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# Wastewater Management Feasibility Study

## REPORT ON TASK 5 OF THE INTEGRATED WATER RESOURCES MANAGEMENT PROGRAM

TOWN OF COLCHESTER, VERMONT

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A - EPA Summary of Management Models

## 1. EXECUTIVE SUMMARY

The Town of Colchester is unique in that it has more shoreline on Lake Champlain than any other community in Vermont. They are also, by far, the largest community that relies primarily on decentralized wastewater systems to support current land use.

Previous sections of this study have demonstrated that Colchester should do more to protect public health and the environment concerning how onsite wastewater systems are managed, maintained and regulated. This report looks at various options for improved wastewater management strategies, their relative costs, advantages and disadvantages, ultimately landing on a recommendation to ramp up the use of operating permits over time.

The Town has understood the need for “hands-on” regulation of onsite wastewater systems for some time. Colchester started regulating the installation of onsite wastewater systems as early as 1967. They used the US EPA Manual of Septic-Tank Practice, published in January of 1967 as their technical standard. Since that time Colchester’s wastewater permitting program has evolved.

In 1999, Colchester replaced the Manual of Septic-Tank Practice with the 1996 version of the Vermont Environmental Protection Rules. In 2005, Colchester became one of only two municipalities state-wide to take “delegation” of Potable Water Supply and Wastewater Disposal Permits from the State of Vermont.

Colchester has 5,260 properties served by onsite wastewater treatment and disposal systems. 1,170 properties (22%) have a State Water Supply & Wastewater Disposal Permit, which suggests that they were constructed or at least altered in 2005 or later. 2,810 properties (54%) have a Town Permit which suggests that they were constructed and last altered between 1967 and 2005. 1,280 properties (24%) have no wastewater permit on file electronically with the town or state. In the mid-1990’s Colchester started to convert all their paper files to electronic format, but current staff do not know whether the task was ever completed, so it is possible (even likely) that some of these 1,280 properties have a paper wastewater permit on file. It is also likely that these properties are at least 25 years old and some may date to the time prior to Colchester issuing permits in 1967. In any case, these systems have not been altered in some time as a permit would have been required for the alterations and an electronic record of the permit would be on file.

While taking “local control” of the permit system is a good step, issuing permits by itself doesn’t adequately assure that every property owner understands what is involved in the proper operation and maintenance of their system nor assures that proper operation and maintenance takes place.

In fact, based on our field inspections and conversations with property owners throughout this study, we conclude that a number of property owners are ill-aware of the components that comprise their wastewater system, or proper routine maintenance requirements. It was our impression that the majority of property owners only address maintenance when there is a problem with their wastewater system. For these reasons, we conclude that more should be done to manage onsite wastewater systems in Colchester.

The US EPA has developed five levels of management that Colchester can consider, as described below. In each of these levels they refer to a “responsible management entity” (RME) that takes responsibility for certain actions required to promote (or require) proper operation and maintenance of onsite wastewater systems.

**Level 1: Homeowner Awareness Model** is simply a program of informing system owners of the importance of ongoing maintenance.

**Level 2: Maintenance Contracts** requires each property to have a maintenance contract with a qualified service provider with a copy of the contract on file with the Town.

**Level 3: Operating Permits** establishes specific maintenance requirements and intervals of maintenance written into the permit, with a requirement that the property owner report back actions to the Town for monitoring.

**Levels 4: RME Operation & Maintenance** establishes a contractual relationship between the property owner and the RME (resumed to be the Town of Colchester) where the RME takes responsibility for performing all operation and maintenance of the system for a fee.

**Level 5: RME Ownership** takes this a step further where the RME takes ownership of the system on private property and assumes responsibility not only for operation and maintenance, but also repairs and replacement in the event of a system failure.

Based on estimates of the initial start-up and annual operation and maintenance costs of each of the five levels, we conclude that each EPA level except EPA Level 5: RME Ownership of wastewater systems is “economically feasible”, when comparing the estimated capital and annual operating costs to the cost of central sewers. While Level 4: RME Operation & Maintenance is “economically feasible” we conclude that this level of management is not warranted.

We recommend that Colchester develop a Level 1: Homeowner Awareness Model town-wide, with improved inventory of all onsite systems. A town-wide strategy to promote improved operation and maintenance is justified given the sheer number of onsite wastewater systems (~5,260) scattered throughout Colchester. Every property owner has a community-wide responsibility and obligation to their neighbors and the community as a whole to operate and maintain their own wastewater system in a manner that assures public health. Every property owner has an obligation to take responsibility for its part in protecting Colchester's water resources.

Creating a town-wide "homeowner awareness" program is a natural extension of the public hearings conducted for this study and the "Heritage Project" that ran concurrently, looking at the future vision for Colchester. The public is much more "in tune" to the importance of wastewater management now that they have a better understanding of how it is integrally linked to land use, water resources, public health and water quality. Opportunities abound for educating property owners on how to properly maintain their wastewater system. This education should be part of an over-arching discussion of wastewater needs and future land-use planning that has already started to take place in Colchester. This town-wide awareness program can be implemented without delay as it is simply a notification program and is not tied to permit conditions on a given parcel.

We recommend that the fourteen neighborhood zones – areas rated "high risk" or "medium risk" in the Priority Area Needs Assessment – (comprising ~1,100 systems) be managed at Level 3: Operation & Maintenance. The conditions for each O&M Permit would be tailored to each property. A property with a conventional system in good working order may have minimal requirements. A property with an "I/A" or "best fix" system on a difficult site may have substantially more conditions in their O&M permit.

We would further recommend that each of these systems be inspected every five years to visually confirm that proper maintenance is taking place and that the system appears to be functioning properly. We would add any "I/A" or "best fix" system located outside the "high risk" and "medium risk" areas in Colchester to this management protocol.

While Colchester has "delegated authority" to administer wastewater permits on behalf of Vermont DEC, the permits must be administered strictly following the Environmental Protection Rules. It is unclear whether Colchester can impose O&M conditions on every permit or whether they can designate one area higher risk than another and impose more stringent O&M conditions in the higher risk area. We have been unsuccessful in getting definitive answers to these questions from DEC staff. If (based on current state statute) the answer is "no", Colchester must pursue the authority through statute changes in order for these recommendations to be effective.

Colchester staff estimate that there are ~100 “I/A” systems that would contain specific conditions on operation and reporting in their wastewater permit. The majority of these systems are located in “high risk” and “medium risk” areas, but not all. If Colchester can’t impose reasonable and enforceable O&M conditions on an estimated 90% of the 1,100 systems in “high risk” and “medium risk” areas, their ability to properly and adequately regulate wastewater treatment primarily with onsite wastewater systems is gravely limited. Colchester must then decide whether centralized sewers in the highest risk areas are the only viable way to adequately protect public health and the environment.

Ultimately the Colchester Selectboard will need to determine how far they wish to take wastewater regulation and management. They need to determine if and when they reach back (if legally permissible) to older permits to apply O&M conditions where appropriate. If it is determined that Colchester cannot legally apply O&M conditions to existing wastewater permits, or apply different standards to different areas based on the level of risk to public health and the environment, then they cannot establish an adequate level of control over the operation and performance of decentralized wastewater systems in their community and need to consider other options for addressing wastewater needs.

These are decisions that must be made at the Selectboard level with public participation in the deliberations. The time is now to have these deliberations while the issues are fresh in the public’s mind over four years of study and public presentations on the Integrated Water Resources Management Study and its results.

It is safe to say that Colchester cannot responsibly sit back and maintain “status quo” with regard to wastewater management. Too much is at stake. While water quality testing didn’t identify a strong correlation between wastewater management practices and beach *e-coli* contamination concerns, this study has demonstrated that a number of wastewater systems in vulnerable areas (especially along the lakeshore) do not meet current design standards. A number of these areas have significant environmental constraints that make proper onsite wastewater management difficult at best. More should be done to assure that wastewater systems are functioning properly and receive the ongoing routine maintenance required to make sure that they continue to function adequately.

## 2. BACKGROUND AND PURPOSE

### 2.1. Introduction

Historically, decentralized wastewater systems have been considered just a precursor for central sewers, only being employed until central sewers were affordable and justified given development patterns. Colchester has trended toward decentralized wastewater solutions to meet their needs as opposed to central sewers, except where it was the only viable solution to address wastewater needs.

Even today, as Colchester contemplates their future vision for development and land use practices, especially within the bay area, they recognize that central sewer capacity is a finite resource along Lake Champlain. As they contemplate if and where central sewers are appropriate to meet that future vision, they recognize that they need to be judicious where they decide central sewers should go so they don't deplete this capacity in areas where decentralized wastewater options are viable.

Decentralized wastewater systems are appropriate and viable for a large majority of Colchester, but they must be operated and maintained properly to protect public health and the environment. Management strategies that promote public education and awareness of the importance of routine maintenance are needed, along with more rigorous enforcement of maintenance in the more environmentally sensitive areas of town.

This study will evaluate the feasibility of increasing the Town's regulatory and administrative oversight of wastewater systems to ensure adequate performance and long term operation and maintenance to improve water quality and reduce public health risks.

## 2.2. Purpose and Need

Colchester is unique in that it enjoys more shoreline along Lake Champlain than any other community in Vermont and is the largest Vermont community to rely primarily on decentralized wastewater systems to manage their wastewater needs. Since decentralized wastewater treatment relies on biological treatment and disposal back into the subsurface environment, how wastewater systems perform has a direct impact on both surface waters and groundwater. Proper management of wastewater infrastructure is essential to protect public health and the environment. Colchester has long embraced decentralized wastewater options and continues to do so, only contemplating central sewers where it is deemed that decentralized options simply can't meet the needs. Given this stance, sound management of these wastewater systems is critical if Colchester is to succeed in their duty of responsible stewardship of their lands and waters.

Currently, Colchester relies on property owners to maintain their own onsite wastewater systems with minimal oversight. Each property owner has a substantial investment in their onsite wastewater system (whether they realize it or not). Properly maintaining their system extends the life-cycle of the investment, protects their property value and protects public health and the town's water resources. Regardless, based on our field work and past experience, many property owners do not understand what should be done to properly maintain their system for optimal performance. In the majority of cases we suspect that little or no maintenance is performed until a problem surfaces. Property owners should recognize that proper maintenance of their onsite wastewater system is a commitment to their neighbors and surrounding community that they will not pollute the lands and waters around them. This is a mutual commitment made by all property owners with onsite wastewater systems, to each other. With a lack of understanding about what proper maintenance entails, this commitment is lost or at best unfulfilled.

