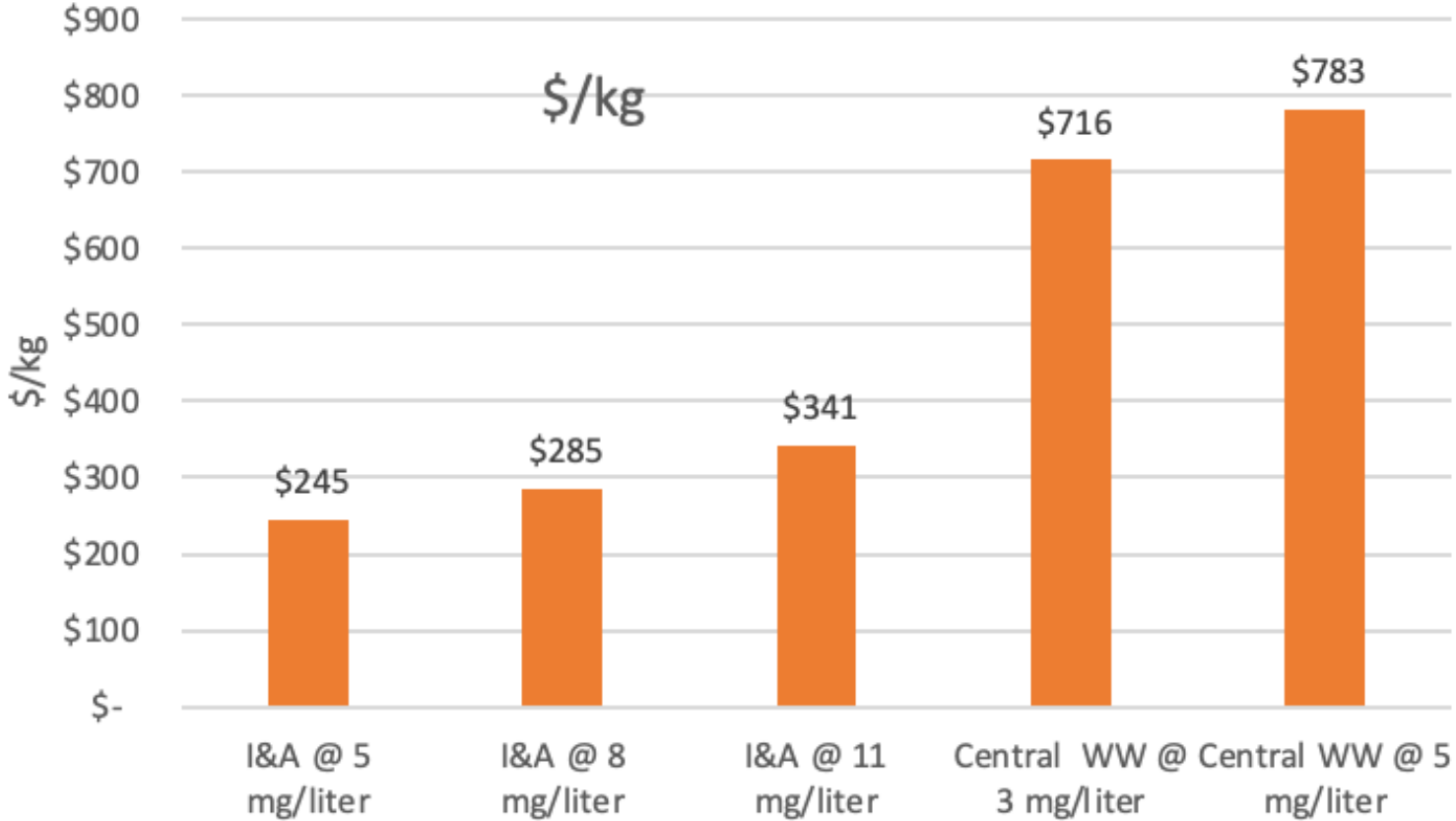
Groundwater

Enhanced I&A Septic Systems

On-Site Septic System Performance Progress



Cost Effectiveness of Wastewater Treatment Options



Cost of Enhanced I&A = \$28,111

Cost of Central Sewer and Treatment = \$90,000

WELLFLEET HEALTH REGULATION (Draft for Discussion)

