

Chapter 1

Introduction

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1.1 PROJECT IDENTIFICATION AND PURPOSE

The purpose of the Comprehensive Wastewater Management Planning (CWMP) Project is to provide an environmentally and economically sound plan for wastewater treatment and recharge, and nitrogen management in Chatham for the next 20 years and to serve as the foundation for the Town to build upon beyond that. The Project (a) evaluates the Town's existing wastewater treatment facility and collection system, (b) addresses nitrogen loading impacts to the Town's coastal embayments, (c) identifies and evaluates wastewater problems for all areas of the Town, and (d) provides a plan to address these wastewater and nitrogen-loading problems.

The Town of Chatham faces unusual challenges in wastewater and nitrogen management. The Town is surrounded on three sides by water and possesses natural beauty and fishing resources that attract thousands of vacationers each year. These vacationers and the year-round fishing industries strongly support the economy on which the Town depends. Nitrogen discharged to groundwater from septic systems and other sources is impacting the Town's numerous sensitive coastal embayments and could threaten the natural beauty of this area, the year-round fishing industry, and the local economy. The 1999 Needs Assessment Report (NAR) identified several watersheds as impacted by excessive nitrogen loadings, and additional study since 1999 has shown that the nitrogen impacts extend to all of the Town's estuaries and coastal embayments.

The Project began in 1998 with the first of three phases completed in the form of the 1999 NAR. After completion of the NAR, there was a long delay as the Massachusetts Estuaries Project (MEP) came into existence and developed more detailed nitrogen loading thresholds and limits for the Town's major coastal embayments. These limits are summarized in several technical reports and technical memoranda that identify the nitrogen concentrations that should be maintained in these water bodies to restore eelgrass beds and restore a more natural habitat to the

estuaries. These reports and memoranda also identify the nitrogen loadings (the actual mass of nitrogen per day) that would be allowed from the watershed to the waterbody. These watershed nitrogen loading values have been developed into regulatory limits called Total Maximum Daily Loads (TMDLs) by Massachusetts Department of Environmental Protection (MassDEP).

The primary purpose of this Draft Comprehensive Wastewater Management Plan and Draft Environmental Impact Report (DCWMP/DEIR) and the Notice of Project Change (NPC) Document is to summarize the significant body of work completed to evaluate the wastewater and nitrogen related problems in the Town of Chatham and develop a recommended plan to implement a Town-wide solution to address these problems. A second purpose of this document is to submit a NPC to the previously approved environmental review process due to the long time period since the last environmental review certificate from the Commonwealth of Massachusetts Executive Office of Environmental Affairs (now the Executive Office of Energy and Environmental Affairs - EOEEA) on this project. This NPC is a completed form attached as the last chapter of this document and is submitted to meet the State's environmental review regulations.

This DCWMP/DEIR will receive environmental review through the Commonwealth's Massachusetts Environmental Policy Act (MEPA) requirements and then be revised and submitted as a Final Comprehensive Wastewater Management Plan and Final Environmental Impact Report (FCWMP/FEIR). These documents (the draft and final versions of the CWMP) will provide a Recommended Plan for wastewater and nitrogen management in the Town of Chatham for the foreseeable build-out time period in Chatham. A CWMP is typically prepared for a 20-year planning period which was originally established for the Project from 2000 to 2020 (when the project was started in 1998). A revised planning period of 2010 to 2030 is now proposed due to the long time required to define the nitrogen limits and complete the plan. The year 2011 is projected to be the approximate first year of operation of improved wastewater treatment facilities in Chatham and 2013 is projected to be the completion date for the first major sewer extension in Chatham as part of the Phase 1 sewerage plan.

1.2 PROJECT LOCATION

The Town of Chatham is located at the elbow of Cape Cod (southeastern corner) as shown on Figure 1-1. The Town is surrounded on three sides by water; Nantucket Sound to the south,

Chatham Harbor and the Atlantic Ocean to the East, Pleasant Bay and Muddy Creek to the North.

1.3 COMPREHENSIVE WASTEWATER MANAGEMENT PLANNING PROJECT SCOPE

The Chatham Comprehensive Wastewater Management Planning Project has been divided into five phases. A brief listing of the major tasks associated with each phase follows:

A. Phase 100: Project Administration and Support.

- Provide project administration throughout the project.
- Coordinate wastewater planning activities with other Town planning activities.
- Provide public participation support.

