

Cape Cod Water Protection Collaborative  
Shared Watersheds, Shared Responsibilities Grant Program

**Application by the Town of Orleans**

**to Investigate**

**Economies of Scale associated with Regional Wastewater Infrastructure and Appropriate  
Cost Sharing Formulas**

**A. General Information**

**1. Name and address of Applicant**

Wastewater Management Steering Committee  
Town of Orleans  
19 School Road  
Orleans, MA 02653

Project Manager: George Meservey, Orleans Planning Director  
(508) 240-3700 x 435

**2. Project Name**

Economies of Scale associated with Regional Wastewater Infrastructure and Appropriate  
Cost Sharing Formulas

**3. Project Summary including Objectives**

This study is intended to quantify the potential cost savings associated with regional wastewater treatment and disposal facilities, based on two case studies. The first case study will be based on a facility at the Tri-Town site in Orleans serving Orleans, Eastham and Brewster, and the second focuses on a prospective plant located in or near South Orleans to serve Orleans and Brewster. The project will be overseen by a Working Group led by the Orleans Wastewater Management Steering Committee and including representatives from watershed groups, the other impacted towns (Eastham and Brewster), the Tri-Town district, and DEP staff. The outcome of the study will be a report that presents a conceptual cost model and the results of applying that model to the two case studies; that identifies and evaluates cost sharing formulas; and that recommends specific steps to be undertaken in CWMPs in the study area and elsewhere

on Cape Cod. The study will include an outreach program to gain public input and to share findings with other towns.

#### **4. Requested Funds**

A detailed budget is provided as an appendix to this application. The total cost of the project is \$65,700. The project match is provided through in-kind services by the Town of Orleans and the Working Group, and accounts for 26% of the project total. The amount requested from the grant is \$48,900.

### **B. Detailed Project Information**

#### **1. Project Objectives**

There is no established method for towns to investigate regional wastewater treatment and disposal when they are conducting independent CWMPs on different schedules. Cost advantages can be significant for small communities, but only if centrally located sites are available, and only if reasonable cost sharing formulas are applied. The objectives of this study are to develop conceptual cost estimates for logical regional options and comparable decentralized alternatives, to identify and apply cost sharing formulas, and to compute unit costs that can serve as the basis for future nitrogen trading.

#### **2. Detailed Project Description**

##### Background

In the absence of watershed management districts or other regional entities charged with developing regional wastewater infrastructure, there is the strong possibility that Cape Cod towns will view town-owned facilities as the primary options. Regional facilities may have benefits, but they also entail significant practical and political hurdles. It would be an appropriate use of CCWPC grant funds to document the cost savings to towns participating in a regional wastewater facility, to help overcome some of the political hurdles to joint facilities. There are 5 principal cost items in wastewater infrastructure: 1) collection, 2) transport to the treatment plant, 3) treatment, 4) transport to the disposal location, and 5) disposal. At the scale of all Cape Cod towns, the economies of scale in wastewater treatment are significant; it might cost two or three times as much to treat a gallon of wastewater at a small single-town plant than it would at a larger regional facility. Offsetting these cost benefits are added transport costs. Complicating the situation is the fact that, given the scarcity of large sites for effluent disposal, one town might benefit significantly from disposal capacity in a bordering town. Conceptual-level cost estimates will be prepared to explore the cost benefits of regional treatment plants in two locations: 1) at the Tri-Town site in Orleans serving portions of Orleans, Eastham and Brewster; and 2) at a site in South Orleans or the easterly section

of Brewster treating wastewater from portions of Orleans and Brewster. Once overall costs are determined, several cost-sharing formulas would be applied to illustrate how each town might divide the total financial burden. Nitrogen trading options will also be investigated.

### Detailed Project Scope

The Orleans Wastewater Management Steering Committee (WMSC) intends to conduct this study through an inter-related set of tasks leading to a final report. The specific tasks are as follows:

**Task 1. Further Refine Scope.** The WMSC will expand and elaborate on this scope of work based on input from its neighboring towns, the members of the Massachusetts Estuaries Project (MEP) team, DEP staff, planners from the Cape Cod Commission, and local watershed organizations.

**Task 2. Confirm Case Study Locations.** The WMSC proposes to use the Tri-Town site and a site in or near South Orleans as the two prospective locations for regional wastewater treatment and disposal facilities. These choices will be confirmed at the project outset, based on discussions with the Collaborative and DEP.

**Task 3. Establish Working Group.** The WMSC will set up a Working Group to run the project, to include: its own members; individual representatives from the Towns of Eastham and Brewster; a DEP representative, a representative from the Orleans Brewster Eastham Groundwater Protection District (the managers of the Tri-Town septage treatment plant), and a staff person from the County.

**Task 4. Select Consultant.** The WMSC will select and contract with an individual or firm to perform the detailed technical aspects of this study. The contract will be between the Town of Orleans and the selected individual or firm.