A town-wide management strategy that includes education, reminders and other triggers to promote proper maintenance are warranted. More rigorous management of systems in "high risk" and "medium risk" zones, to include operation and maintenance (O&M) permits along with periodic inspections (every five years) should be implemented. Outside these risk areas, any system that is constructed as an Innovative/Alternative (I/A) or "best fix" system should also receive an O&M permit and periodic inspection.

Management of decentralized wastewater systems by a municipality can be tricky as systems are typically privately owned, are of varying types and have varying operation and maintenance needs. In Colchester, management strategies to ensure proper operation and maintenance of onsite wastewater systems is critical, due to the sheer number of systems and the cumulative impact they can have on water quality.

## 2.3. Goals and Objectives

The goal of this report is to identify a management program for wastewater infrastructure that will:

- Support both current needs and future build-out
- Maintain and improve built infrastructure
- Advance environmental sustainability
- Improve public health and quality of life
- Preserve and restore stream corridors and the lake shoreline
- Maximize the return on every dollar invested

The framework for this management program will be developed considering three basic elements:

- Education and outreach activities directed to property owners
- Improved operation and maintenance through education, reminders and monitoring
- Technical and financial support for system replacements where there is a need

To accomplish these objectives we will:

- Use our prior assessment of the capacity of Colchester's existing wastewater infrastructure to support existing development and anticipated growth to develop a management strategy that achieves a sustainable relationship with the town's water resources.
- Identify and prioritize geographic areas and types of development where enhanced management is most essential, including areas that are being impacted by existing wastewater treatment practices or likely to be sensitive to future development.
- Evaluate different management models, including changes to existing local regulatory requirements, and establishment of a wastewater utility or user-fee program(s), to identify the optimal approach for Colchester that will ensure that wastewater treatment systems do not adversely affect local receiving water quality.
- Develop the framework for the preferred management program(s) and evaluate implementation costs.

## 2.4. Elements of a Successful Management Program

A successful management program for distributed wastewater must be:

- Easy to understand
- Have public support
- Have a nexus to the stated outcomes the program is to achieve
- Fairly and equitably distribute costs for the program among those affected

Management programs should include the following key elements:

- Measurable management goals
- Authorized legal authority, regulations and ordinances
- Consistent technical standards for system evaluation and operation
- Qualified field personnel and administrators
- An accurate inventory of existing systems
- Public education and outreach
- Monitoring of regular system inspections and maintenance
- Proper recordkeeping and reporting
- Sustained funding
- Enforcement capabilities

### 2.4.1 Measurable Management Goals

Protection of public health and protection of the environment are the ultimate goals of the management program. Public health protection goals typically focus on preventing or eliminating public health hazards such as a failed septic system. Protection of the environment typically focuses on providing proper treatment in order to protect both surface waters and groundwater resources.

Management program goals and strategies should be evaluated on a periodic basis as changing land use regulations, wastewater regulations, stormwater regulations, development patterns, technological advances, and environmental and public health concerns require program managers to regularly evaluate program effectiveness and efficiency. Periodic revisions to the management plan may be necessary based on these factors.

### 2.4.2 Authorized Legal Authority

Authorized legal authority is the foundation of a successful management program. In order to manage public and private wastewater systems, the Town must have certain legal mechanisms in place to do so.

Legal authority provides the Town with the ability to:

- Inventory systems
- Perform inspections
- Monitor maintenance
- Mandate elimination of failed or substandard systems
- Establish service charges
- Enforce regulations with actions for non-compliance

State statute will dictate the legal authority of a community to implement a management plan. Local regulations and ordinances, adopted through a public process, are the foundation for administration and enforcement of any management program. They define specifically how the town will implement, conduct, fund and enforce the standards of the program. This is explained in more detail in Section 2.5.

### **2.4.3 Technical Standards**

Clear and well established technical standards should be used to evaluate both wastewater and stormwater systems and administer the management programs. The Vermont Environmental Protection Rules, Chapter 1: Wastewater System and Potable Water Supply Rules (Environmental Protection Rules) are the State mandated technical standard for onsite wastewater systems.

### **2.4.4 Qualified Personnel**

The personnel who manage the programs must have the knowledge and experience necessary to perform their duties efficiently and effectively. Wastewater personnel should (at a minimum) have knowledge of Vermont soils, a working knowledge of the Environmental Protection Rules, and knowledge of onsite wastewater system design, operation and maintenance.

### **2.4.5 Accurate Inventory**

Creating and maintaining an accurate inventory of systems and structures that fall under regulation of a wastewater management program is essential. All relevant details of the system components that require routine maintenance should be documented in a database in such a manner that easy monitoring of scheduled maintenance and inspection can be achieved.

For wastewater systems, the data would likely include the number and size of septic tanks, type of disposal system, details of other system components, and a schedule for maintenance and inspection. The database should be customizable so the maintenance schedule for one property can be different than another property as a history of maintenance needs is developed over time.

For instance, a heavily used wastewater system on one property may require the pump-out of their septic tank every three years, while another similar property with light use may only need to have their septic tank pumped out every seven years.

#### **2.4.6 Public Education and Outreach**

Public participation in the establishment of the management plan is essential to the acceptance and success of the program. Public meetings involving state and local officials, property owners, and other interested parties are an effective way to gain program support. The meetings should cover topics like program goals, management alternatives, inspections, maintenance, oversight, costs, and financing. These meetings provide a forum for identifying community concerns and priorities so that they can be considered in the planning process.

Educating property owners about the proper operation and maintenance of their wastewater system is an essential part of any wastewater management plan. Homeowners are often uninformed about how their system functions, the required periodic maintenance, and the public health concerns and environmental contamination concerns from poorly managed or failed systems. Many people only perform maintenance after a problem occurs. Homeowners that are educated in proper wastewater operation and maintenance and understand the consequences of a system failure are more likely to be proactive in complying with operation and maintenance requirements.

#### **2.4.7 Monitoring of Regular Inspections and Maintenance**

Regular periodic inspection and maintenance of wastewater systems by qualified personnel is essential to assure satisfactory system performance. For private property, inspection and maintenance could be performed by a certified individual or company (paid for by the property owner or RME) who is qualified to complete the inspection and maintenance with reporting back to the town to document completion of the work. Regardless of who is responsible for performing inspections and maintenance, the town should have the right to enter the property to access and inspect components as deemed necessary to ensure compliance with the management regulations.

#### **2.4.8 Proper Recordkeeping**

Keeping accurate inventory, maintenance and financial records is an essential part of any management program. A database should be created to maintain a comprehensive inventory of all systems in the Town, and should be expandable to accommodate future additions to the system. The database should be suitable for tracking both permit-related data (e.g., location, site and system characteristics, design flows) and performance-related data (e.g., inspections, maintenance required and performed, problems, follow-up actions).

For systems where no information exists, the lack of information would be noted and methods to ascertain the missing information would be pursued.

#### **2.4.9 Sustained Funding**

The implementation and ongoing operation of any management program has direct costs associated with it. A sustained source of funding should be identified to support the program, either through a user charge or funding through municipal budgeting and the property tax. Either way, it is important that all costs be accurately reflected in the budgets prepared to conduct the management program so the town can understand the “true cost” of the management program. This allows them the means to evaluate the cost-effectiveness of the plan over time based on measurable performance metrics.

#### **2.4.10 Enforcement Capabilities**

To be effective, management programs must have the appropriate enforcement tools to compel compliance. Procedures should be established in the local regulations to conduct enforcement and compliance actions. Local regulatory agencies need clear authority to inspect systems on private property and order remedial action to be taken by the property owner for violating town ordinances and permit conditions. Elements of enforcement procedures typically include:

- A process for reporting and responding to problems
- Defining conditions that constitute violations of program requirements
- Establishing inspection procedures to investigate problems
- Use of informal and formal corrective action measures
- Additional or alternate compliance measures
- Appeals process (e.g. hearing of grievances)

Enforcement should not be based solely on fines to be effective. Compliance incentives should also be considered.

## 2.5. Legal Authority to Implement Wastewater Management

### 2.5.1 Wastewater Permit History in Colchester and Vermont

The following is a chronological history of the evolution of wastewater permitting in Colchester.

**1967** - The Town of Colchester began issuing wastewater permits for any property development since 1967. The technical standard used was a US EPA Publication entitled Manual of Septic-Tank Practice published in January 1967. The manual provided guidelines and design standards for septic tanks and absorption systems for residential, institutional, recreational and other establishments.

**1969** – The Vermont Health Department started issuing wastewater permits for public buildings only. They used the same Manual of Septic-Tank Practice that Colchester used.

**1982** – The Vermont Department of Environmental Conservation (VTDEC) takes responsibility for issuing wastewater permits from the Department of Health. Single family residences are added to those properties that require a wastewater permit, but properties located on 10 acres or more were exempt. This was known as the “10 acre loophole”.

**1996** – Vermont adopted the Environmental Protection Rules that replaced the Manual of Septic-Tank Practice as the technical regulation for design and permitting of wastewater systems. These technical standards were more “science based” and did a better job of taking into account the type of soils, depth to groundwater, depth to bedrock and other factors, specific to Vermont’s geography and environment.

**1999** – Colchester adopted the 1996 Environmental Protection Rules as the technical standard for design and permitting of wastewater systems (to replace the Manual of Septic-Tank Practices).

**2002** – The Environmental Protection Rules were revised to include Innovative/Alternative (I/A) technologies and performance-based system design. The “10 acre loophole” was also eliminated. Colchester incorporated these revisions as adopted in 2002

**2005** – Colchester becomes a “delegated municipality” and takes over responsibility for issuing wastewater permits in Colchester on behalf of VTDEC.

**2007** – The Environmental Protection Rules were again revised and were established as the state-wide uniform technical standard for wastewater system design and permitting. These Rules superseded any rules that any community in Vermont had in-place at the time. The adoption of these Rules also included a one-time “clean slate” where systems constructed prior to the adoption of these rules were exempt from permitting. Colchester did not accept “clean slate” and continued to enforce previous permit requirements for systems constructed between 1967 and 2007.