B. Phase 200: Project Scoping and Environmental Documents Preparation and Filing.

- Collect and review available data pertinent to the project.
- Develop the Detailed Scope of Services and involve the necessary regional, State and national regulatory agencies in the scoping and review process.
- Prepare and file the Environmental Notification Form (ENF) and the Development of Regional Impact (DRI) documents.

C. Phase 300: Needs Assessment.

- Review and evaluate the existing conditions in Chatham including land use, population growth patterns, wastewater collection and disposal, groundwater conditions, nitrogen loading in water supply and coastal embayment zones of contribution, environmentally sensitive areas, water supplies, regulatory issues, Chatham Wastewater Treatment Facility (WWTF) and the existing centralized wastewater collection system.
- Develop and describe future conditions in the Town including projected population, water consumption and wastewater disposal volumes, including seasonal fluctuations.

- Identify areas of Town that experience problems related to wastewater treatment and disposal.
- Identify the No Action Alternative.
- Summarize Phase 300 work in a Needs Assessment Report.

D. Phase 400: Development and Screening of Alternatives.

- Identify and develop alternative technologies (both conventional and innovative), solutions, and plans to meet the Town’s wastewater needs.
- Identify and develop decentralized treatment and recharge alternatives.
- Identify and develop centralized treatment and recharge alternatives.
- Identify and develop collection system alternatives.
- Identify and develop residual management and disposal alternatives.
- Identify and develop flow and loading reduction alternatives including water and wastewater pricing policies, low flush and composting toilets, and water reuse.
- Identify potential sites for potential wastewater facilities.
- Screen the alternative technologies, solutions, and plans to select alternatives that will receive a detailed evaluation.
- Summarize the Phase 400 work in the Screening Analysis Report.

E. Phase 500: Detailed Evaluation of Recommended Plan.

- Further develop the alternative solutions and plans for detailed evaluation.
- Perform a cost effectiveness analysis.
- Perform an evaluation of non-monetary factors and an environmental impact evaluation.
- Prepare a recommended plan and a schedule for its implementation.
- Summarize Phase 500 work in a Comprehensive Wastewater Management Plan and Draft and Final Environmental Impact Reports.

The full Project Scope was included in the Environmental Notification Form and Development of Regional Impact documents, which are available at the Town Library.

1.4 ENVIRONMENTAL REVIEW PROCESS

The CWMP Project is undergoing a joint review process with the Massachusetts Executive Office of Energy and Environmental Affairs MEPA Unit and the Cape Cod Commission. On September 8, 1999 the Final Needs Assessment Report was submitted to these two regulatory agencies for their review and comment. A public hearing was held on September 23, 1999 to discuss the findings of this report and receive public comment. This review resulted in the issuance of the October 29, 1999 Certificate of the Secretary of the Executive Office of Environmental Affairs (now the Executive Office of Energy and Environmental Affairs), which is attached as Appendix A.

Due to the elapse of over eight years since the submittal of the 1999 NAR and the release of the EOEEA Secretary's Certificate, the Town filed its first NPC on February 27, 2004 to restart the Project and modify the environmental review process. This first NPC requested that the review process be modified to combine Phase 400 and 500 (Alternative Screening and Detailed Evaluation Phases respectively) to streamline the review process. It also requested that a Supplemental Needs Assessment be prepared to address several issues that were raised after review of the Needs Assessment Report. The environmental review Certificate for this NPC was issued on April 9, 2004 and is attached in Appendix B. A second NPC is submitted as part of this document due to the long time period since the last environmental Certificate and to further streamline the review process by combining the Supplemental Needs Assessment information into this document.

1.5 IDENTIFICATION OF PREVIOUS PROJECT DOCUMENTS AND EVALUATIONS

A. Final Needs Assessment Report for Comprehensive Wastewater Management Planning Study, August 1999. The Needs Assessment Report was the first report prepared as part of the CWMP process and predated the work of the Massachusetts Estuaries Project (MEP). The report summarized information on the Town's existing and future conditions including natural resources, land use, populations, water usage, estimated wastewater flows and loadings, and seasonal variations. This information was then used to identify areas of needs within the Town including impacts to coastal embayments and freshwater systems in addition to identifying other areas of needs including improvements at the existing WWTF, collection system, and

effluent recharge facilities; water supply needs; impacts from on-site septic systems; and industrial areas. This report can be viewed and obtained at the Town of Chatham's website of: http://www.chatham-ma.gov/public_documents/ChathamMa_CWMPPlan/CWMP.

