

Chapter 1

Introduction

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1.1 REPORT IDENTIFICATION AND PURPOSE

This Final Interim Needs Assessment and Alternatives Screening Analysis Report is the first major report (Phase I) of the Town of Eastham Wastewater Management Planning Project. The purpose of the report is to evaluate the wastewater needs of the Town of Eastham (Town), and identify and screen alternative solutions to meet the needs. The report ends by identifying a group of alternative wastewater management plans for the Town and the identification of specific areas of need in town. These alternative plans will be evaluated in the next phase of the project to develop the Plan Evaluation Report. Comments received from the Town on the Draft Interim Needs Assessment and Alternatives Screening Analysis Report have been addressed (see Appendix 1-1) and incorporated into the Final Report where applicable.

1.2 PROJECT BACKGROUND AND MAIN ISSUES

The Town of Eastham is located in the lower portion of Cape Cod as shown in Figure ES-1. The Town is a seasonal community with a year-round population of 5,450 that swells to approximately 21,800 when seasonal residents, tourists, and day trippers arrive for the summer season. The Town does not have a municipal drinking water supply system or a municipal wastewater management system. Nearly all properties are serviced by private drinking water wells except for a few residential properties along the southern boundary that are serviced by the Orleans Public Water System. All of the properties are serviced by individual on-site septic systems.

Sampling and nitrate analysis of the private drinking water supply wells since 1984 indicate that the number of private wells with elevated nitrate levels have increased. The increased nitrate levels indicate that groundwater quality is declining. The individual on-site septic systems

located on the same lots (or neighboring lot) as the private drinking water wells are believed to be the nitrate source.

There is concern that the nitrate is an indicator of many septic system contaminants currently not being analyzed in the groundwater (phosphorus, volatile organic compounds, personal care products, pharmaceuticals, etc.) that may be reaching the private wells and causing a public health threat.

There is also concern that these nutrients and contaminants may be reaching the coastal estuaries and the freshwater ponds in Eastham and causing excessive algae production which, in turn causes degraded surface-water quality. This type of pond and estuary degradation is called eutrophication.

The Town is working on a municipal drinking water supply program and is considering a plan to extend municipal water supply to all properties in Town. Efforts to fund implementation of the plan have been unsuccessful at town meeting due, in part, to issues about wastewater management. One goal of this wastewater management project is to address these issues.

Massachusetts Department of Environmental Protection (MassDEP) (and residents in Town) are concerned about possible eutrophication in the coastal estuaries and MassDEP has initiated the Massachusetts Estuaries Project (MEP) for a group of 89 estuaries in Southeastern Massachusetts. They plan to develop the nitrogen limits (quantity of nitrogen that enters the estuary from its watershed before eutrophication and water quality problems occur) for the estuaries. These nitrogen limits will then become regulatory limits called Total Maximum Daily Loads or TMDLs that will be enforced by the State or Federal Governments. The following three estuaries that have watersheds extending into Eastham will have TMDLs developed as part of this program:

- Rock Harbor
- Nauset Harbor / Salt Pond / Mill/Muddy Pond / Town Cove System
- Wellfleet Harbor

The TMDLs may require significant wastewater management to mitigate current nitrogen loadings from septic systems to the watersheds and estuaries.

The Cape Cod Commission and a dedicated group of “pond-watchers” are concerned about possible eutrophication in the freshwater ponds and have initiated a pond monitoring program and an assessment of water quality in several ponds. The water quality assessment (and subsequent evaluations) indicates that significant wastewater management may be required to correct current phosphorus loadings from septic systems to the watersheds and ponds.

The watersheds to these coastal estuaries and freshwater ponds are illustrated in Figure ES-1 with estimated wastewater removals to address estimated existing nitrogen and phosphorus loadings.

A primary goal of this report and overall project is to quantify these wastewater issues and define them as “wastewater needs,” and then develop management and treatment solutions to address these needs.

1.3 PLAN OF STUDY

The Plan of Study has been divided into five phases. A brief listing of the tasks associated with each phase follows, and a detailed Plan of Study for the project (as submitted to MassDEP) is included in Appendix 1-2.

A. Phase I – Interim Needs Assessment, and Identification and Screening of Alternative Solutions and Sites

1. Review and Summarize Town Issues and Project Background.
2. Review and Summarize Regulatory Issues Affecting Wastewater Management Planning.
3. Evaluate, Summarize, and Describe Existing and Future Conditions in Town Including Nitrogen Limits.
4. Identify the Goals and Objectives of the Town Related to Wastewater Management.
5. Summarize the Wastewater Related Needs of the Town.