Below is a more detailed description of the current Environmental Protection Rules and Colchester’s authority as a “delegated municipality”.

### 2.5.2 Current State-Wide Regulations

The Environmental Protection Rules (2007 revision) establish uniform state-wide regulations for potable water supplies and wastewater systems. As part of these rules, the State established:

- Statewide Uniform Technical Standards
- Authority of Delegated Municipalities
- Existing Permits Remain in Effect

### 2.5.3 Statewide Uniform Technical Standards

The Environmental Protection Rules establish statewide uniform technical standards that every community must abide by. They state (in part) that:

*After June 30, 2007, any existing municipal ordinances and zoning bylaws that establish technical standards and criteria for the design, construction, operation, and maintenance of potable water supplies and wastewater systems are superseded. (e.g. no longer in effect by the technical standards and criteria of these Rules and the Vermont Water Supply Rules.) Municipalities may continue to have ordinances and/or bylaws that:*

- (1) are not specifically regulating potable water supplies and/or wastewater systems, but rather regulating development in general, (ex: setbacks);*
- (2) only regulate the use and/or operation of municipally owned water and/or sewage treatment plants; and*
- (3) require submission of copies of plans and documents used to obtain a State permit under these Rules to the municipality;*
- (4) require a certificate of occupancy that is based on full compliance with a State permit issued under these Rules;*

- (5) *require notice of, and have the option to observe, any soil testing such as the digging of test pits; and*
- (6) *require time of sale inspections.*

In summary, (after June 30, 2007) municipalities cannot adopt ordinances or regulations that are in conflict with the Environmental Protection Rules or contain ordinances or regulations that regulate the technical end of wastewater permitting. Further, **local ordinances and requirements cannot be more lax or more stringent than these State rules.**

#### **2.5.4 Authority of Delegated Municipalities**

The Environmental Protection Rules allow municipalities to retain authority to issue Potable Water Supply and Wastewater Disposal Permits under the standards set by the Rules. On December 13, 2005, the Town of Colchester became a “Delegated Municipality” pursuant to the Environmental Protection Rules. As such, the Town acts on behalf of the State to issues all local water and wastewater permits in accordance with those rules.

#### **2.5.5 Existing Permits Remain in Effect**

Notwithstanding the State delegation, all permits issued under the local permit program requirements of Colchester’s Code of Ordinance- Chapter 8 continue to remain in effect unless or until they are amended under the State delegated program. Permits issued by Colchester prior to June 30, 2007 remain in effect until amended under the Environmental Protection Rules. Colchester has been issuing Town permits since 1967.

## 2.5.6 Summary of Colchester's Legal Authority

The Town has delegated legal authority to issue permits for wastewater systems on behalf of Vermont DEC. However, these permits must strictly conform to the Environmental Protection Rules. We have discussed what this means in some detail with key staff at DEC and frankly have received differing opinions. There are several critical questions related to our recommendations that we have not been able to get definitive answers to, including:

- Can specific and enforceable O&M conditions be placed on any permit? (Permits for conventional wastewater systems typically do not contain specific O&M requirements. Permits for “I/A” or “best fix” systems typically do.)
- Can Colchester “open up” existing permits and impose O&M conditions on the permittee for a permit that has already been issued?
- Can Colchester designate certain areas as higher risk and apply O&M conditions in a more rigorous fashion than systems in lower risk areas?
- Can Colchester inspect any system at any reasonable time to confirm that it was installed in accordance with the permit and is in good working order? (Colchester does have authority to make a time of sale inspection.)

Fundamentally, Colchester needs to have the legal authority to impose and enforce O&M conditions where they deem it necessary to protect public health and the environment. They need to be able to designate areas with different risk classifications and impose differing permit conditions as appropriate to the risk. They also need to have the legal authority to make inspections to confirm compliance with these requirements. Without this authority, Colchester will have a very difficult time ensuring that onsite wastewater systems are properly operated and maintained.

If the answer to these questions is “no” (based on current state statute) Colchester must consider whether they pursue statute changes to grant them the authority they need to protect public health and the environment while meeting their wastewater needs primarily with decentralized wastewater treatment and disposal systems.

## 2.6. Current Status of Permits in Colchester

As part of an earlier task in the study, land records were reviewed and data was merged into a database for Colchester's future use in managing decentralized wastewater permits. The database contains information that existed in each of the following data sources:

- ImageWARE scanned images and index: May 26, 2009
- Assessor database: February 6, 2009
- ACS digital land records and index: July 23, 2009
- ACS digital land records and index: July 27, 2010 (for 1996-2002 documents)
- Planning & Zoning permits database: March 17, 2009
- DEC Regional Office documents: November 2009 (linked where feasible)

The database contains a record for each tax parcel in Colchester and links any town and state wastewater and stormwater permits known to be on file electronically as of the dates stated above. In the mid-1990's Colchester started a project to scan and electronically record all wastewater permits in the land records. While the project was started, no current town staff knows whether the project was completed or how far it went. The database is now somewhat out-of-date as transactions that occurred since the above dates will need to be included to bring the database current with all land transactions made since then.

From the database information collected in 2009, we have been able to breakdown the permits into categories as indicated in Table 2.1 below.

**Table 2.1**  
**Number of Parcels by Permit Type**

Parcel/Permit Status	Number of Parcels	Number of Permits
VTDEC/Town Delegated Permits (Issued in 2005 or later)	1,170	
VTDEC Permits not linked to a parcel <sup>(1)</sup>		827
Town Permit (Issued prior to 2005)	2,810	
No permit on file	1,280	
<b>Total</b>	<b>5,260</b>	

Notes:

<sup>(1)</sup> Prior to 1982 the State of Vermont recorded permits by applicant name and not Parcel or Tax ID number. This makes assignment of these permits to a specific parcel difficult in many cases. Since Colchester issued permits as far back as 1967, it is likely that these 827 VTDEC permits are all duplicated in the 2,810 Town permits issued prior to 2007, but there is no way to know for sure.

Table 2.2 provides a further breakdown of these permits by priority needs area. The data was compiled with the most recent wastewater permit taking precedent. For instance, if a property had a Town Septic Permit issued in 1985 and a State Water Supply & Wastewater Disposal Permit (WSWRP) issued in 2008, the WSWRP permit was counted, but not the Town Septic Permit to avoid double accounting.

There were a substantial number of properties (~1,280) where no electronic permit was found on file. This does not necessarily mean that there is no wastewater permit for that system as it is unclear whether Colchester converted all paper records to electronic format, but it does suggest that these systems haven't been altered for quite some time.

**Table 2.2**  
**Number of Parcels by Permit Type by Area**

	Priority Needs Area	Electronic Permits		No Electronic Permit	Total Developed Parcels <sup>(4)</sup>
		WSWRP <sup>(1)(3)</sup>	Town Septic <sup>(2)</sup>		
High	Goodsell Point / Sunset View Road	2	31	16	49
	Mills Point	0	88	16	104
	East Lakeshore Drive West	1	25	36	62
	Porters Point	15	42	35	92
	West Lakeshore Drive	11	20	12	43
	Coates Island	0	6	20	26
	Thayer Beach	5	7	6	18
Medium	North Malletts Bay/ Niquette Bay	29	41	39	109
	Beach Road / Marble Island	69	53	34	156
	Meadow Drive	6	56	13	75
	East Lakeshore Drive East	14	55	25	94
	Colchester Point	9	36	36	81
	Broad Lake Shore	7	89	27	123
	Shore Acres	3	39	26	68
Low	Spaulding East Shore	7	20	10	37
	Village Drive	13	82	53	148
	Belwood	6	75	27	108
	Canyon Estates	5	64	13	82
	Williams Road	87	85	38	210
	Holy Cross	3	13	9	25
Developed Parcels Outside Risk Areas <sup>(4)</sup>		878	1,883	789	3,550
<b>Total Developed Parcels<sup>(4)</sup></b>		<b>1,170</b>	<b>2,810</b>	<b>1,280</b>	<b>5,260</b>

Notes:

<sup>(1)</sup> WSWRP column includes permits issued under these rules by Colchester in 2007 and later

<sup>(2)</sup> Town Septic column includes town permits issued between 1967 and 2007

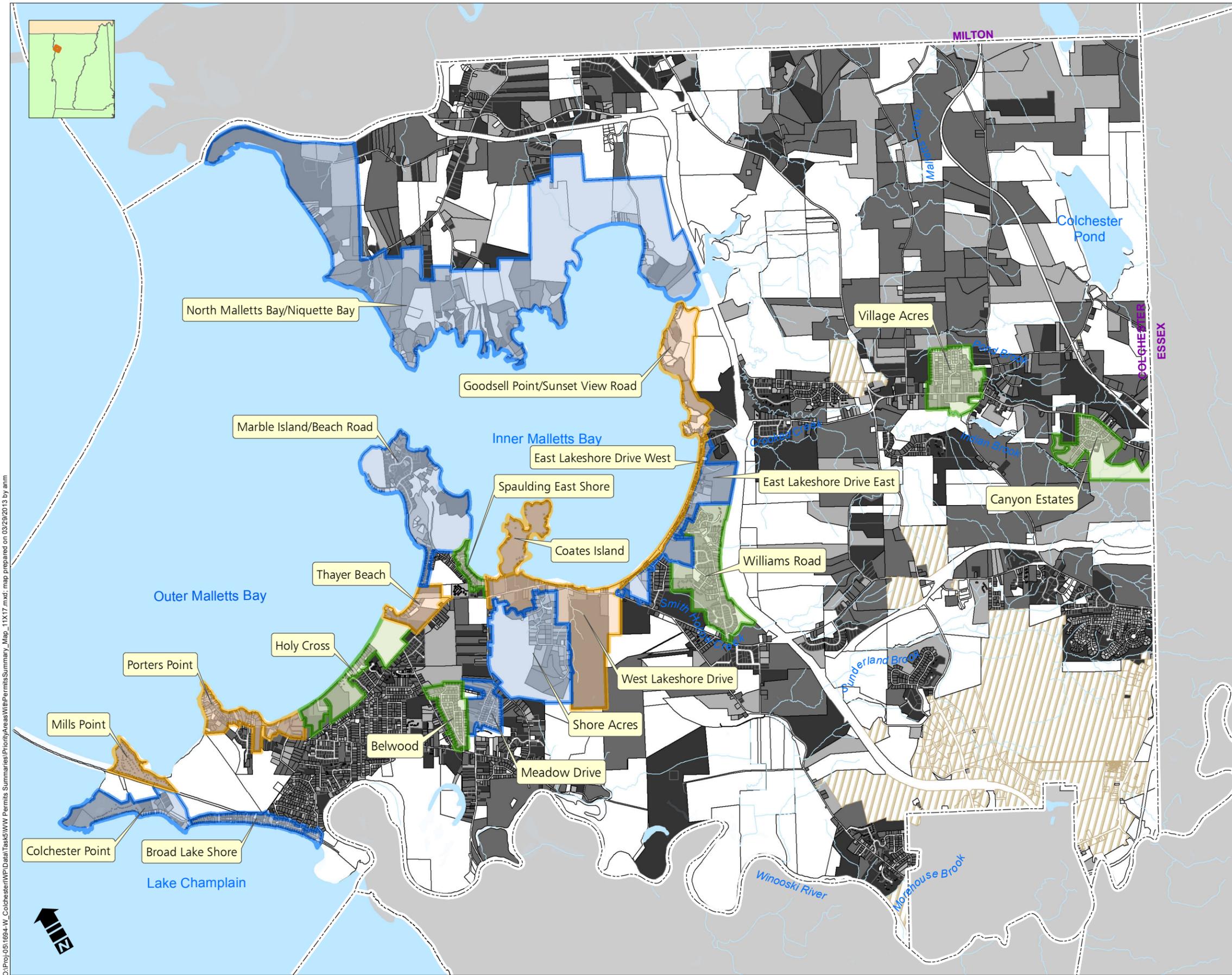
<sup>(3)</sup> WSWRP stands for DEC Water Supply & Wastewater Disposal Permit