**Task 5. Develop Conceptual Cost Model.** Using actual data from Cape Cod projects, a spreadsheet-based model will be developed to predict the costs of wastewater collection, transport, treatment and disposal for a range of service populations and wastewater flows. The model will include costs for construction, land, engineering and other relevant factors, and will be formulated to allow easy comparison of centralized and decentralized options.

**Task 6. Identify Potential Local Treatment and Disposal Sites.** It will be necessary to establish decentralized options to compare against regional facilities. Each town, with the assistance of the consultant, will identify sites within that town's boundaries that may be suitable for that town's wastewater treatment and disposal.

**Task 7. Establish Tentative Sewer Service Areas.** Neighborhoods will be selected in each town of sufficient number and size to account for all of the septic nitrogen load that would need to be eliminated to satisfy that town's responsibility for TMDL compliance, assuming that the allocation of responsibility is proportional to current watershed nitrogen load. Consideration will be given to minimizing the length of sewers by focusing on areas with small lots, and to areas close to the regional and decentralized sites.

**Task 8. Apply the Cost Model.** The cost model will then be applied to estimate the overall cost of the regional alternative (assuming transport of collected wastewater to either Tri-Town or the site in/near South Orleans) and one or two decentralized options per town. Results will include the capital costs, the operation and maintenance costs and the overall net present worth of each option.

**Task 9. Identify and Apply Cost Allocation Formulas.** The overall project costs will be allocated to each town using a series of allocation formulas to include:

- Uniform cost per gallon treated
- Uniform cost per residential property served with a surcharge for commercial lots
- Incremental cost, where the neighboring town pays only the additional cost over and above what the host community would otherwise pay
- Uniform costs once a variable host fee is paid for treatment and disposal.

**Task 10. Evaluate Cost Sharing Formulas.** All identified cost sharing formulas will be screened using a set of evaluative factors chosen by the Working Group. The most feasible formulas will then be evaluated in more detail as to their fairness, ease in implementation, impacts on growth, etc.

**Task 11. Establish Unit Cost for Future Trading.** The allocated costs will be transformed into cost per pound of nitrogen removed. These unit costs would then be available to serve as a basis for future nitrogen trading, as well as to establish benchmarks for comparison with evaluations conducted as part of each town's CWMP. The unit costs will be compared against costs of specific recommended plans from completed CWMPs elsewhere on Cape Cod.

**Task 12. Develop Conclusions and Recommendations.** The Working Group will develop conclusions on the circumstances under which regionalization makes economic sense and will form recommendations on how the towns might appropriately share regional costs. The recommendations will also include:

- Information needed by towns so that their CWMPs can cost-effectively evaluate regional options,
- Key policy issues related to nitrogen trading, and
- How wastewater management districts might facilitate the realization of the benefits of regional cost sharing.

The experiences of the Tri-town District will be summarized and included in the Working Group's conclusions.

**Task 13. Prepare Report.** A concise summary report will be prepared to present the background of this issue, the identification and evaluation of options, and specific recommendations. A draft report will be produced first, and then updated based on comments of the Working Group and others that may have productive input.

**Task 14. Conduct a Public Meeting.** The findings of this study will be presented at a public meeting to include representatives of the impacted towns, town officials from other Cape Cod shared watersheds, watershed groups, etc. The meeting will be video-taped for broader distribution. Public comments will be documented and included as an appendix to the final report.

**Task 15. Meet with DEP Staff.** A separate meeting will be held with members of the DEP staff associated with CWMP development to discuss the policy issues related to the report's recommendations.

### **3. Description of How the Proposed Project Meets the Eligibility Criteria in the Guidance**

#### **a. Better understand the impact of multiple town nutrient loading on water quality**

Overall nutrient loading for multi-town watersheds is developed through the MEP process. This application will investigate the potential for multi-town solutions by demonstrating the effectiveness of sharing a regional facility. The assumption is that only infrastructure solutions that meet the TMDL requirements will be evaluated for cost effectiveness.

#### **b. Better understand available nutrient loading management options**

One of the options which any town involved in a CWMP process should consider is the opportunity to develop joint facilities with neighboring towns. This project will evaluate the potential cost savings of a multi-town wastewater facility, taking into account the relative costs of collection, transport, treatment, and disposal. The information developed will allow other towns to evaluate management options that may extend beyond municipal boundaries.

#### **c. Evaluate the merits and costs of different management scenarios**

This project will directly address the costs of different management scenarios, targeted at watershed-based planning beyond the traditional town by town approach. A cost model will be developed that can be used by towns to balance cost

considerations with other issues that bear on the siting and development of wastewater infrastructure. The outcome will be very meaningful to towns that are serious about fully addressing the adverse impacts of nutrient loading on receiving waters.

At present, many citizens and local board members perceive that shared facilities may be the most cost-effective solution. The empirical evaluation of the various costs that will be completed in this study will be used by the participating towns as part of their overall wastewater management planning.