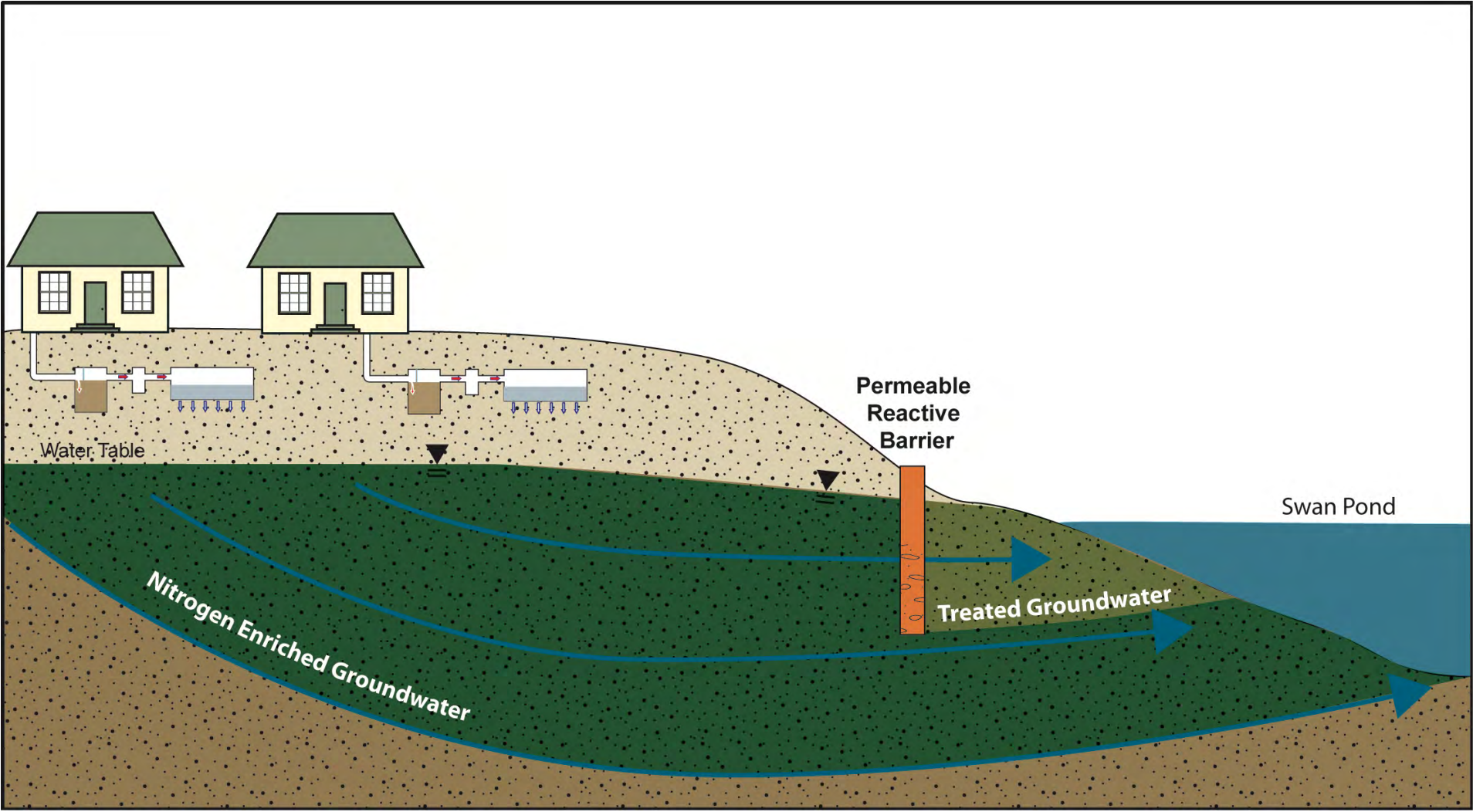
Purpose: To reduce nitrogen loading to Wellfleet's coastal waters by providing the best available technology.