<sup>(4)</sup> Excludes developed parcels connected to central sewers

Some assumptions about the general age of systems can be derived from the above statistics:

- 1,170 systems (22%) of all systems were at least altered in 2005 or later, requiring either a new permit or permit amendment
- 2,810 systems (54%) were built between 1967 and 2005, an age range of 13 to 46 years old, as they have a town permit, but no WSWR Permit on file.
- 1,280 systems (24%) of all systems were likely constructed prior to 1990 and could have been constructed prior to Colchester issuing permits in 1967, making these systems more than 46 years old.

The information provided in Table 2.2 is shown graphically in the following Figure No. 1.



**Figure 1.**  
**Wastewater Permits**  
**and Priority Areas**

Integrated Water Resources  
 Management Program

Town of Colchester, Vermont

Undeveloped or Conserved Parcels  
 Sewered with Municipal Service

**Task 4 and 5 Priority Areas**

High Risk Priority Areas  
 Medium Risk Priority Areas  
 Low Risk Priority Areas

**Electronic Permit Information**

DEC or Town Permit Under State Rules (1,170)  
 Town Septic Permit (pre-2006) (2,810)  
 No Electronic Permit Information (1,280)

Sources: VCGI: Streams, Roads; CCRPC: Parcel Boundaries; Stone Environmental and Aldrich + Elliott: Priority Areas, Electronic Permit Information, Sewered Parcels, Undeveloped or Conserved Parcels

0 0.5 1 Miles

O:\Proj\0511694-W\_Colchester\WPI\Data\Task4\Task4\Permits\_Summaries\PriorityAreas\WithPermitsSummary\_Map\_1X17.mxd: map prepared on 05/29/2013 by am

## 2.7. Colchester's Current Wastewater Regulatory Staff

The Colchester Wastewater Division is part of the Planning & Zoning Department. The Wastewater Division administers the Town's wastewater regulations as codified in Chapter 8 of the Code of Ordinances and also encompasses the State mandated Health Officer duties as required in Title 18 of Vermont Statutes Annotated, Chapter 11. As a delegated community, the Town issues all permits required under the Environmental Protection Rules.

The Wastewater Division is currently staffed by one full-time Wastewater Official / Health Officer. The main responsibilities of the Wastewater Division include:

- Issuing local/state wastewater permits
- Health Officer duties
- Administering Colchester's Wastewater Revolving Loan Fund
- Enforcement of ordinances and permits

## 2.8. Colchester's Current Wastewater Fee Structure

Table 2.3 provides a summary of Colchester's current Wastewater Permit Fees for reference purposes and comparison to proposed fees for various management strategies presented later in this report.

**Table 2.3**  
**Colchester's Current Wastewater Fee Structure**

Permit Type	Fee
<b>Local Wastewater Permit (tank replacement)</b>	<b>\$110</b>
<b>State Water &amp; Wastewater Permit (includes recording fee)</b>	
▪ <b>Projects 0 – 559 gallons/day</b>	<b>\$350<sup>(1)(2)</sup></b>
▪ <b>Projects 560 – 2,000 gallons/day</b>	<b>\$700<sup>(1)(2)</sup></b>
▪ <b>Projects 2,000 – 6,500 gallons/day</b>	<b>\$2,000<sup>(1)(2)</sup></b>
▪ <b>Projects 6,500 – 10,000 gallons/day</b>	<b>\$5,000<sup>(1)(2)</sup></b>
▪ <b>Projects 10,000+ gallons/day</b>	<b>\$10,000<sup>(1)(2)</sup></b>
<b>State Water/Wastewater Permit Renewal</b>	<b>\$100<sup>(1)</sup></b>
<b>State Water/Wastewater Permit (minor amendment)</b>	<b>\$150<sup>(1)(3)</sup></b>
<b>Boundary Line Adjustments</b>	<b>\$200<sup>(4)(5)</sup></b>

Notes:

- <sup>(1)</sup> Includes recording fee
- <sup>(2)</sup> Add \$200 for Class B systems
- <sup>(3)</sup> Assumes no increase in flow and/or no construction
- <sup>(4)</sup> Add \$50 surcharge for Mylar's without digital copy
- <sup>(5)</sup> Includes \$75 wastewater exemption review letter and recording

### 3. WASTEWATER MANAGEMENT ALTERNATIVES ANALYSIS

The wastewater management alternatives analysis considers different levels of wastewater management ranging from relatively simple homeowner awareness programs to acquisition of and operation and maintenance of individual wastewater systems by the town. The alternatives analysis also considers whether the management program should be administered town-wide or on a risk assessment basis (using the risk analysis and ranking results of the Priority Area Needs Assessment report).

The Town of Colchester is already more actively engaged in the management of decentralized wastewater systems than most other Vermont communities. Colchester is one of only two towns in Vermont that chose to “take delegation” of the administration of state-level regulations for small-scale decentralized wastewater systems under provisions of the Environmental Protection Rules. Town Planning & Zoning Department staff has primary responsibility for administering the permitting program, including regular correspondence with state regulators, completing site and system inspections, issuing permits and record-keeping.

### 3.1. Decentralized Wastewater Management Models

There are several different levels of management that the Town of Colchester might choose to pursue, and varying structures for the governance, as described later in this section. The US EPA uses the term “responsible management entity” or RME to describe the manager of a decentralized wastewater management program, and they define an RME as *a legal entity responsible for providing management services to ensure that decentralized onsite or clustered wastewater treatment facilities meet established criteria.*

The EPA groups RMEs and associated service providers into five broad “models” for managing decentralized wastewater systems, as described below. In reality, most jurisdictions include elements from more than one of these management models to create programs that meet their unique goals and objectives, in keeping with their local regulatory and political considerations.

#### **Level 1: Home Owner Awareness**

The systems are properly sited and constructed based on prescribed criteria. The RME makes owners aware of maintenance needs through reminders, and maintains an inventory of all systems.

#### **Level 2: Maintenance Contracts**

The RME requires property owners to have contracts with appropriately qualified, and in some cases certified, service providers to ensure proper and timely professional maintenance and inspection. Maintenance contracts are recorded in the inventory database. Notices and reminders are sent out to property owners when records indicate that the maintenance contract has expired.

#### **Level 3: Operating Permits**

The RME implements a management program that issues permits to property owners for operating their systems, with conditions and requirements for proper maintenance. The operation and maintenance must be carried out by qualified, and often certified, service providers. The authority monitors and enforces compliance, and may or may not act as the service provider. Compliance measures are recorded in the inventory database. Notices and reminders are sent out to property owners when confirmation of maintenance functions has not been received.

#### **Level 4: RME Operation and Maintenance**

The public health and/or environmental risks are high enough to require management by a qualified organization on behalf of the property owners. The RME takes on the obligation of maintaining systems to meet compliance on behalf of property owners, in exchange for a fee. The RME does not own the infrastructure, so this situation is also known as “contract operation”.

### **Level 5: RME Ownership**

The RME assumes ownership of all the infrastructure assets including systems located on private property. Not only does the RME assume all maintenance and repair responsibility, they also assume responsibility for system replacements if there is a failure. The property owner would only be liable for a system replacement or upgrade if one is triggered by a change of use by the property owner. For users, the service provided appears equivalent to centralized services with the RME taking on all the associated obligations to ensure performance in exchange for a fee for services.

Each management model has benefits and limitations depending on the specific needs of the community and level of risk to public health and the environment. The EPA prepared [Table 1: Summary of Management Models](#), as part of their publication [Voluntary National Guidelines for Management of Onsite and Clustered \(Decentralized\) Wastewater Treatment Systems](#). A copy is included as **Appendix A** for reference.

## 3.2. Management Entities/Governance

Several different types of management entities are possible within the state's legal framework. Governance structures that could function as RMEs in Vermont communities include the following:

### **Local Government**

- Municipality (via local water/wastewater ordinance)
- Fire District

### **Local Non-Government**

- Local Utility
- Co-operative
- Limited Liability Corporation (LLC)

Colchester currently uses a local wastewater ordinance to regulate on-site wastewater systems and centralized sewer systems located within the Town (a municipality model).

Colchester's management activities for decentralized wastewater systems contain elements from the EPA Level 1 and Level 2 models. The town has prescribed criteria for wastewater systems based on state regulations, and an inventory of wastewater service and permits by parcel developed earlier in this study, along with extensive paper-file permit records (similar to EPA Level 1). In addition, where systems contain "I/A" components requiring maintenance contracts, the Town is required to maintain copies of current contracts on file (similar to EPA Level 2).

