Summary of the Town of Truro Comprehensive Watershed Management Plan (CWMP) – Draft Alternatives Screening Analysis and Recommended Plan (October 2025)

Purpose and Context

The Town of Truro's *Comprehensive Watershed Management Plan (CWMP)* provides a 20-year framework (2027–2047) for managing nitrogen pollution to protect water quality in its three coastal watersheds: **Wellfleet Harbor**, **Pamet River**, and **East Harbor (Provincetown Harbor)**. Prepared by GHD for MassDEP compliance under *314 CMR 21 (Watershed Permit Regulations)*, it builds upon the *Massachusetts Estuaries Project (MEP)* and *Cape Cod Commission (CCC)* watershed reports. Excess nitrogen from septic systems, fertilizers, and stormwater runoff has been identified as the principal driver of eutrophication, algal blooms, and loss of marine habitat in these systems, threatening both ecological and economic vitality.

Watershed Overview and Reduction Goals

Only **Wellfleet Harbor** currently has a formal nitrogen *Total Maximum Daily Load (TMDL)*. For **Pamet River** and **East Harbor**, which lack TMDLs, the CCC recommends a provisional 25 % nitrogen-load reduction target. Truro's nitrogen-load analysis estimates a total reduction need of about **1,500 kg N/yr**, distributed as follows:

Watershed	**Current Reduction Goal (kg N/yr)**	**2047 Goal (kg N/yr)**
Wellfleet Harbor	90	90
East Harbor	289	317
Pamet River	1,125	1,141
Total	**1,504**	**1,548**

The average single-family home septic system discharges roughly 4.7 kg N/yr, illustrating the magnitude of cumulative septic impacts.

Analytical Framework

The *Alternatives Screening Analysis* evaluated both **conventional** and **alternative** nitrogen-management technologies for technical feasibility, nitrogen-removal efficiency, cost-effectiveness, and scalability.

- *Conventional controls* include sewering, cluster treatment systems, and MassDEP-approved “General Use” nitrogen-reducing septic systems.
- *Alternative controls* encompass “Provisional Use” innovative onsite systems, fertilizer bylaws, stormwater best-management practices (BMPs), permeable reactive barriers (PRBs), and pilot measures such as shellfish aquaculture or inlet modification.

The CWMP follows an **Adaptive Management** model: pilot technologies are monitored, with a contingency plan of proven conventional systems ready for implementation if pilots underperform.

Watershed-Specific Management Plans

1. Wellfleet Harbor – Truro contributes only ~2 % of watershed nitrogen, mostly within Cape Cod National Seashore.

- *Recommended Plan*: stormwater BMPs (54 kg N/yr) + fertilizer bylaw (51 kg N/yr) = ~105 kg N/yr reduction.
- *Contingency*: retrofit existing Title 5 systems with General Use nitrogen-reducing units (~92 kg N/yr). Both options exceed the 90 kg N/yr goal.

2. East Harbor (Provincetown Harbor) – Focus on Beach Point and Pilgrim Heights, where 85 % of land lies within the Seashore and stormwater from Route 6 drains directly to East Harbor.

- *Alternative 1*: stormwater BMPs + fertilizer bylaw + Provisional Use onsite systems → ~318 kg N/yr reduction.
- *Alternative 2*: sewer connection for Shore Drive properties (361–563) to the Provincetown WWTF → ~989 kg N/yr removal. Further hydrologic and cost analysis is advised before selecting a final approach.

3. Pamet River – Entirely within Truro, roughly half inside the National Seashore.

- *Recommended Plan*: PRB (112 kg N/yr) + stormwater BMPs (186) + fertilizer bylaw (66) + cluster system east (220) + Provisional Use onsite systems (561) ≈ 1,145 kg N/yr.
- *Contingency*: two cluster systems (303 + 227) + General Use onsite systems (614) ≈ 1,144 kg N/yr. Both meet or slightly exceed reduction targets.

Implementation and Management

A **Responsible Management Entity (RME)**—potentially a Town department or contracted administrator—will oversee installation, operation, and monitoring of onsite nitrogen-reducing systems and ensure regulatory compliance.

The **Adaptive Management Program** includes four five-year phases (2027–2046):

1. **2027–2031** – Adopt fertilizer bylaw, begin stormwater programs, pilot nitrogen-reducing systems, and file for a Wellfleet Harbor Watershed Permit.
2. **2032–2036** – Install PRB and Pamet River East cluster; continue system upgrades.
3. **2037–2041** – Expand nitrogen-reducing onsite installations.
4. **2042–2046** – Complete onsite installations and evaluate results.

Each phase culminates in a *Watershed Management Update Report* to refine actions based on monitoring data.

Cost Estimates (2025 $)

Strategy	**Recommended Plan**	**Contingency Plan**
Stormwater BMPs	$ 8.66 M	–
Permeable Reactive Barrier	$ 1.38 M	–
Nitrogen-Reducing Onsite Systems	$ 9.06 M	$ 32.82 M
Cluster Systems (East/West Pamet)	$ 4.46 M	$ 12.25 M
Centralized Sewering (Provincetown WWTF)	–	$ 14.78 M
Total Capital Cost	**$ 23.6 M**	**$ 59.9 M**

Non-structural strategies such as fertilizer regulations carry negligible capital cost but rely on community compliance and enforcement.

Environmental and Climate Considerations

The CWMP integrates **climate-resilience design standards** to account for sea-level rise, intensified storms, and flooding, particularly affecting coastal PRBs, cluster systems, and stormwater infrastructure. A greenhouse-gas (GHG) review indicates that decentralized alternatives (e.g., onsite systems and PRBs) generate substantially fewer lifecycle GHG emissions than centralized sewering, while providing opportunities for **solar PV integration** and **water-reuse** initiatives.

Environmental Impact and Justice

Environmental assessments conclude that implementing the Recommended Plan would **enhance surface and groundwater quality**, protect aquatic habitats, and sustain recreational and aesthetic resources. Minor construction-related impacts—noise, traffic, and temporary soil disturbance—are considered manageable through standard mitigation. An **Environmental Justice (EJ)** screening found no disproportionate adverse impacts; bilingual notifications and inclusive public engagement are incorporated into the MEPA process.

Governance, Funding, and Next Steps

Next steps include:

- Filing the **Expanded Environmental Notification Form** and securing a **Single Environmental Impact Report** under MEPA.
- Establishing the **RME** framework and financing strategy through state Clean Water State Revolving Fund (CWSRF) loans, grants, and potential homeowner cost-share programs.
- Conducting feasibility and pilot studies for the **East Harbor** sewer or PRB options and for **Little Pamet River** delineation.
- Periodic coordination with MassDEP for adaptive adjustments and performance verification.

Overall Findings

The CWMP presents a **balanced, phased, and data-driven nitrogen-management strategy** combining regulatory, natural, and engineered approaches. The **Recommended Plan**—costing about one-third of the Contingency Plan—relies on innovative decentralized measures that can achieve regulatory compliance with lower carbon emissions and greater flexibility. Success will depend on robust monitoring, public participation, and sustained funding to protect Truro's estuaries, drinking water, and coastal ecology through mid-century.

Source: Town of Truro Comprehensive Watershed Management Plan (Alternatives Screening Analysis Report and Draft Recommended Plan – October 2025)