6. Identify, Review and Summarize Alternative Solutions to Meet the Town's Wastewater Management Needs.

7. Screen the Alternative Solutions to Identify the Most Feasible Ones for Detailed Evaluation.

8. Identify and Screen Potential Sites for Wastewater Management Facilities.

9. Group Feasible Solutions and Sites into Alternative Wastewater Management Scenarios.

10. Prepare the Interim Needs Assessment and Alternatives Screening Analysis Report by Summarizing the Tasks of this Phase.

B. Phase II – Revised Needs Assessment, and Identification and Screening of Alternative Solutions and Sites

C. Phase III– Detailed Evaluation and Development of the Comprehensive Wastewater Management Plan

The first task will be to evaluate the alternative wastewater management plans developed in Phase I and II, and develop a broad based plan that can be presented at Town Meeting. If the Town wants to finalize the plan to a full Comprehensive Management Plan, the following tasks are needed:

1. Perform Subsurface and/or Environmental Investigations for Potential Wastewater Management Sites.

2. Prepare a Methodology of the Planned Detailed Evaluations for Project and Regulatory Review.

3. Perform Present-Worth Evaluations of the Alternative Scenarios.

4. Perform Non-Monetary Evaluations of the Alternative Scenarios.

5. Perform an Environmental Impact Analysis of the Alternative Scenarios.
6. Evaluate the Present-Worth, Non-Monetary Factors, and the Potential Environmental Impacts (and Benefits) of the Alternative Management Scenarios to Select the Most Appropriate One.
7. Develop and Present the Recommended Wastewater Management Plan, and Prepare the Draft Comprehensive Wastewater Management Plan (DCWMP) Report.
8. Submit The DCWMP Report For Regulatory and Public Reviews.

D. Phase IV – Resolution of Remaining Issues and Project Completion

1. Resolve Remaining Issues.
2. Modify the DCWMP to Prepare the Final Comprehensive Wastewater Management Plan (FCWMP) Report, and Submit it for Review.

E. Phase V – Complete Environmental and Public Review Processes

1. Utilize the Eastham Wastewater Management Planning Committee for Project Reviews and Public Outreach.
2. Prepare and Conduct a Public Participation Program.
3. Submit and Coordinate the Public Review of the Environmental Notification Form.
4. Submit and Coordinate the Public Review of the Draft Comprehensive Wastewater Management Plan and Draft Environmental Impact Report (DCWMP/DEIR)
5. Submit and Coordinate the Public Review of the Final Comprehensive Wastewater Management Plan and Final Environmental Impact Report (FCWMP/FEIR).
6. Coordinate the Needed Public Meetings and Hearings to Comply with State and Regional Regulations as well as Meet the Informational Needs of the Community.

1.4 ORGANIZATION OF THE INTERIM NEEDS ASSESSMENT AND ALTERNATIVES SCREENING ANALYSIS REPORT

The Interim Needs Assessment and Alternatives Screening Analysis Report is written to summarize the tasks identified in Phase I of the Plan of Study. It is called an “interim” report because all of the nitrogen and phosphorus limits have not been developed by MassDEP and the Cape Cod Commission, and it is envisioned that the final needs will be determined once those limits are released.

The report is divided into fourteen chapters. Chapter 1 presents general introductory information about the planning project and key watershed related issues in the Town of Eastham. Chapters 2 and 3 describe the technical data and regulatory issues (respectively) that were reviewed as part of the evaluations. Chapter 4 describes the existing and future conditions in Eastham and establishes the basis for the subsequent evaluation. These are the existing and future conditions that define the wastewater-related needs that are then summarized in Chapter 5.

Chapter 6 begins the process of identifying alternative technologies to meet the needs and the screening criteria used to do so. A complete analysis was conducted to identify all feasible alternatives that could be a component in a future plan. The alternative solutions are divided into categories and described in the following chapters:

- Chapter 7, On-Site Drinking Water and Wastewater Treatment Technologies
- Chapter 8, Community/Municipal Drinking Water Supply and Wastewater Treatment Technologies
- Chapter 9, Collection System Technologies
- Chapter 10, Treated Water Recharge Technologies
- Chapter 11, Potential Sites for Drinking Water Supply, Wastewater Treatment and Recharge Facilities
- Chapter 12, Flow and Loading Reduction Alternatives
- Chapter 13, Additional Non-Wastewater Nitrogen Mitigation Alternatives

These alternatives are all discussed and key advantages and disadvantages are summarized to provide an understanding of the usefulness of each alternative to solving the wastewater related needs in Eastham.

Chapter 14 provides a screening summary of these alternatives to identify the ones that are the most appropriate for the Town. This Chapter ends with a group of alternative management plans (with typical costs per residence) for the whole Town and for areas of Town that have specific needs. The alternative management plans identified are recommended to receive additional detailed evaluation during the development of Phase III of the Plan of Study.