However, there is room for improvement: the wastewater service inventory is not actively maintained, regular reminders of the need for system maintenance are not provided to property owners, and consistent enforcement of the requirement for maintenance contracts or reporting for "I/A" systems has proven to be challenging.

### 3.3. Case Studies and Funding

The following cases illustrate where communities across the U.S. have successfully implemented management programs for decentralized wastewater systems, using a wide range of funding mechanisms, incentives, and regulatory “hooks”.

#### **Keuka Lake, NY**

Keuka Lake has a watershed of about 110,000 acres (about 170 square miles) with approximately 6,000 septic systems in the drainage area. On-site wastewater septic systems are the one nonpoint source of pollution in the watershed for which an organized, watershed-wide remediation and management program currently exists. In the 1980’s, this program began with lake water testing for the presence of fecal coliform bacteria. In the early 1990s, the Keuka Lake Watershed Improvement Cooperative (KWIC) was formed by eight local governments to oversee a newly adopted wastewater law and to consider other threats to water quality in Keuka Lake as they may arise. The municipalities also agreed to uniformly enforce and implement the wastewater law.

The resulting management system contains many elements from EPA Models 2 and 3. The local regulations require a permit for construction or alteration of any on-site septic system not already subject to continuous review by the NYS Departments of Health and Environmental Conservation.

Regular septic system inspections and approvals are required for all systems in Zone One, “the critical water quality protection zone”, consisting of all land within 200 feet of the lake or its major tributaries. Inspections are also required for all real property transfers, building permit applications requiring bedroom expansion, and for high maintenance systems such as aerobic treatment devices and holding tanks. The intent of the program is to identify and correct existing problem systems and enforce strict adherence to current design standards for new projects.

An appointed watershed program manager oversees all technical wastewater system construction, repairs, and replacements. Each municipality participating in the KWIC is responsible for hiring a Watershed Inspector to perform inspections and investigate complaints that arise in the watershed. Watershed inspectors report to the Watershed Program Manager, inspect systems, and assist with record-keeping. Record-keeping was recently made easier with the implementation of a web based GIS application for management of the inventory, maintenance contracts, and performance monitoring of the onsite wastewater treatment systems along the lake. The program is sponsored by the Keuka Lake Association, but is primarily funded through the fees charged for wastewater system inspections and construction permits.

## **Otter Tail County, MN**

The Otter Tail Water Management District covers about 55 square miles in west-central Minnesota, and includes six lakes, four townships, and portions of the City of Otter Tail. The district was formed in 1984 as a mechanism to assure the proper onsite treatment of wastewater in an area experiencing decreasing lake water quality and population growth. Initially the District served 1,200 homes, cabins, and businesses, but over time it has grown to include more than 1,600 connections. All properties participating in the district either use an individual on-site wastewater system or are connected to one of sixteen cluster systems.

The Otter Tail Water Management District is an example of a Level 4 RME Management program. It is a nonprofit entity financed through user fees, with the power to levy taxes and to write and enforce laws. The District has a board of directors and one technical staff member who are responsible for day-to-day operations. Wastewater systems serviced by the district include seasonal residents, permanent residents, and resorts or businesses, with the majority of the systems serving seasonal residences. District members can choose to join in one of two modes. In the “passive” mode, they pay only an administrative fee to the District but are responsible for maintaining their system on their own and for following the Otter Tail District’s rules and regulations for inspection scheduling and reporting. Members can also choose the “active” mode as an insurance type of plan, where the district will perform all maintenance and monitoring, as well as pay for repairs needed to the wastewater system, from the septic tank to the leachfield area.

Members can shift from the passive to active mode at any time, but once a property has chosen the active mode the property cannot be switched back. The annual cost for a lakeshore property owner on the passive mode is around \$40 per year, while the active mode costs roughly \$160 to \$225 per year, depending on the technologies employed for that specific system. The district allows both conventional and alternative systems and has a groundwater monitoring program for wells near drain fields.

## **Warren, Vermont**

Warren Village is a typical 19<sup>th</sup> century New England mill town of small lots with individual wells and septic systems close to the Mad River and Freeman Brook. Like many other Vermont villages, there was no municipal wastewater infrastructure, other than a small cluster system serving seven properties. Amid growing concern about the possible impact of septic systems on the rivers, the Town conducted a traditional sewer feasibility study in the early 1990s, but residents rejected its recommendation for a centralized system with mandatory connections. Then in 1998, the Mad River Valley Planning District helped the Town win a US EPA National Onsite Demonstration Grant, and the decentralized management project was launched. In 2004, Warren constructed and implemented decentralized wastewater systems and a management program in its historic Village.

The resulting program is an example of a Level 5 RME, combining traditional and alternative sewage systems with a comprehensive management plan for most of the Village's 95 properties. Joining the program was not mandatory, but by the time construction was started, more than 90% of Village residents joined voluntarily. Each participating Village property is connected to one of four wastewater systems: a managed pre-existing onsite system; a new individual onsite system; a 20,000 gallon per day (gpd) cluster system at Brooks Field; or a 2,000 gpd cluster system on Luce Pierce Road. The management program is governed by a local sewer ordinance, and a Town staff member manages the program with assistance from an operation and maintenance service provider, an engineering firm, and an environmental consultant.

### **New Shoreham, Charlestown, and South Kingstown, RI**

The Block Island and Green Hill Pond Watershed Project brought together the Rhode Island towns of New Shoreham (Block Island), Charlestown, and South Kingstown, the University of Rhode Island, US EPA, and other federal, state and municipal agencies, along with resource and community partners. They united under the common goal of improving onsite wastewater management in areas especially vulnerable to environmental and health risks. The majority (if not all) of the properties in each of the three towns are served by onsite wastewater treatment systems, and all three communities also border brackish estuaries or ocean areas and shellfisheries that are vulnerable to nitrogen loading. The number of onsite systems in each community ranges from about 1,300 systems (New Shoreham) to about 6,600 systems (South Kingstown).

The Towns and related groups had been working for years to deal with problems related to failed and substandard systems, and much like Colchester, had already succeeded in establishing a foundation for local management. For example, each town had a local wastewater management plan, and state-funded low-interest loans for septic system repair and replacement were available to homeowners in Charlestown.

The US EPA National Community Decentralized Wastewater Treatment Demonstration Project effort was a "sister project" to the Warren Village demonstration project described above, and ran from 2000-2007. By the end of the demonstration project, all three towns adopted comprehensive wastewater management plans and were running self-sufficient management programs for all onsite wastewater treatment systems within their jurisdictions. These management programs are most akin to the EPA's Management Model 3 (operating permit model).

The three management plans include several common aspects:

- Reliance on state-level regulations and regulators for technical standards and system permitting.
- Mandatory inspection schedules based on system type and use, including tank pump-outs, maintenance and repairs as needed, and detailed reporting by service providers to towns.
- Long-term, low-interest loans for onsite wastewater system repair and replacement offered through the State revolving loan program, along with other incentives such as rebates for locating hard-to-find systems, installing access risers, or installing effluent filters.
- Public education programs reaching system owners, realtors, design professionals and maintenance providers.
- Databases for tracking inspection results and organizing communication with system owners, regulators, and service providers. (Initially each community used its own database, but by the end of the demonstration project all were using at least some web-based management services and Charlestown transitioned to entirely paperless reporting by operation and maintenance service providers.)
- Transition from funding of management program operations and staff through the demonstration grant to funding via local municipal budgets or annual fees assessed on un-sewered properties in each town.
- Watershed monitoring data used to document trends and identify illicit discharges, with results made widely available to the public. Watershed groups obtained funding to continue monitoring after the demonstration project ended.

Each town's management program is codified in local regulations and ordinances and is administered by Town staff members. The cost of keeping the programs running averages approximately \$50,000/year per town. The costs of program administration are generally included in the General Fund for each town's municipal budget, although the local ordinances do give the Program Administrator and Town Manager the ability to propose a fee schedule for approval by the town council, to be assessed on each system owner. The nearby Town of Jamestown, for example, charges a fee of \$35/year per un-sewered property to support a half-time Town staff member to administer a similar management program.

## **Tisbury, Massachusetts**

The Town of Tisbury is located on the northwestern tip of Martha's Vineyard, and is largely rural with a population center in the village of Vineyard Haven. Aside from a cluster system that serves about 120 properties in the Vineyard Haven village core, wastewater is treated by approximately 2,400 onsite systems. Concerns about failing systems, protecting sole-source drinking water aquifers, and mitigating nutrient loading from onsite systems to shellfisheries resulted in the Town establishing an on-site wastewater treatment system (OWTS) management program in 1989.

The program required inspection of OWTS at the time of property transfer, six years before Massachusetts' statewide "time of transfer" requirements were enacted. Over time, the time-of-transfer inspection program has evolved into a town-wide program which, starting in 2001, required inspections and pump-outs of onsite wastewater systems on a seven-year cycle. The Town's current management program is closest to the EPA's Model 3, because the program regulatory authority (in this case the town) requires landowners to have qualified service providers perform maintenance and routine pump-outs, while the Health Department staff perform inspections, issue permits, and provide technical assistance and program administration services. (In Massachusetts, the local Boards of Health issues permits according to state-level regulations and technical standards which may be made stricter in local regulations.) The management program is codified in a local ordinance and is administered by Health Department staff members.

The inspection and pump-out programs are funded from the Town's general fund, and permit fees go back into the general fund. The Town's health department has an annual budget of \$240,000, and the OWTS management program makes up about 20% of the department's annual budget. Inspections take the health inspector approximately half an hour each and about 30 systems are inspected every month, including those driven by property transfers. The town tracks systems and inspections using a web-based proprietary database. A low-interest revolving loan program is available to assist with funding onsite wastewater system repairs and upgrades.