B. Action Plan for the Town of Chatham Ponds, November 2003. This report summarizes the water quality and aquatic habitat conditions of the freshwater ponds of Chatham, and recommends measures to protect and restore these waters. Twenty inland ponds were evaluated as part of this report. The report defines options for protection and improvement of the freshwater ponds, develops a set of specific recommendations (both short and long-term), and presents an implementation strategy for the Town. This report is attached as Appendix C and can be viewed and obtained at the Town of Chatham's website of: http://www.chatham-ma.gov/public_documents/ChathamMa_CWMPPlan/CWMP.

C. NPC Dated February 27, 2004. This first NPC was prepared and submitted for environmental review because more than three years had passed since the last environmental review document, and because the Town requested a change in Scope as stated in the previously issued Certificate. The proposed Scope change was the combination of the Phase 400 (Identification and Screening of Alternatives) and Phase 500 (Detailed Evaluation and Recommended Plan) into one document. The Secretary's Certificate for the April 9, 2004 NPC is contained in Appendix B.

D. Technical Memorandum on findings of USGS Modeling for Effluent Recharge Alternatives and Effects on the Landfill Plume, July 2005. This Technical Memorandum summarized evaluations completed by United States Geologic Survey (USGS) to investigate possible effects of increased recharge of treated water at the WWTF site to the groundwater under the capped landfill which is adjacent to the WWTF site. It is noted that groundwater evaluations performed as part of the landfill capping project did not find any contamination that exceeded State standards but there was concern that a possible plume might exist, and its movement could be influenced by increased hydraulic recharge at the WWTF site. The evaluations summarized in the Technical Memorandum found that increased recharge at the site *would not relocate a potential landfill plume to the Indian Hill Well Public Water Supply and would not cause a resulting public health problem.* This was a major finding because previous concerns by the Massachusetts Department of Environmental Protection (MassDEP) of such a ground water relocation had limited the treatment and recharge capacity at the site to 0.15

million gallons per day (mgd). MassDEP has since agreed to the findings of the Technical Memorandum and is planning to remove the past treatment and recharge capacity limit. A copy of the Technical Memorandum is attached in Appendix D.

E. Infiltration Loading Test, July 2006. This report describes the testing that was completed to determine the WWTF site's suitability for receiving and infiltrating treated water. The report reviewed the site conditions, testing procedures and the findings of the testing. Findings of the report identified the infiltration capacity of the site at 30 gallons per day (gpd/sf) which is greater than typically allowed for treated water recharge facilities. MassDEP was receptive to the infiltration capacity estimate; however MassDEP requested additional localized groundwater modeling in the area. This report is attached as Appendix E and can be viewed and obtained at the Town of Chatham's website of:

http://www.chatham-ma.gov/public_documents/ChathamMa_CWMPPlan/CWMP.

F. Treated Water Recharge Site Evaluations, Drafted in June 2004 and Finalized in June 2007. This final report summarizes the findings of these evaluations performed between 2003 and 2006, and incorporated some of the findings developed as part of the Preliminary Design developed in April 2006. The report summarizes the site investigations and soil conditions found at six sites evaluated around Town. Sites included the existing WWTF, Town owned golf course, airport, high school, Volunteer Park, and a piece of Town owned land located in the northeast part of Chatham. Estimated treated water (effluent) recharge capacities were presented based on various recharge technologies. A copy of this report is included in Appendix F.

G. Technical Memorandum on Findings of Groundwater Modeling for Treated Water Recharge at Existing WWTF Site and Site No. 1, June 2007. This memorandum summarized the groundwater modeling evaluations requested to answer remaining questions on treated water recharge at the existing WWTF and Site No. 1 which is located to the north of the WWTF site. The findings indicated:

- There would be no mounding impacts from a recharge of treated water at these sites associated with sewer extension to all properties in the Town (a maximum-month recharge of 3.1 mgd at historic high groundwater conditions).

- The design loading rate of 30 gpd/sf identified in the July 2006 Loading Test Report was identified to be feasible.
- The modeled transport of treated water was identified.

This Technical Memoranda is attached in Appendix G.

H. Collection System and Wastewater Treatment Facilities Preliminary Designs, April 2006. Two three-ring binders were prepared in 2006 to provide summaries of the findings and evaluations used in development of preliminary design plans for a potential Town-wide collection system and a phased approach for improvements for the existing WWTF. The improvements to the WWTF would provide a facility that would achieve 3 mg/L total nitrogen.

The preliminary design was prepared to illustrate how a Town-wide wastewater collection, treatment and recharge system could be planned and designed for the Town's build-out condition. The preliminary design is developed to potentially accommodate the complete sewerage of Chatham under the build-out condition. It is also developed in a flexible manner to accommodate the possibility that the entire Town may never become sewerage in the future, or to allow expansion over several phases. This preliminary design is summarized as part of the Recommended Plan of this document.