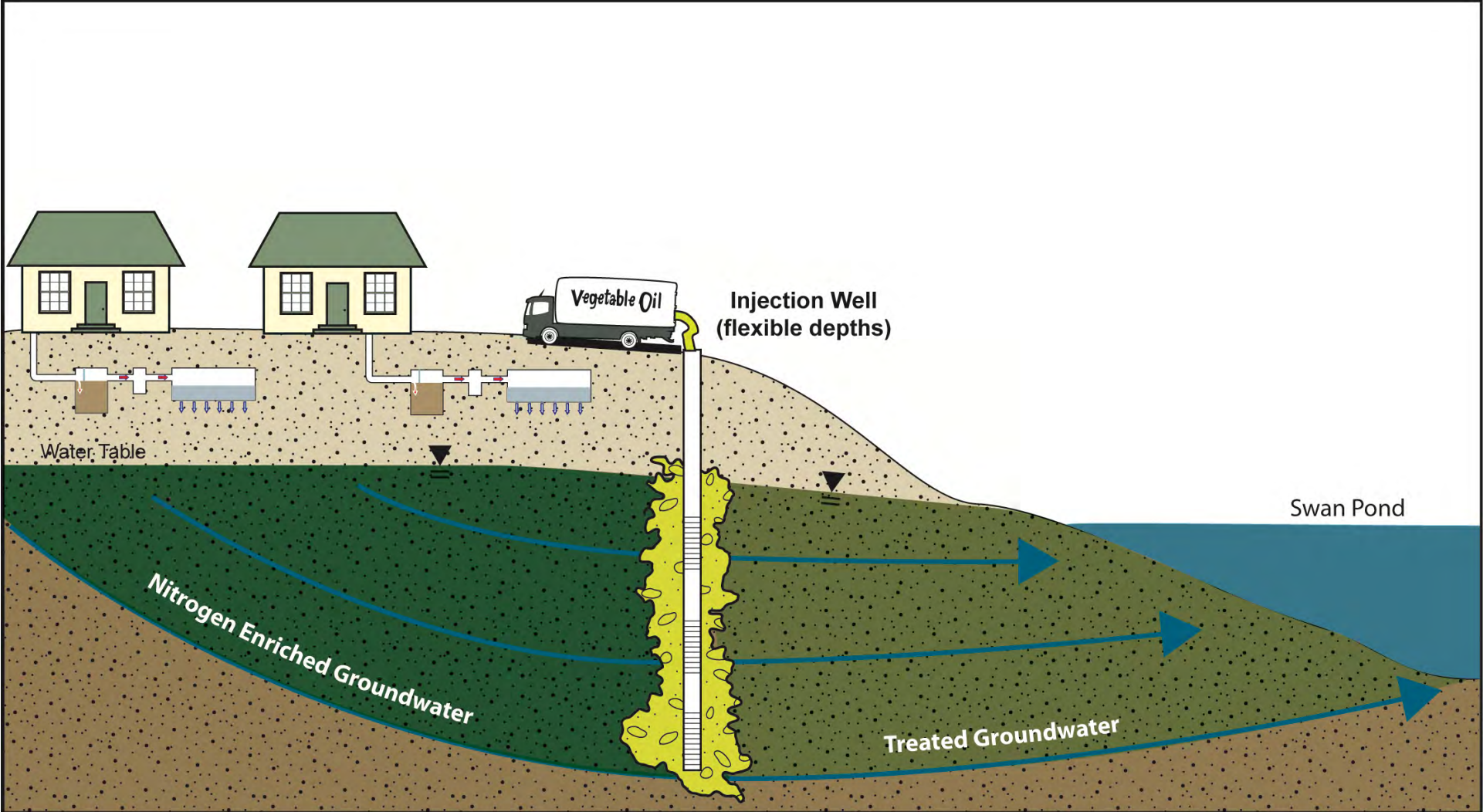
608. The use of enhanced innovative & alternative (I&A) septic systems are required for new, repairs, upgrades, and property transfers.

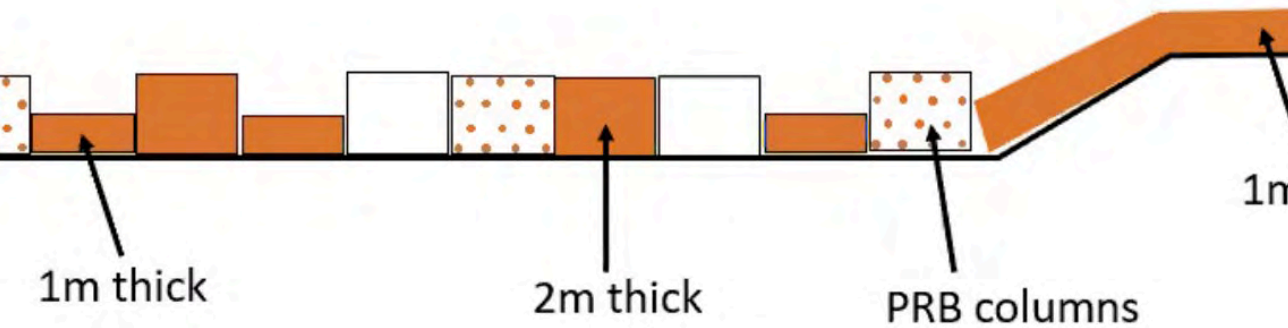
609. Enhanced I&A septic systems are defined as those technologies that have average nitrogen effluent concentrations less than 10 mg/liter or greater as demonstrated by third-party testing. Currently the Board of Health recognizes the following technologies as enhanced: NITRO, NITREX, and the sawdust-based system known as the "Layer Cake" technology (Heufelder, 2019). Other technologies may be petitioned by applicants for review by the Board of Health and must present third-party testing data.

