

Town of Orleans Comprehensive Wastewater Management Plan

EXECUTIVE SUMMARY

OVERVIEW

The Town of Orleans has developed a Comprehensive Wastewater Management Plan to guide the improvement of coastal estuaries and freshwater ponds to meet state and federal mandates. The plan is highly adaptable to accommodate measured progress in water quality improvement, future regional opportunities, effectiveness of lower-cost alternatives, and availability of favorable financing. To meet current mandates, a municipal sewer system is needed to serve one-half of Orleans' developed properties at an estimated capital cost of \$150 million to be spent over 15 to 20 years. The plan also accommodates the option of later providing town-wide sewers, if needed or desired in the future, at an added cost of \$95 million. Appropriation requests will be brought before future Town Meetings for each phase of the plan.

INTRODUCTION

In 2000, the Town of Orleans embarked on a multi-year, multi-phase process to determine the best ways to improve wastewater management practices. This process has been called Comprehensive Wastewater Management Planning, and the result is a Comprehensive Wastewater Management Plan or CWMP. The CWMP has three principal segments that are summarized in this report:

- **Needs Assessment**
- **Identification and Evaluation of Alternatives**
- **Development of Recommended Plan**

NEEDS ASSESSMENT

Private on-lot disposal, in conformance with the State Sanitary Code (Title 5), adequately protects Orleans citizens from the potential public health problems associated with improperly designed or located wastewater disposal systems. Orleans' principal wastewater-related problems lie in the control of nutrients that are only poorly removed from typical septic systems. A systematic appraisal of town-wide wastewater practices demonstrated the need to eliminate 2,800 private septic systems for the purposes of:

- Protection of coastal waters from excessive nitrogen loading, and
- Protection of freshwater ponds from high phosphorus loading.

Elimination of 52% of the individual septic systems in Orleans, and construction of a municipal wastewater system, is needed to control these nutrients to meet state and federal requirements and to help protect 8 priority ponds. The Needs Assessment is presented in Sections 2, 3 and 4 of this report.

IDENTIFICATION AND EVALUATION OF WASTEWATER MANAGEMENT ALTERNATIVES

The Town's Wastewater Management Steering Committee (WMSC) embarked on a thorough evaluation of many technologies and techniques for reducing nutrient loading to fresh and marine waters. First, all available solutions were analyzed to identify those most applicable to Orleans. Next, nine wastewater plans were formulated from these applicable technologies, including centralized and decentralized systems, a range of effluent disposal techniques, and sites all across Orleans. Each plan was evaluated against 16 factors and the resultant ratings were used to reduce the candidate plans to these three:

- Plan 1** Decentralized Treatment and Disposal in All Major Watersheds
- Plan 2** Centralized Treatment and Disposal at the Tri-Town Site (Namskaket Watershed)
- Plan 3** Centralized Treatment in South Orleans with Disposal on Golf Courses in the Pleasant Bay Watershed.

The WMSC conducted a very thorough analysis of these three plans using 20 criteria, including such factors as cost, energy use, environmental impact, treatment plant site suitability, regulatory acceptability, amenability to regionalization, and overall public acceptability. The formulation of the plans and the WMSC evaluation are described in Sections 5 through 10 of this report.

DESCRIPTION OF THE RECOMMENDED WASTEWATER MANAGEMENT PLAN

Based on the WMSC's detailed review of the three plans, and supplemented with a comprehensive public consultation process, Plan 2 emerged as the overall best one. To make Plan 2 even more suitable, it will be supplemented by provisions for small-scale treatment and disposal systems in some of the most impacted "headwaters" sub-watersheds, an active regionalization initiative, and provisions for future effluent reuse. This Recommended Plan includes both structural and non-structural components, and will be constructed in phases to reduce initial project costs, allow time for neighboring towns to proceed with their wastewater planning, and account for the effectiveness of the non-structural elements to be demonstrated. This multi-component, phased approach, with opportunities for "mid-course corrections", is termed "adaptive management." Section 11 of this report describes the Recommended Plan in detail.

Structural Elements of Plan

The principal features of the structural plan are as follows:

- **Wastewater Collection:** a municipal sewer system to serve about 2,800 Orleans properties in nitrogen-sensitive watersheds and near key ponds;
- **Wastewater Treatment:** an advanced treatment system located at the site of the Tri-Town Septage Treatment Facility to remove a high percentage of the collected nitrogen;
- **Effluent Recharge:** a series of open rapid infiltration basins at the Tri-Town site designed to disperse effluent without excessive mounding of the groundwater;
- **Septage Handling:** new septage tanks and equipment to receive and treat septage from Orleans, and neighboring towns, to replace the aging Tri-Town facilities;
- **Sludge Handling:** Dewatering equipment to produce a truckable residual that will be transported off-Cape for reuse or disposal; and
- **Cluster Systems:** Five small, local treatment and disposal facilities to provide early protection of certain threatened receiving waters.