1.6 RELATED REGIONAL PROJECTS

The following regional projects have been completed or are ongoing on Cape Cod to develop information that has been incorporated into the wastewater facilities planning project. The Town of Chatham has been very active in participating in these various regional efforts.

A. Massachusetts Estuaries Project (MEP). This project is a collaborative effort between MassDEP, University of Massachusetts (UMass) School of Marine Science and Technology (SMASST), the United States Geological Survey (USGS), and the Cape Cod Commission (CCC) to develop nitrogen loading limits for a group of 89 coastal embayments in Southeastern Massachusetts. Full details on this project can be viewed at www.state.mass.gov/dep/smerp/smerp.htm. The main components of this effort include:

1. Watershed delineation by USGS staff.

2. Nitrogen loading assessment for the watershed by the CCC Water Resources staff.
3. Tidal flushing evaluations and hydrodynamic model development by Applied Coastal Research and Engineering, Inc. (ACRE).
4. Specialized coastal surveys, monitoring, and analysis by SMAST staff and development of water quality models.
5. Nitrogen concentration threshold and loading limit development by SMAST, MassDEP, and ACRE staffs.
6. Technical guidance information.

The MEP has recently developed nitrogen limits for the Pleasant Bay, Stage Harbor, Sulphur Springs, Taylors Pond, Bassing Harbor, and Muddy Creek systems. In addition, the MEP project has developed the Cockle Cove Creek Salt Marsh Nitrogen Concentration Threshold.

B. Cape Cod Commission and Barnstable County Regional Efforts. The CCC has initiated several regional efforts that are ongoing or recently completed as briefly discussed below:

1. Formation and coordination of the Cape Cod Water Protection Collaborative, which meets regularly to discuss wastewater initiatives. This is an effort by the county to follow up on recommendations of the Association to Preserve Cape Cod (APCC) and the Barnstable County Business Round Table to develop a Cape Cod regional entity to assist Town efforts to implement wastewater facilities. A primary purpose for the Collaborative is to assist in obtaining grants and low interest loans for these projects. The Town of Chatham is represented on the main Collaborative Committee by Robert Duncanson, Ph.D., and on the Collaborative Technical Advisory Committee by Robert Duncanson, Ph.D.
2. Funding and development of several regional wastewater planning and coordination effort and reports.

3. Coordination with USGS and Cape Cod towns to provide groundwater modeling services. This effort is an offshoot of USGS efforts to delineate coastal and pond watershed areas and contributing areas to public water supplies. This project has become an efficient method to investigate potential effects of treated water recharges using the USGS regional groundwater model. The results of this modeling activity for Chatham are presented in Chapter 7.

1.7 ORGANIZATION OF THIS DCWMP/DEIR

The Draft Comprehensive Wastewater Management Plan/Draft Environmental Impact Report is written to provide an update of the planning process since the 1999 NAR report's distribution and summarize the findings of tasks identified in Phases 400 and 500 of the Project Scope.

The report text is all contained in Volume 1 of this document. Volume 2 contains the report figures and tables to make reference to these items as easy as possible. The referenced Appendix items (Volumes 3 and 4) are contained on two compact disks at the end of Volume 2.

This Report is divided into eleven chapters:

- Chapter 1 presents general introductory information about the CWMP Project.
- Chapter 2 summarizes the main findings of previous documents prepared for the CWMP.
- Chapter 3 identifies the public participation program implemented as part of the CWMP to gain public understanding and support of Project efforts to find the best solution for the Town's wastewater and nitrogen problems.
- Chapter 4 describes the MEP project reports for Chatham and summarizes their findings.
- Chapter 5 presents the evaluation of centralized wastewater treatment alternatives including residuals management and collection systems.
- Chapter 6 presents the evaluation of decentralized wastewater treatment as it applies to Chatham.
- Chapter 7 summarizes the findings of the treated water recharge technologies and site evaluations, and reviews additional reuse technologies.
- Chapter 8 presents the non-wastewater nitrogen mitigation alternatives.

- Chapter 9 identifies and summarizes the various alternative management plans developed as part of the CWMP.
- Chapter 10 presents a summary of the environmental impact analysis of these alternative management plans.
- Chapter 11 presents the recommended plan, and identifies the implementation schedule, financial considerations and additional evaluations.
- Chapter 12 presents a second NPC submitted to streamline environmental review process and provide formal notification due to the long (greater than three years) time period since the last environmental certificate.