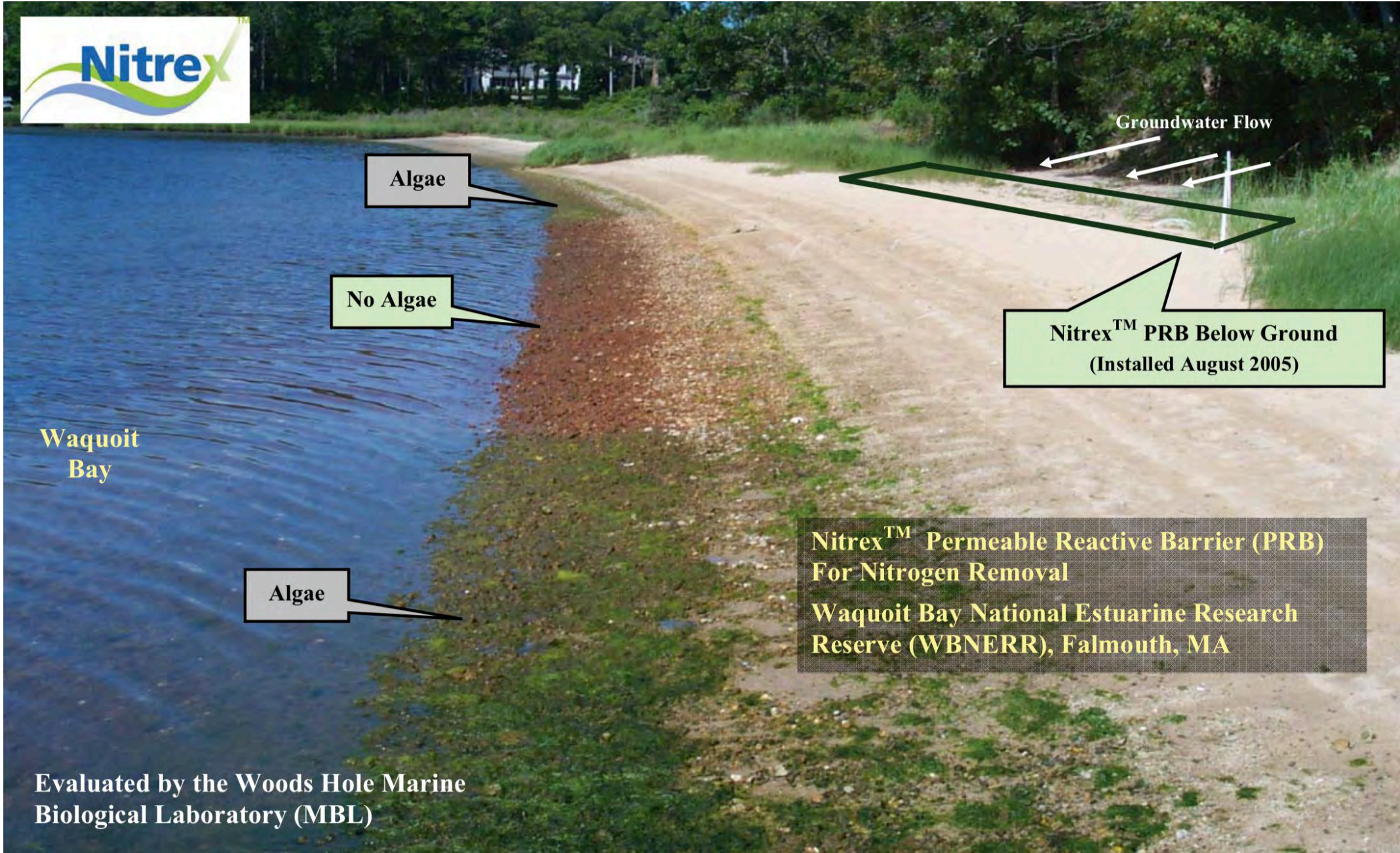
610. Any property owner who has installed an alternative septic system may, upon approval by the Board of Health, defer connection to town sewer to allow them to utilize their alternative septic system.

Note: The 2021 Wellfleet Town Meeting authorized \$250,000 to assist property owners up to \$12,500 per installation.









Groundwater Flow

Algae

No Algae

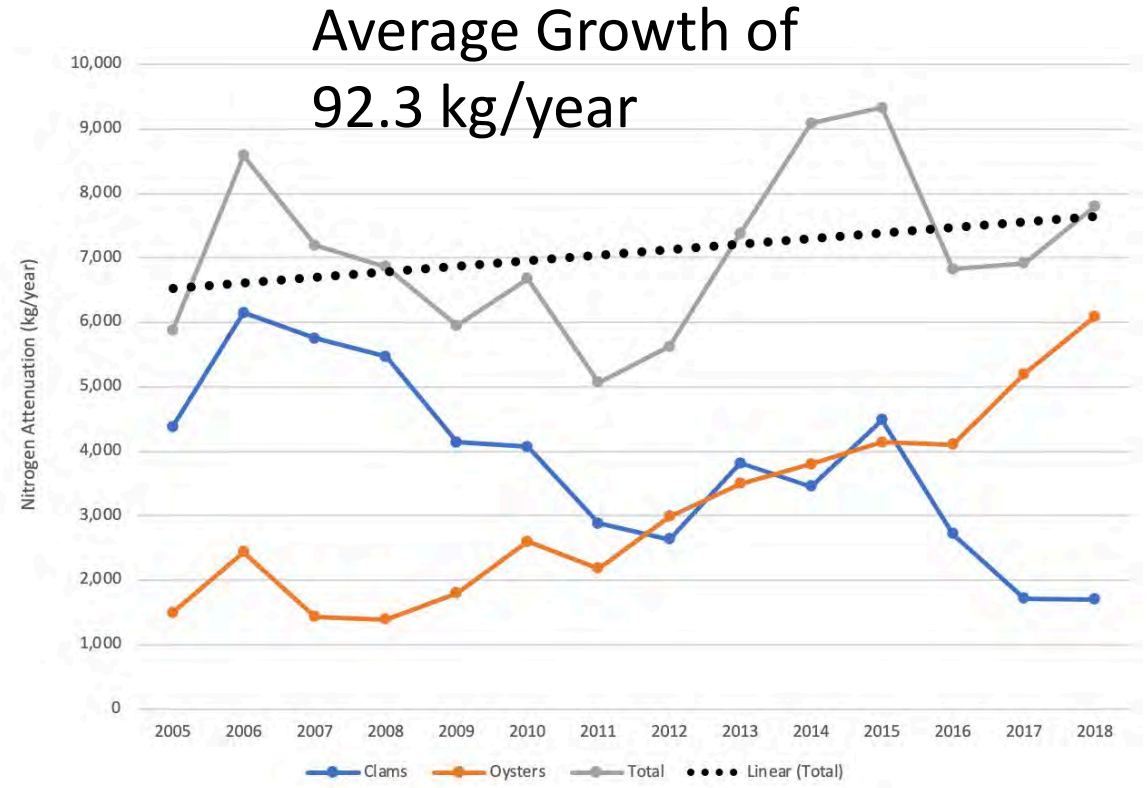
Nitrex™ PRB Below Ground
(Installed August 2005)

