
EXECUTIVE SUMMARY

Leadership within the Old Lyme has recognized that the Town and the Water Pollution Control Authority can play important roles in addressing significant environmental challenges within the community. The Town has proactively accepted the responsibility of developing a community-wide solution to the wastewater issues that both the public at-large and private beach associations are facing. This Coastal Wastewater Management Plan is a continuation and culmination of prior work the Town has completed and serves as an important decision-making tool. This Plan was developed through tremendous collaboration of multiple parties and presents a comprehensive wastewater approach to the public and private stakeholders in Old Lyme. It also serves as a guide to navigating the next steps to a wastewater solution.

GOALS AND OBJECTIVES

In response to current on-site wastewater management limitations, recent Consent Orders, and the desire for a common solution for the Old Lyme coastal communities, the Town of Old Lyme contracted Woodard & Curran to perform detailed evaluations of local and regional wastewater management alternatives for the Project Study Area. This project, termed the Coastal Wastewater Management Plan, is focusing on a comprehensive analysis of short-term and long-term wastewater management needs within the Project Study Area, as well as wastewater infrastructure (collection, treatment, disposal and reuse), operation and maintenance (O&M) costs, annual and lifecycle costs, as well as non-cost factors including water balance, wastewater management preferences, and implementation measures to manage system capacity allocation.

BACKGROUND

The Project Study Area comprises the unsewered beach communities and neighborhoods south of and along Route 156, between the previously sewerred Point-O-Woods neighborhood to the east, and the White Sand Beach neighborhood to the west. On-site wastewater systems in the Project Study Area have been problematic for several decades, as a result of aging systems, poor soils, shallow groundwater and small lots. Based on the results of the individual wastewater planning efforts in several of the beach communities, it is clear that significant on-site septic system challenges exist. Past planning documents recommended that more centralized treatment and disposal systems are needed due to on-site limitations.

Approximately ten years ago, the Point-O-Woods neighborhood was the first Old Lyme beach community to install sewer infrastructure through a regional interconnection to New London. Wastewater facilities plans were prepared for both the Old Colony Beach Club Association (OCBCA) and the Old Lyme Shores Beach Club Associations (OLSBCA) in 2011, which also recommended conveyance of wastewater to the New London Wastewater Treatment Facility (WWTF). CT-DEEP subsequently issued Consent Orders requiring full compliance by June 30, 2016.

WASTEWATER MANAGEMENT NEEDS ANALYSIS

The Project Study Area was divided into ten Sub-Areas. In order to evaluate and prioritize wastewater management needs for the ten Sub-Areas, a wastewater management needs analysis was conducted. Factors including lot size, utilities, soils data, topographic description, and proximity to natural resources were used to prioritize wastewater management needs. The needs analysis results closely parallel population densities in the Project Study Area. The Sub-Areas with the highest need for wastewater management solutions comprise the proposed Wastewater Service Area. The Wastewater Service Area represents over 90% of the sanitary flow from the Project Study Area.

FLOW PROJECTIONS

Average daily sanitary flows were estimated using the Town's census data and average water consumption. Average daily sanitary flow with an allowance for infiltration and inflow (I/I) was projected as well as maximum daily, peak hourly flows. The Town of Old Lyme experiences a 50% decline in population during the winter. Since the majority of this decline comes from residents in the Wastewater Service Area, it was assumed one third of the average summer time flows exist in the winter as the population decreases.

WASTEWATER MANAGEMENT ALTERNATIVES

All wastewater management plans consist of infrastructure components. In general, these include collection, treatment, disposal, and sometimes reuse. Two primary alternatives (Local Alternative and Regional Alternative) were developed and evaluated as part of the Coastal Wastewater Management Plan. The Regional Alternative is predicated on the use of the existing New London WPCF to treat wastewater from the Wastewater Service Area, and the Local Alternative relies on the construction of a new WPCF in Old Lyme, coupled with on-site subsurface disposal and reuse, to treat wastewater and dispose of effluent from the Wastewater Service Area.

As part of the Coastal Wastewater Management Plan, we evaluated collection system alternatives and developed an opinion of probable cost (OPC) for each collection system component for both the Local and Regional Alternatives. This analysis included an overview of each collection system alternative, capital and annual operation and maintenance cost projections, as well as other non-cost considerations related to the collection system components of the Local and Regional Alternatives.

COLLECTION OPTIONS

There are several collection system configurations. These include: gravity; low pressure; septic tank effluent gravity/pumping; and vacuum. The collection system alternatives within the High-Needs Sub-Areas comprising the Wastewater Service Area are identical for the Local and Regional Alternatives. In addition to the lowest capital cost and annual O&M costs, the gravity sewer option is advantageous because it provides a more resilient storm-ready system. With the majority of the Sub-Areas adjacent to the ocean and in flood zones, a gravity system can be designed for flooding with watertight manholes and backup generators at the pump stations that would keep the system functioning through severe storms.