### 3.4. Wastewater Management Zones

As part of the evaluation of alternatives, Colchester must consider whether the management strategy they select is administered town-wide or only in those areas (zones) where the risks are considered most severe. In the Detailed Needs Assessment of Priority Areas, twenty subareas of Colchester received a more detailed on-site assessment to characterize that area's ability to adequately meet the wastewater needs of both current and full build-out development. Areas were rated based on the ability of parcels in each area to meet each of the following five criteria:

- Area Limitations
- Distance to Surface Waters
- Soils Suitability
- Depth to Groundwater
- Depth to Bedrock

Areas were rated “high risk” if the aggregate score from this rating system exceeded 15 points. These areas generally rated severe for two or more of the above criteria. Areas were rated “medium risk” if the aggregate score was between 10 – 15 points. These areas generally rated severe for one criterion or moderate-severe for two or more criteria. Areas were rated “low risk” if the aggregate score was less than 10 points.

It is interesting to note that there is no obvious discernible pattern for the location of “high risk”, “medium risk” and “low risk” areas. “High risk” areas were all along the shoreline, but were interspersed with “medium risk” and “low risk” areas. A map that shows the location and extent of each risk area is included as **Appendix B**.

Table 3.1 provides a summary of the needs assessment scoring by area (in descending order).

**Table 3.1**  
**Priority Area Ranking**

Priority Needs Area	Number of Parcels	Area Limitations	Distance to Surface Waters	Soils Suitability	Depth to Groundwater	Depth to Bedrock	Overall Ranking	Overall Score	Weighted Score
Goodsell Point/Sunset View Road	49	S	MS	S	MS	S	H	18	23.5
Mills Point	104	S	L	LM	S	S	H	13	17
East Lakeshore Drive West	62	S	S	L	MS	LM	H	11	16.5
Porters Point	92	MS	LM	MS	MS	MS	H	13	16.5
West Lakeshore Drive	43	S	S	LM	MS	L	H	12	16
Coates Island	26	MS	MS	S	S	L	H	13	15.5
Thayer Beach	18	MS	MS	S	S	L	H	13	15.5
North Malletts Bay/Niquette Bay	109	MS	LM	M	LM	S	M	11	15
Beach Road/Marble Island	156	S	LM	M	MS	MS	M	11	14.5
Meadow Drive	75	S	MS	LM	MS	L	M	11	14.5
East Lakeshore Drive East	94	S	LM	L	MS	M	M	9	12
Colchester Point	81	MS	MS	L	MS	L	M	9	12
Broad Lake Shore	123	S	MS	L	L	LM	M	8	12
Shore Acres	68	M	LM	S	S	L	M	10	11
Spaulding East Shore	37	S	LM	L	MS	L	L	6	8
Village Drive	148	MS	LM	LM	MS	L	L	6	7.5
Belwood	108	MS	LM	L	MS	L	L	5	6
Canyon Estates	82	S	L	L	L	L	L	4	6
Williams Road	210	MS	LM	L	LM	LM	L	4	5.5
Holy Cross	25	LM	L	L	L	L	L	1	1.5

Seven areas ranked “**high**” based on the detailed field investigations and analysis.

- Goodsell Point/Sunset View Road
- Mill Point
- East Lakeshore Drive – West
- Porters Point
- West Lakeshore Drive
- Coates island
- Thayer Beach

These areas are each along the lakeshore and are comprised of both year-round and seasonal dwellings and some commercial uses. Each of these areas ranks severe or moderate-severe for area limitations and severe for at least one other criterion.

Seven areas ranked “**medium**” based on the detailed field investigations and analysis.

- North Malletts Bay/Niquette Bay
- Beach Road/Marble Island
- Meadow Drive
- East Lakeshore Drive - East
- Colchester Point
- Broad Lake Shore
- Shore Acres

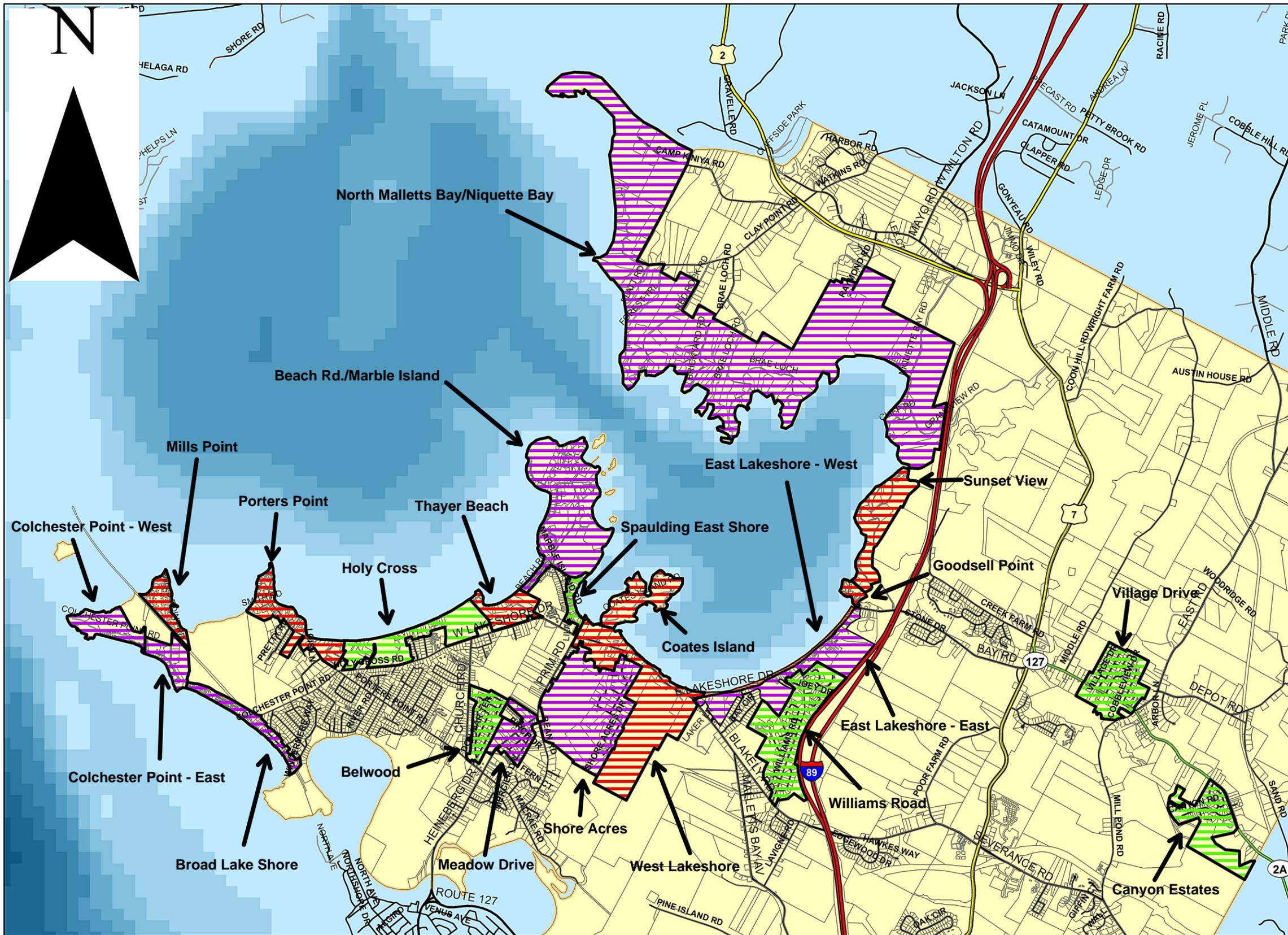
These areas are also generally along the lakeshore (with the exception of Meadow Drive and Shore Acres) and are comprised of both year-round and seasonal dwellings and some commercial uses. Most areas are rated severe or moderate-severe for area limitations because of small lots. Some are rated severe or moderate-severe for depth to groundwater and depth to bedrock.

Six areas ranked “**low**” based on the detailed field investigations and analysis.

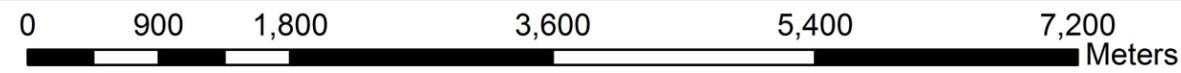
- Spaulding East Shore
- Village Drive
- Belwood
- Canyon Estates
- Williams Drive
- Holy Cross

Each of these areas is inland of the lakeshore (with the exception Holy Cross) and is not limited by distance to surface waters. Most of these areas have area limitations, but also have sandy soils and adequate depth to groundwater.

These areas are shown graphically in the following figure. If Colchester chooses to establish different management zones, the findings above would be a good basis to do so.



**Category of Needs**



## 3.5. Wastewater Management Alternatives

### 3.5.1 Introduction

Prior to developing the recommended management program for wastewater infrastructure, the following management alternatives were identified for a comprehensive technical and economic evaluation:

**Level 1-** Homeowner Awareness on a **Town-Wide Basis**

**Level 2-** Maintenance Contracts for **all Priority Areas**

**Level 3-** Operating Permits for **High Risk Areas only**

**Level 3-** Operating Permits for **High and Medium Risk Areas**

**Level 4-** RME Operation & Maintenance for **High Risk Areas Only**

**Level 5-** RME Ownership for **High Risk Areas Only**

There are a multitude of different scenarios that could be evaluated. We selected those listed above to provide a representative range of costs over the likely scenarios under consideration. For each alternative, start-up (implementation) costs along with annual budget and user costs were developed.

Budget estimates for **start-up costs** include the following components:

**Salaries:** Salaries include the actual payroll cost of Town employees to research the wastewater components of each on-site system and enter the inventory of systems into the database. For systems that have a Town or State permit, the research and inventory can be performed through office research. For systems that do not have a permit, a site visit will be required to inventory the components of each on-site system. An office assistant will import the system inventories into the database for tracking of operation and maintenance activities. A part-time manager is included to manage the overall research, inventory and database entry activities.

**Benefits:** Benefits include the cost of Town employee health care, insurance, paid leave, retirement/savings, and other benefits. For this study, the cost of benefits is estimated at 50% of the worker's salary.

**Auto/Gasoline:** This is the cost of automobile maintenance and gasoline required for the field technician to perform the field inventory of systems that do not have a permit on file. A unit cost of \$0.55/mile (current GSA mileage rate) was used.

**Risers, Covers, and Effluent Filters:** (For Levels 4 and 5 only) This is the cost for adding risers, covers and effluent filters to the septic tanks, pump stations and treatment systems that do not already have them. A riser is simply an extension that raises access to the tank up to ground level. The cover sits on the riser and allows easy access to the septic tank. An effluent filter is a physical device that is placed on the outlet pipe of the septic tank to enhance solids removal from the septic tank effluent. Effluent filters help to prevent blockages and prolongs the useful life of the leach field.