Waquoit Bay

Algae

Nitrex™ Permeable Reactive Barrier (PRB)
For Nitrogen Removal
Waquoit Bay National Estuarine Research
Reserve (WBNERR), Falmouth, MA

Evaluated by the Woods Hole Marine
Biological Laboratory (MBL)





Stormwater Remediation Projects

Stormwater Retrofits with Green Infrastructure



Coastal Ecosystem Restoration

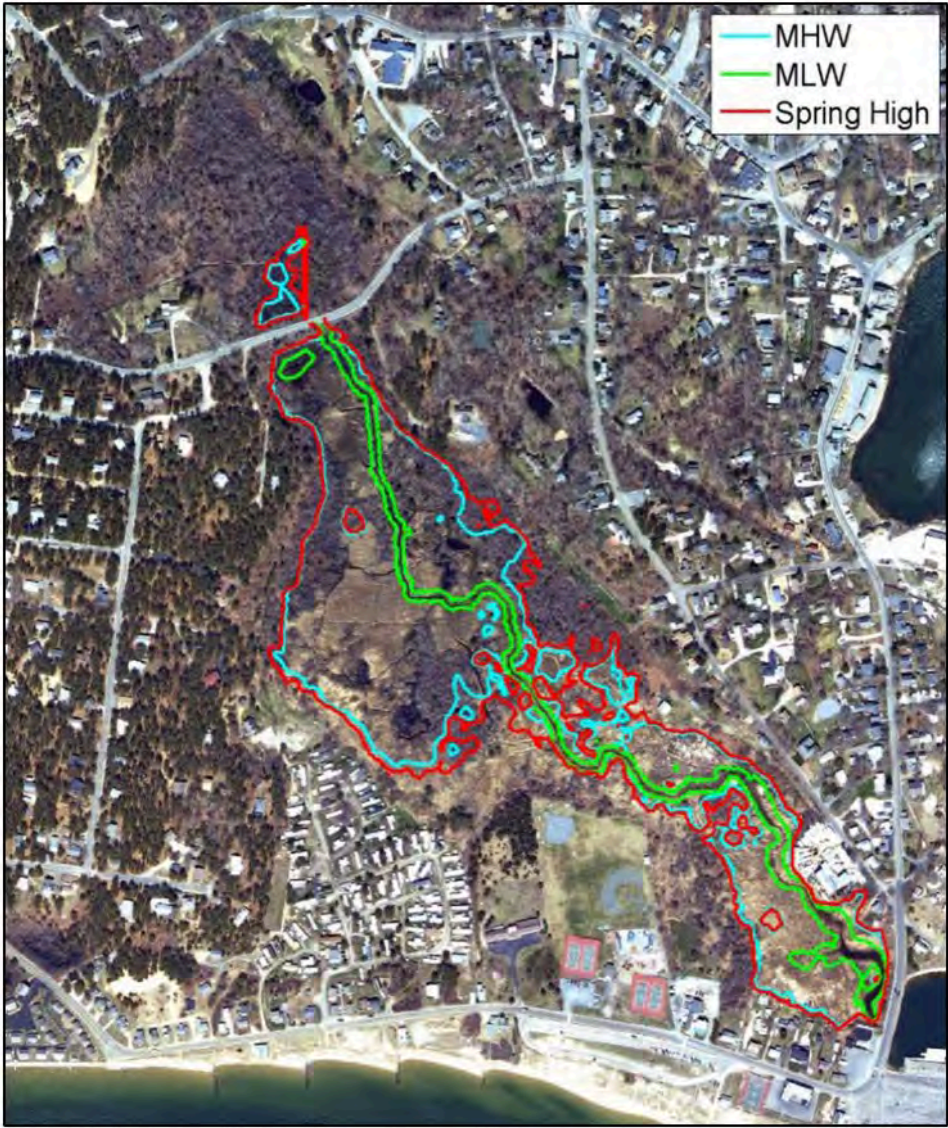
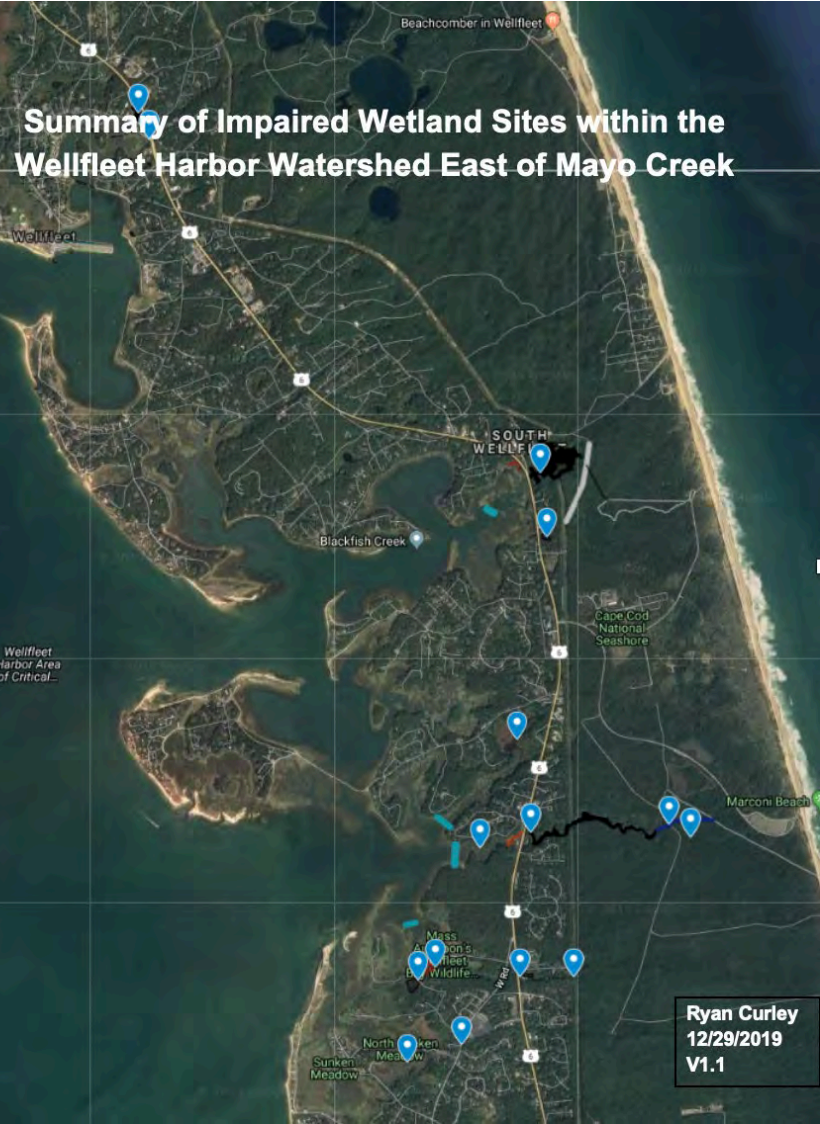
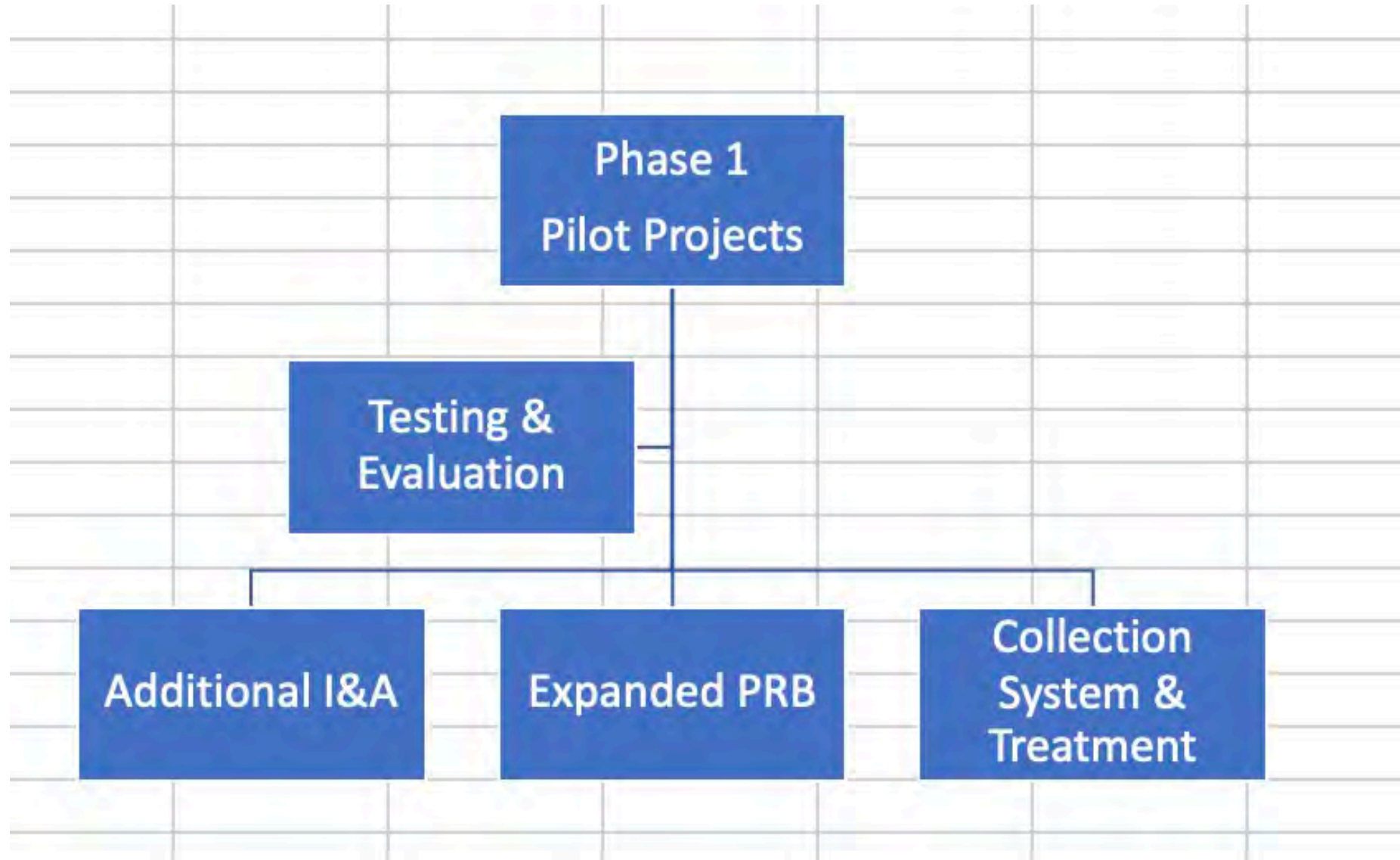