The Regional Alternative collection system facilities consist of the individual Sub-Area collection systems, the regional common sewer in Old Lyme and approximately 10 miles of force main and gravity sewers to get to the New London Water Pollution Control Facility (WPCF). The collection system route to New London also consists of 5 downstream pump stations in East Lyme and Waterford. There are substantial capital needs in the East Lyme and Waterford collection systems if Old Lyme connects to this pipe network as part of the Regional Alternative.

TREATMENT OPTIONS

Three general types of treatment configurations were evaluated for the Local Alternative. These configurations consist of on-site, neighborhood/cluster, and centralized. It was determined that on-site septic systems and larger cluster systems would not be practical forms of treatment for the Wastewater Service Area. There are physical constraints making smaller systems an unviable option within the High Needs Sub-Areas. In addition, poor soils and high groundwater make on-site disposal systems challenging.

A centralized treatment facility with off-site disposal was identified to provide the best economies of scale for treatment. The effluent quality is an important factor for not only pollution removal but also providing options for water reuse opportunities. Two types of centralized wastewater treatment facilities were considered within Task 5 (Evaluation of Wastewater Treatment Alternatives): (1) Sequence Batch Reactor (SBR); and (2) Membrane Bio Reactor (MBR). These types of facilities would meet high quality effluent standards while being flexible to handle seasonal flow conditions. The MBR was recommended due to its superior effluent quality for reuse, as well as the small footprint, allowing a smaller site for the local WPCF building.

DISPOSAL AND REUSE OPTIONS

A few sites have been identified as locations for potential disposal and reuse systems. This Study focuses on 2 of those sites. Field investigations were performed in May and June of 2013 at the Black Hall Golf Course (Black Hall) and former driving range (Cherrystone) in Old Lyme.

There are two different disposal alternatives recommended for Old Lyme: (1) groundwater discharge – a very straightforward permitting process with CT DEEP; and (2) wastewater reuse – a more complicated permitting process with CT DEEP.

COMPARISON OF ALTERNATIVES AND RECOMMENDATIONS

The results of the collection, treatment and disposal/reuse alternatives evaluation were formed to develop the overall Local and Regional Alternatives. The collection system subtotal is based on the gravity sewer option, due to its lowest capital cost compared to the other collection system alternatives.

System Component	Capital	
	Local ¹	Regional
Collection	\$31,100,000	\$49,101,000
Treatment	\$14,800,000	\$8,455,000
Disposal / Reuse	\$8,300,000	\$0
Totals	\$54,200,000	\$57,556,000

1) Local and Regional Costs based on gravity systems for Service Area.

Although the capital cost for the new local WPCF in Old Lyme is higher than the buy-in costs associated with the New London WPCF, the cost difference is offset by the significantly higher collection cost associated with upgrading downstream sewers in East Lyme and Waterford for the Regional Alternative. Overall, the Local Alternative has an anticipated capital cost that is \$3M less expensive than the Regional Alternative.

System Component	Annual O&M	
	Local ¹	Regional
Collection	\$192,000	\$589,000
Treatment ²	\$472,000	\$186,000
Totals	\$664,000	\$775,000

1. Local and Regional based on gravity systems for Service Area.

2. Annual disposal / Reuse costs are included with treatment O&M.

The annual operation and maintenance cost for the Local Alternative is approximately \$100,000 less expensive than that for the Regional Alternative. This is due primarily to the cost associated with paying New London for treatment costs, together with the additional cost associated with the long sewer system in East Lyme and Waterford, and the incremental cost to Old Lyme for maintaining its own extension to the sewer system under the Regional Alternative.

In addition to the cost benefits of the Local Alternative, there are several other non-cost factors that were considered by the Town in this evaluation. These include:

- Deferred Downstream Capital Improvements: For the Regional Alternative, future capital upgrades will be shared amongst the sewer users in New London, Waterford, East Lyme, and Old Lyme.
- Implementation of New Utility: The Local Alternative will come with challenges of implementation for facilities and additional construction in Old Lyme. Initial years for a new utility can be challenging, as connections are being made, and systems are started.
- Control of Flow Allocations: The Town of Old Lyme will have far better control of the allocation of sewer flows, capital costs, and annual costs for the Local Alternative. For the Regional Alternative, Old Lyme would only be a customer to the downstream communities, and would have less say in capital costs and apportionments.

PROPOSED ALTERNATIVE

The Local Alternative was selected. It has a lower capital cost, as well as a lower net annual cost per EDU. The gravity sewer options are the best fit for the regional and local alternatives. Similarly, the low pressure, STEP and STEG sewer alternatives are not the most appropriate options for either alternative, and should not be considered as part of the Local Alternative. The Local Alternative will also provide a far higher quality effluent than the Regional Alternative, better contributing to water quality in the area and along the Long Island Sound.

NEXT STEPS

Upon CT-DEEP's review of this Draft Plan, a subsequent meeting with the Town will be scheduled to: (1) discuss permitting impacts associated with the Local Alternative, (2) make any necessary revisions to the Final Plan, and (3) develop a detailed Implementation Plan. However, based on the milestones for completion (June 30, 2016) in the two outstanding Consent Orders, we feel strongly that the Town's Local Alternative can be implemented within this timeframe.