**Small Purchases:** (For Levels 4 and 5 only) The Town will be operating and maintaining systems and will need the tools and equipment required to do so. This is an allowance for the purchase of the required tools and equipment, such as:

- Metal detector
- Manhole hook
- Sludge judge
- Cordless drill with drill bits and adaptors
- Socket set, wrenches and screw drivers
- Shovel, rake and pick ax
- Volt meter

**Maintenance Truck:** (For Levels 4 and 5 only) The operators will require a maintenance truck to perform the required maintenance and store their tools. This is an allowance for the purchase of a 4-wheel drive maintenance truck with an equipment storage box.

**Educational Material:** Education of property owners regarding how to operate and maintain their wastewater system is an essential component of every management level. This includes the cost of reproducing an educational brochure for the operators to leave with the homeowner during inspection and maintenance activities. It is assumed that Colchester will use existing literature resources offered by US EPA (among others) and will not develop their own literature.

**Easement Assistance:** (For Level 4 and 5 only) The Town will need legal access for operation and maintenance activities. For Level 5, the Town will obtain ownership of the on-site systems. Easement assistance is the cost for creating an easement for each of the systems to obtain legal access.

**Attorney Fees:** (For Level 4 and 5 only) The town will need to retain an attorney to prepare the required property easements. The attorney will also prepare bills of sale for property ownership transfer under Level 5.

**Miscellaneous Supplies:** Miscellaneous supplies include such items as paper, reproductions, pencils, protective gloves and other disposable supplies.

Budget estimates for **annual operating costs** include the following components:

**Salaries:** Salaries include the actual payroll cost of Town employees who send out maintenance reminders, enter updated compliance information into the database and issue annual service fee bills. An office assistant will perform database updates and mail out maintenance reminders. For Level 3 Management, a technician will perform the required inspections. For Level 4 and 5 Management, wastewater operators will perform the required operation and maintenance of systems. A part-time manager is included to manage the overall activities of the office assistance, technicians and operators.

**Benefits:** Benefits include the cost of Town employee health care, insurance, paid leave, retirement/savings, and other benefits for a Town employee. For this study, the cost of benefits is estimated at 50% of the worker's salary.

**Auto/Gasoline:** This is the cost of automobile maintenance and gasoline required for the field technician to perform the field inventory of systems that do not have a permit on file. A unit cost of \$0.55/mile (current GSA mileage rate) was used.

**Septic Tank Pumping:** (For Levels 4 and 5 only) This is the cost for a septage hauler to pump out septic systems as needed.

**Miscellaneous Repairs/Maintenance:** (For Level 5 only) This cost is an allowance for making any repairs or necessary maintenance to the Town owned on-site systems (e.g. broken floats, pump repairs, pipe leaks)

**Capital Reserve:** (For Level 5 only) This is a budget to establish a capital reserve fund to replace failed on-site systems. For budget purposes, it was assumed that systems have a 25-30 year life cycle before cull replacement.

**Telephone:** This is for cell phone charges for field personnel.

**Reminder Notice Copies:** (For Levels 1, 2 and 3 only) This includes the cost to print and copy maintenance reminders.

**Education Material Copies:** For all levels, this is the cost to copy educational material for homeowners.

**Postage:** This is the cost of postage for mailing maintenance reminders, educational material, and service fee bills.

**Information & Technology:** This is an allowance for maintaining information and technology (e.g. trouble shooting problems with the database, software and hardware upgrades)

**Miscellaneous Supplies:** This is the cost of miscellaneous supplies including paper, pencils, rubber gloves and other disposable supplies

**Insurance:** (For Level 5 only) This is the cost for property insurance on the Town owned systems.

The annual cost per property was derived by dividing the annual budget amount by the number of properties associated with each level. A technical evaluation was performed by summarizing the advantages and disadvantages of each management level. Ultimately, each management level needs to be evaluated considering the following questions:

- Is it fair and reasonable across all areas where proposed?
- Do the public health and environmental risks justify the strategy?
- Is it cost-effective to apply and can it be reasonably supported by user fees?

It is difficult to answer these questions fully in this study given the sample size of field inspections performed in each of the priority areas. For the purposes of this report, we have based our conclusions and recommendations on the assumption that the field data accurately represents a homogeneous characterization of the entire area, which may not be true in all cases.

If Colchester decides to pursue a Level 3: Operating Permits Model (or Level 4: RME Operation & Maintenance) in a given area, an inspection of all properties should be conducted to determine if the imposition of such a requirement is appropriate in all cases. There are likely to be some systems within the priority area that are fully conforming to current regulations and pose no public health or environmental risk. The cost of these initial field inspections is included in the initial start-up cost budgets prepared for each of the scenarios described above.

### 3.5.2 Level 1 Management: Homeowner Awareness (Town-Wide)

This alternative evaluates a Level 1: Homeowner Awareness Model on a town-wide basis applied to all 5,260 properties in Colchester with an onsite wastewater system. There will be a limited inventory of all systems (e.g. system type (if known), permit conditions (if any)). Property owners will be made aware of maintenance needs through educational material and maintenance reminders that would be mailed out on a periodic (e.g. annual) basis.

**Initial Start-up Costs** associated with Level 1 Management: Homeowner Awareness is estimated at \$2,100 which equates to a cost of \$0.40 per system based on 5,260 systems. Costs are summarized in Table 3.2.

**Table 3.2**  
**Level 1: Homeowner Awareness (Town-Wide)**

#### Initial Start-Up Costs

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$1,248
Benefits	\$624
Miscellaneous Supplies	\$200
<b>Total Cost</b>	\$2,072
<b>Use</b>	<b>\$2,100</b>
<b>Initial Set-Up Fee Determination</b>	
Number of Properties	5,260
<b>Initial Set-up Cost / Property</b>	<b>\$0.40</b>

**Notes:**

- Salaries determined as follows:  
 Supervision: Program Manager \$36/hour x 4 hr/week x 2 weeks=\$288  
 Database Setup: Office Assistant \$12/hr x 40 hr/wk x 2 wks= \$960

**Annual Budget and User Costs** associated with Level 1: Homeowner Awareness is estimated at \$5,300, which equates to a cost of \$1.00 per system based on 5,260 systems. These costs are summarized in Table 3.3.

**Table 3.3**  
**Level 1: Homeowner Awareness (Town-Wide)**

**Annual Budget and User Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$768
Benefits	\$384
Reminder Notice Copying <sup>(2)</sup>	\$263
Educational Material Copying <sup>(3)</sup>	\$526
Postage <sup>(4)</sup>	\$2,630
Information & Technology	\$500
Miscellaneous Supplies	\$200
<b>Total Annual Cost</b>	<b>\$5,271</b>
<b>Use</b>	<b>\$5,300</b>
<b>Annual User Fee Determination</b>	
Number of Properties	5,260
<b>Annual User Cost / Property</b>	<b>\$1.00</b>

**Notes:**

- Salaries based on the following:  
Supervision: Program Manager \$36/hour x 8 hr/year = \$288  
Mailings: Office Assistant \$12/hr x 40 hr/year = \$480
- Reminder notice copying: 5,260 copies x \$0.05/copy = \$263
- Educational material copying: 2 Pages x 5,260 copies x \$0.05/copy = \$526
- Postage: 5,260 letters x \$0.50/letter = \$2,630

**Advantages** of Level 1 Management - Homeowner Awareness:

- This is the least cost alternative
- The Town has the legal authority to provide homeowner awareness
- This is the easiest alternative to implement
- Making homeowners aware of maintenance requirements may increase the numbers of homeowners that perform proper maintenance and reduce the number of failures and impacts on the environment.

**Disadvantages** of Level 1 Management - Homeowner Awareness:

- There is no complete inventory of system components
- There is no tracking of compliance monitoring
- There is no mechanism to document performance/failures
- This is the most “passive” management strategy, relying on the goodwill of the property owner to maintain their system

### **3.5.3 Level 2 Management: Maintenance Contracts (All Priority Areas)**

This alternative evaluates a Level 2 (Maintenance Contracts) Model applied to all priority areas (high, medium and low). There are 1,710 properties within the twenty priority areas listed in Section 3.3.

This alternative requires property owners to have a maintenance contract with a qualified service provider and includes an inventory of all wastewater treatment and disposal systems entered into a database to track maintenance contracts. Property owners will receive reminders when the maintenance contract is scheduled to expire and will be required to provide the Town with evidence that the maintenance contract has been renewed. The Town will enter the completed functions into the database.

The objective of this alternative is to build on the homeowner awareness model by ensuring that the property owners retain qualified service providers to maintain their on-site wastewater systems by sending in confirmation of such routine maintenance functions as septic tank pumping, cleaning of effluent filters and annual inspections for I/A systems.

This model was only developed for the “priority needs areas”. It is our opinion that this level of management is not justified town-wide. We’ve concluded that annual educational material and maintenance reminders should suffice for areas where the risks are minimal based on the areas environmental features.

**Initial Start-up Costs** associated with Level 2: Maintenance Contracts is estimated at \$17,000 which equates to a cost of \$10 per system based on 1,710 systems. These costs are summarized in Table 3.4.

**Table 3.4  
Level 2: Maintenance Contracts (All Priority Areas)**

**Initial Start-Up Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$11,196
Benefits	\$5,598
Miscellaneous Supplies	\$200
<b>Total Cost</b>	\$16,994
<b>Use</b>	<b>\$17,000</b>
<b>Initial Set-Up Fee Determination</b>	
Number of Properties	1,710
<b>Initial Set-up Cost / Property</b>	<b>\$10.00</b>

**Notes:**

- Salaries based on the following:  
 Supervision: Program Manager \$36/hour x 1 hr/week x 26 weeks=\$936  
 Database Creation: Office Assistant 1,710 systems x 0.5 hrs/system x \$12/hr = \$10,260

**Annual Budget and User Costs** associated with Level 2: Maintenance Contracts is estimated at \$9,000 which equates to a cost of \$5.25 per system based on 1,710 systems. Costs are summarized in Table 3.5.