Figure 6. Aerial view of Mayo Creek showing the extent of mean high water (MHW), mean low water (MLW) and spring high tide under a scenario that maximizes salt-marsh restoration without flooding existing infrastructure (Woods Hole Group 2016).

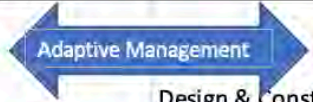


Plan Implementation - Adaptive Management



Wellfleet Targeted Watershed Plan

Phase	Years	Nitrogen Reduction Strategies										TOTAL kg/yr		
		Wastewater Treatment		Stormwater		Fertilizer		Permeable Reactive Barrier		Shellfish			Ecological Restoration	
			kg/yr		kg/yr		k/gyr		kg/yr		kg/yr		kg/yr	
1	2022 - 2026	Establish Responsible Management Entity (RME) and Install 25 - 30 EIA systems/year	494	Rte 6 MADOT integrate N attenuation	102	Implement Fertilizer Controls	98	Pilot Project Bank/Commercial Street (50 feet)	20	Sustainable growth at 94 kg/year	462	Mayo Creek: Design, Permit & Construction	317	1834
		95 Lawrence - Permit, Design & Construct Phase 1 (Housing & Municipal Properties)	341											
2	2027 - 2031	95 Lawrence - Design & Construct Phase 2 (Connect Neighborhood Homes)	281	Additional Stormwater Retrofits	102	Implement Fertilizer Controls	98	Construct Commercial Street/Duck Creek (1000 feet)	235	Sustainable growth at 94 kg/year	462	Herring River	2456	
		Install 66 - 77 EIA systems/year	1278											
3	2032 - 2036	Install 66 - 77 EIA systems/year	1278	Additional Stormwater Retrofits	102	Implement Fertilizer Controls	98	Construct The Cove PRB projects (2000 feet)	970	Sustainable growth at 94 kg/year	462	Sunken Meadow (Hatches Creek)	2910	
		Design & Construct Supplemental Sewers and/or Neighborhood Cluster Systems	1278											
4	2037 - 2041	Install 66 - 77 EIA systems/year	1278	Additional Stormwater Retrofits	102	Implement Fertilizer Controls	98	Additional PRBs?		Sustainable growth at 94 kg/year	462	Trout Brook (Upper Basin)	1940	
		Design & Construct Supplemental Sewers and/or Neighborhood Cluster Systems	1278											
5	2042 - 2046	Install 66 - 77 EIA systems/year	1278	Additional Stormwater Retrofits	102	Implement Fertilizer Controls	98	Additional PRBs?		Sustainable growth at 94 kg/year	462	Eastern Blackfish Creek	1940	
		Design & Construct Supplemental Sewers and/or Neighborhood Cluster Systems	1278											
6	2047 - 2051	Install 66 - 77 EIA systems/year	1278	Additional Stormwater Retrofits	102	Implement Fertilizer Controls	98	Additional PRBs?		Sustainable growth at 94 kg/year	462		1940	
		Design & Construct Supplemental Sewers and/or Neighborhood Cluster Systems	1278											
N reduction			7506		612		588		1225		2772		317	13020