**d. Evaluate options for cost apportionment**

The high cost of wastewater facilities dictates that towns take a well documented, deliberate approach to investigating all management alternatives. Politically, local voters need the assurance that any and all options have been fully explored before the allocation of millions of dollars is approved. Under this study, regional facilities will be evaluated and cost options will be put within the context of nutrient trading to determine if financially viable options exist that will be beneficial to each of the towns in the two watersheds under study.

**e. Evaluate alternatives for burden sharing among towns, including siting of treatment and disposal sites**

The study will develop a unit cost for wastewater that needs to be treated, and this unit approach will level the playing field, enabling towns to enter into meaningful dialogue on sharing facilities in an equitable manner. Burden sharing among towns has a higher likelihood of success if the various “costs” of wastewater management – infrastructure, siting of treatment & disposal facilities, volumes treated by each town – can be quantified so that all towns can see the costs and benefits.

**f. Evaluation and development of innovative approaches to municipal cooperation**

The project proposes developing a cost model for infrastructure components that will allow the towns to understand economies of scale in wastewater management. This approach has been completed piecemeal for CWMPs in the past, but has not been developed on a regional basis for communities trying to meet the TMDL requirements under the Massachusetts Estuaries Program. The project will help towns move towards watershed planning and shared responsibilities by providing a framework for nutrient trading in order to assure that shared facilities indeed share burdens and benefits equitably among participating towns.

**4. Detailed Timeline for the Project**

It is expected that the study will begin in January 2008 and be completed in June of 2008. A project schedule is attached.

**5. Detailed Discussion of Expected Inter-Municipal Cooperation**

The Towns of Brewster and Eastham will be represented on the Working Group and have substantive input into the project. Depending on the feasibility of regionalization, these same parties may be working together to develop a joint facility, negotiating cost sharing terms or nutrient trading agreements. This project will serve to expose those parties to the details of the cost savings accruing from joint facilities, and begin the process of interaction, negotiation and agreement. It will require the participating towns to establish the structures and mechanisms for inter-municipal cooperation.

**6. Detailed Project Budget**

A detailed budget is provided as an appendix to this application.

**7. Description of How the Grant Funding will Allow Progress in Improving Water Quality**

To the extent that one or more regional wastewater facilities cost less than if individual towns "go their own way", the identification of lower cost options can only help speed each town's progress. Further, if towns that have been delayed in making progress in their CWMP can accomplish the tasks called for in this Scope of Work (such as identification of potential sites and sewered neighborhoods), they have advanced their planning effort. If regionalization is studied now and found to be promising, it can be considered in more detail when those towns study alternatives in their CWMPs. Conversely, if regionalization is not feasible, then it need not be considered in later CWMP work. By establishing a standard framework for evaluation regionalization and evaluating cost sharing measures (including nutrient trading), this study will help advance all Cape Cod programs.

**8. Description of How the Project Fits into an Overall Approach to Reducing Nutrient Loading and/or Improving Water Quality**

The Towns of Orleans, Eastham and Brewster must cooperate in finding and implementing nutrient management solutions. That cooperation may be relatively simple, in terms of water quality monitoring and MEP report review, or it may be very substantial in the form of joint wastewater infrastructure. This project creates a forum for the parties to understand each other's needs and forces the creation of the inter-town committees or task forces that may eventually be critical to implement watershed-based solutions.

## **9. Description of Why the Project Has a High Likelihood of Success**

The following factors will contribute to the success of this project:

- The grantee, the Town of Orleans and its WMSC, is in the midst of its CWMP process, and has a thorough appreciation of the importance of the costs of small-scale and larger-scale facilities.
- The grantee has a track record of successful completion of similar projects, such as the County-sponsored evaluation of the Tri-Town facility and site.
- High-level representatives of neighboring towns will be involved in the Working Group.
- The experiences of the Tri-Town Board of Managers will be brought to bear through a representative to the Working Group. The Board of Managers' specific experiences re-negotiating their inter-municipal agreement in 200\_ is particularly important.
- The selected case studies cover two distinct situations. At the Tri-Town site, there appears to be assimilative capacity in the Namskaket Marsh system well in excess of current nitrogen loads. In or near South Orleans, a new wastewater discharge that would eventually reach Pleasant Bay must be offset by additional sewerage to account for the nitrogen load from the prospective plant. Brewster and Orleans contributions to both the Pleasant Bay and Namskaket Marsh watersheds sets up a distinct possibility for nutrient trading.
- DEP can benefit in its dealings with other Cape Cod towns, and DEP staff involvement in this project will likely add credibility to this important topic.

## **10. Description of Plans for Reporting the Project Findings**

The study will be conducted by a Working Group whose meeting will be advertised and open to the public. The final report will be widely circulated. An outreach program will be conducted to apprise the general public of the results, as well as watershed groups and other towns dealing with similar issues.

LETTERS OF SUPPORT:

- Orleans Board of Selectmen
- Eastham Board of Selectmen