These structural facilities are expected to cost approximately \$150 million to build, and \$1.4 million to operate annually, both expressed in mid 2008 dollars.

Non-Structural Elements of Plan

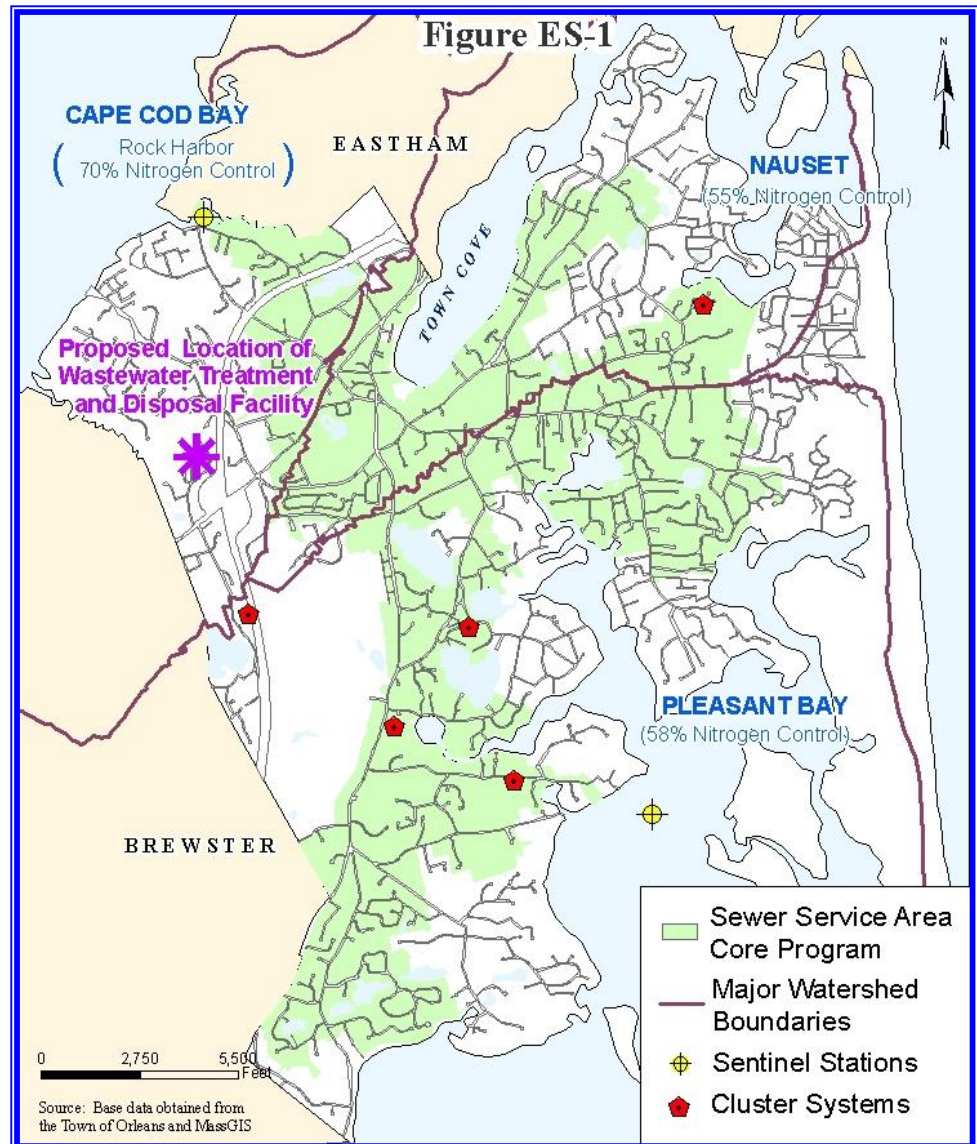
Cost savings may result if non-structural aspects of the Recommended Plan can be successfully implemented. These non-structural elements may allow less extensive sewerage and smaller treatment and disposal facilities:

- A **fertilizer control** program to reduce nitrogen leaching from lawns and parks;
- A **stormwater management** program to reduce nutrient loads from runoff;
- Expansion of the **water conservation programs** of the Water Department;
- A **wastewater flow and load reduction** initiative, including testing of alternative toilets;
- **Enhancement of embayment flushing** rates to increase assimilative capacity; and
- **Land use controls** including the Board of Health's nutrient control regulation and measures to make this a "growth neutral" plan.