[95 Lawrence Rd. Information](#)[Atlas Poster](#)[Enhanced Innovative & Advanced](#)[Lawrence Road Housing Project](#)[PRB](#)[Presentations](#)[Reports & Documents](#)[Salt Marsh Restoration](#)[Shellfish](#)[Storm Water](#)[Wellfleet Watershed Plan](#)[COVID-19 Information Page - Updated Regularly Read more »](#)[Home » Boards & Committees » C-D](#)

Clean Water Advisory Committee

Executive Summary

The goal of this plan is to mitigate water quality impairments, restore marine habitats, and to bring the coastal waters associated with Wellfleet Harbor into compliance with the Clean Water Act. The plan is the product of over ten years of planning and engineering studies and integrates the approaches developed by the Cape Cod 208 Water Quality Plan Update. It is based upon a hybrid approach that integrates both traditional and non-traditional technologies to reduce excessive nitrogen loads. The plan prioritizes those technologies that have lower costs, quicker results, provide local co-benefits (including jobs), and minimize climate impacts. It includes an adaptive management plan that provides for a full evaluation of emerging nature-based technologies backed up with conventional wastewater treatment systems.

Thank you for your attention!

Questions?

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Slides for Curt Felix - Financing

Wellfleet Targeted Watershed Plan

Non-Traditional			Traditional	
Enhanced I&A	19 - 45		95 Lawrence	4.0
95 Lawrence	4.0		Sewers Town-Wide	153 - 203
PRB	4.8			
Stormwater	2.0			
Salt Marsh Restoration	1.0			
Shellfish	2.0			
TOTAL CAP COST (\$M)	33 - 59			157 - 207
Cost (\$/kg)	59 - 109			305 - 405

Capital Plan - \$6,431,886

(recommend borrowing authorization for **1st five years**)

- Innovative & Alternative (I&A) Septic Systems - \$3,750,000
 - Health Regulation Subsidy \$12,500 x 60 systems x 5 years = \$3,750,000
- 95 Lawrence Neighborhood Wastewater Treatment Project - \$1,931,886
 - Groundwater Discharge Permit \$150,000
 - Incremental cost of Cluster Sewer System \$1,781,886 capital
- Permeable Reactive Barrier (PRB) Pilot Project – Commercial St. - \$450,000
 - Hydrogeologic Investigation \$100,000
 - Pilot Project Design, Construction & Monitoring \$350,000
- Salt Marsh Restoration - \$300,000
 - Hawes Pond (Self-Regulating Tide Gate) \$150,000
 - Mayo Creek (Self-Regulating Tide Gate) \$150,000

O&M Plan \$432,746

(recommended appropriation for 1st 5 years)

- Innovative & Alternative (I&A) Septic Systems - \$100,000
 - Responsible Management Entity Contract \$100,000 (Sub Contract)
- 95 Lawrence Neighborhood Wastewater Treatment Project - \$52,746
 - Incremental cost of cluster O&M \$52,746
- Shellfish Propagation - \$80,000
 - Additional Cultch & Seed \$40,000
 - Rotating 3-year closure program \$40,000
- Project Management - \$200,000
 - Grant Writer
 - Water/Wastewater Director
 - Monitoring, Testing, Compliance

Preliminary Grant/Revenue Sources 25-75%

- Advanced Septic Systems - \$3,750,000
 - Short-term rental tax revenue (~\$500,000/yr)
 - SRF Smart Growth – 25% forgiveness
 - USDA Rural – 50-75% grant
 - Cape Cod Water Protection Fund – 50% projects under \$1 million
 - Rural/Small Town Growth Initiative \$50,000-\$400,000
 - Section 319 Federal Grants (non-point source) up to \$500K
 - Privatized Cost to regulation.
- 95 Lawrence Neighborhood Wastewater Treatment Project - \$1,931,886
 - SRF/USDA
 - Rural/Small Town
 - Massworks
- Permeable Reactive Barrier (PRB) Pilot Project – Commercial St. - \$450,000
 - DEP/EPA Grant (they have already expressed interest in support)
 - All of the above
- Salt Marsh Restoration - \$300,000
 - All of the Above (MassDOT will cover engineering & permit costs for Hawes Pond; construction?)
- Shellfish Propagation - \$80,000
 - All of the above

Benefits

- Lower Cost
 - \$28,000 per residence vs. over \$90,000
 - Likely \$20-\$40 million financed in increments over time vs.
 - \$100-\$200 million immediately in tax base
- Greater financial control with annual financial discussion
- No risk of “overbuild”
- Maintains local control and local jobs
- 50% reduction in leachfields aids all residential and commercial permit applicants
- More immediate watershed benefits
- Lower
 - energy,
 - water and
 - climate change impact required by 2020 ATM vote
- Very little long-term O&M