Phasing Plan

A formal phasing plan is recommended to serve as a blueprint for the Town's adaptive management approach. First, all of Orleans' documented wastewater needs would be satisfied in the "Core Program". Upon completion of the Core Program, if the Town deems it necessary or desirable, an "Extended Program" could be implemented to provide public wastewater service to the entire town at an added cost currently estimated to be about \$95 million (mid 2008 dollars). The Core Program could have 6 phases completed over 15 to 20 years. At the end of each phase, the Town should document the reduction in watershed nitrogen loads and its progress on the various non-structural elements, and then adjust its expenditures in the next phase accordingly. Supporting the decisions will be a continuing program of water quality and marine habitat monitoring.

Since the achievement of water quality goals will take many years and perhaps several midcourse corrections, DEP's approval of the phased plan and associated checkpoints is intended to provide the Town with assurance that it is on the right track. It is proposed that compliance with the approved CWMP will free the Town from enforcement actions under current state and federal laws.



Capacity at Proposed Site for Wastewater Treatment and Disposal

Technical studies at the site of the Tri-Town Septage Treatment Facility have shown its capabilities for both wastewater treatment and effluent disposal. While some confirming studies are needed, the best available information indicates that this site has sufficient room for wastewater treatment facilities for both the Core and Extended Programs. There is also room for rapid infiltration of the wastewater flows expected at the end of the 20-year planning period for Orleans' Core Program. The Tri-Town site does not have adequate room for Orleans' Extended Program flows; a supplemental disposal site would be needed if that program were implemented. At that time, effluent reuse on ballfields at the nearby schools could be used to help meet the added disposal need. Effluent disposal at the Tri-Town site can be accomplished within the assimilative capacities of the Namskaket and Little Namskaket systems, without impacting Town Cove or Rock Harbor.

Opportunities for Regionalization

The Orleans Recommended Plan provides two significant opportunities for regionalization:

- Treatment of wastewater from Eastham at the Tri-Town site to enable Eastham to meet its share of the expected nitrogen control requirements for Rock Harbor and the Nauset system.
- A possible joint treatment facility with Brewster located near the Orleans' southerly boundary, with effluent reuse on golf courses in Brewster and Harwich.

The Recommended Plan would allow regionalization some time after the first three phases of the Orleans Core Program, leaving time for Eastham and Brewster to complete their wastewater planning studies.

Implementation Schedule

The Recommended Plan should be implemented in accordance with the following schedule:

Complete CWMP	late 2009
Preliminary and final design	mid 2009 to fall 2011
Bidding of Phase 1 facilities	late 2012
Town Meeting appropriation for Phase 1 construction	May 2013
Phase 1 construction	mid 2013 to mid 2015
Start-up of Phase 1 facilities	mid 2015

Costs to Typical Users and Non-Users

In 2008, the Orleans Board of Selectmen adopted an interim financing policy that calls for 20% of the debt service for the wastewater facilities to be recovered from betterment assessments levied against properties connected to the proposed sewer system and 80% recovered through increased property taxes. The goal of this policy is to equalize the costs to those connected to the sewer and those that will continue to rely on private on-site septic systems. For the typical \$700,000 home, the equivalent annual cost for either category of property owner would be approximately \$2,600 per year, including betterment assessments, property tax increases, user fees, connections costs, septic system replacement costs and periodic septage pumping. The Town is pursuing several grant and loan opportunities to help reduce costs.

Coordination with the Orleans Brewster Eastham Groundwater Protection District (OBEGWPD)

The Tri-Town Septage Treatment Facility, owned by the OBEGWPD, now serves the three District towns and others in the region. Many of its facilities are nearing the end of their useful life, and more stringent effluent limitations may be imposed in the future. New wastewater facilities at the Tri-Town site can easily accommodate updated septage handling capability. The Town of Orleans should work closely with Eastham and Brewster to obtain permission to build the wastewater facilities and to effect an orderly transition from existing to new septage handling functions. These discussions should be part of broader negotiations on regional solutions for wastewater needs.

CONCLUSION

The CWMP is a highly adaptable phased approach to wastewater management that allows Orleans to address recent nutrient control mandates with relatively low risk and controllable costs.