**Table 3.5**  
**Level 2: Maintenance Contracts (All Priority Areas)**

**Annual Budget and User Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$4,676
Benefits	\$2,338
Reminder Notice Copying <sup>(2)</sup>	\$86
Educational Material Copying <sup>(3)</sup>	\$171
Postage <sup>(4)</sup>	\$855
Information & Technology	\$500
Miscellaneous Supplies	\$200
<b>Total Annual Cost</b>	<b>\$8,826</b>
<b>Use</b>	<b>\$9,000</b>
<b>Annual User Fee Determination</b>	
Number of Properties	1,710
<b>Annual User Cost / Property</b>	<b>\$5.25</b>

**Notes:**

- Salaries based on the following:  
Supervision: Program Manager \$36/hour x 1 hrs/wk x 26 wk/yea r = \$936  
Mailings: Office Assistant \$12/hr x 16 hr/year = \$192  
Database Updates: Office Assistant 1,710 systems x 1/3 per year x 0.5 hrs/system x \$12/hr = \$3,420  
Billing: Billing Clerk \$20/hr x 16 hrs/event x 1 event/yr = \$320
- Reminder notice copies: 1,710 copies x \$0.05/copy = \$86
- Educational material copying: 2 pages x 1,710 copies x \$0.05/copy = \$171
- Postage: 1,710 letters x \$0.50/letter = \$855

**Advantages** of Level 2 Management - Maintenance Contracts are as follows:

- Provides an inventory system that is useful in system tracking
- Systems are regularly looked at by qualified technicians
- Regular maintenance will reduce the number of failures and impacts on the environment

**Disadvantages** of Level 2 Management - Maintenance Contracts are as follows:

- Difficulty in tracking and enforcing compliance because it must rely on the owner or contractor to report a lapse in a valid contract for services
- Need to rely on owner or contractor to report details on required maintenance
- The Town does not inspect any of the systems

### **3.5.4 Level 3 Management: Operating Permits (High Risk Areas Only)**

This alternative evaluates a Level 3: Operating Permits Model applied to all high risk areas. There are currently 394 properties within the seven high risk areas listed in Section 3.3. Of the 394 properties within the high risk areas, 141 (36%) have no electronic documentation of an existing permit. Due to the lack of permits for a number of properties, an initial inspection is needed to document what the system components are on a given property to establish the routine maintenance requirements that will be included in an operating permit.

Each property will receive an operating permit that clearly spells out the periodic maintenance required to maintain their system along with reporting requirements back to the Town. Permits will be issued for a specific duration and are renewable. Failure of a property owner to comply with their permit conditions can result in revocation of their permit and other enforcement actions. Due to the high level of risk in these areas, a system inspection every five years is also included. The system inspection is intended to be a visual confirmation that the reporting is accurate and that the system remains functional.

The objective of this alternative is to build on the homeowner awareness model by ensuring that the property owners maintain their on-site wastewater systems by sending in confirmation of such routine required maintenance tasks as septic tank pumping, cleaning of effluent filters and annual inspection of any Innovative/Alternative system.

As stated previously in this report, it will be difficult for Colchester to impose O&M permit conditions on those properties with no current town or state permit. Regardless, this analysis provides Colchester with the relative cost for such a program. Ultimately, we recommend that Colchester move to this type of program in the “high” and “medium” risk areas (refer to Section 4.0).

**Initial Start-up Costs** associated with Level 3: Operating Permits (High Risk Areas Only) is estimated at \$34,000 which equates to a cost of \$86 / system based on 394 systems. Costs are summarized in Table 3.6.

**Table 3.6**  
**Level 3: Operating Permits (High Risk Areas)**

**Initial Start-Up Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$21,997
Benefits	\$10,989
Auto/Gasoline <sup>(2)</sup>	\$578
Telephone <sup>(3)</sup>	\$250
Miscellaneous Supplies	\$200
<b>Total Cost</b>	<b>\$34,014</b>
<b>Use</b>	<b>\$34,000</b>
<b>Initial Set-Up Fee Determination</b>	
Number of Properties	394
<b>Initial Set-up Cost / Property</b>	<b>\$86</b>

**Notes:**

- Salaries based on the following:  
 Supervision: Program Manager \$36/hour x 2 hr/week x 20 weeks=\$1,440  
 Database Creation: Office Assistant 394 systems x 0.5 hrs/system x \$12/hr = \$2,364  
 Office Inventory: (Permitted Systems) Technician 253 systems x 0.5 hrs/system x \$20/hr = \$2,530  
 Field Inventory: (Non-Permitted Systems)  
     Office Assistant (Scheduling) 141 systems x 0.25 hrs/system x \$12/hr = \$423  
     Two Techs 141 systems x 2 hrs/system x \$40/hr = \$11,280  
 Permit Writing: Technician 394 permits x 0.5 hrs/permit x \$20/hr = \$3,940
- Auto/Gasoline based on 30 miles/day x 5 days/wk x 7 weeks x \$0.55/mile = \$578
- Cell phone for Field Technician 2.5 months x \$100/month = \$250

**Annual Budget and User Costs** associated with Level 3: Operating Permits (High Risk Areas) is estimated at \$12,000 which equates to a cost of \$31 per system based on 394 systems. Costs are summarized in Table 3.7.

**Table 3.7  
Level 3: Operating Permits (High Risk Areas)**

**Annual Budget and User Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$6,910
Benefits	\$3,455
Auto/Gasoline <sup>(2)</sup>	\$660
Telephone <sup>(3)</sup>	\$200
Reminder Notice <sup>(4)</sup>	\$20
Educational Material <sup>(5)</sup>	\$40
Postage <sup>(6)</sup>	\$197
Information & Technology	\$200
Miscellaneous Supplies	\$100
<b>Total Annual Cost</b>	<b>\$11,782</b>
<b>Use</b>	<b>\$12,000</b>
<b>Annual User Fee Determination</b>	
Number of Properties	394
<b>Annual User Cost / Property</b>	<b>\$31</b>

**Notes:**

- Salaries based on the following:  
 Supervision: Program Manager \$36/hour x 1 hrs/wk x 52 wk/year = \$1,872  
 Mailings: Office Assistant \$12/hr x 8 hr/year = \$96  
 Database Updates: Office Assistant 394 systems x 0.25 hrs/system x \$12/hr = \$1182  
 Field Inspections: Office Assistant (Scheduling) 80 systems/year x 0.25 hrs/system x \$12/hr = \$240  
 Field Technician 80 systems/year x 2/hr/system x \$20/hour = \$3,200  
 Billings: Billing Clerk 16 hours/year x \$20/hour = \$320
- Auto/Gasoline based on 30 miles/day x 5 days per week x 8 weeks x \$0.55/mile = \$660
- Cell Phone for Field Technician 2 months x \$100/month = \$200.
- Reminder notice copying: 394 copies x \$0.05/copy = \$20
- Educational material copying: 2 pages x 394 copies x \$0.05/copy = \$40
- Postage: 394 letters x \$0.50/letter = \$197

**Advantages** of Level 3 Management - Operating Permits are as follows:

- Provides an inventory system that is useful in system tracking
- Identifies non-compliant systems and initiates corrective actions
- Operating permits require regular compliance reports
- Substandard and I/A systems are regularly looked at by qualified technicians
- Protects the homeowner's investment
- Regular maintenance will reduce the number of failures and impacts on the environment
- The Town does not assume the cost of maintenance contracts

**Disadvantages** of Level 3 Management - Operating Permits are as follows:

- Difficulty in tracking and enforcing compliance because it must rely on the owner or contractor to report a lapse in a valid contract for services
- Need to rely on owner or contractor to report details on required maintenance
- Requires permit tracking system
- Town may not have the legal authority to initiate this model for all systems
- Higher level of resources and technical expertise to implement
- Regulatory authority needs enforcement powers

### **3.5.5 Level 3 Management: Operating Permits (High and Medium Risk Areas)**

This alternative evaluates a Level 3: Operating Permits Model for all high risk and medium areas. There are currently 1,100 properties within the fourteen high risk and medium risk areas listed in Section 3.3. Of the 1,100 properties, 341 (31%) have no electronic documentation of an existing permit. Due to the lack of permits for a number of properties, an initial inspection is needed to document what the system components are on a given property to establish the routine maintenance requirements that will be included in an operating permit.

Each property will receive an operating permit that clearly spells out the periodic maintenance required to maintain their system along with reporting requirements back to the Town. Permits will be issued for a specific duration and are renewable. Failure of a property owner to comply with their permit conditions can result in revocation of their permit and other enforcement actions. Due to the high level of risk in these areas, a system inspection every five years is also included. The system inspection is intended to be a visual confirmation that the reporting is accurate and that the system remains functional.

The objective of this alternative is to build on the homeowner awareness model by ensuring that the property owners maintain their on-site wastewater systems by sending in confirmation of such routine required maintenance tasks as septic tank pumping, cleaning of effluent filters and annual inspection of any Innovative/Alternative system.

As stated previously in this report, it will be difficult for Colchester to impose O&M permit conditions on those properties with no current town or state permit. Regardless, this analysis provides Colchester with the relative cost for such a program. Ultimately, we recommend that Colchester move to this type of program in the “high” and “medium” risk areas (refer to Section 4.0).

**Initial Start-up Costs** associated with Level 3: Operating Permits (High Risk and Medium Risk) is estimated at \$80,000 which equates to a cost of \$73 per system based on 1,100 systems. Costs are summarized in Table 3.8.

**Table 3.8**  
**Level 3: Operating Permits (High and Medium Risk Areas)**

**Initial Start-Up Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$51,570
Benefits	\$25,785
Auto/Gasoline <sup>(2)</sup>	\$1,402
Telephone <sup>(3)</sup>	\$400
Miscellaneous Supplies	\$400
<b>Total Cost</b>	<b>\$79,557</b>
<b>Use</b>	<b>\$80,000</b>
<b>Initial Set-Up Fee Determination</b>	
Number of Properties	1,100
<b>Initial Set-up Cost / Property</b>	<b>\$73</b>

**Notes:**

- Salaries based on the following:
  - Supervision: Program Manager \$36/hour x 1 hr/week x 52 weeks=\$1,872
  - Database Creation: Office Assistant 1,100 systems x 0.5 hrs/system x \$12/hr = \$6,600
  - Office Inventory: Technician (Permitted Systems) 759 systems x 0.25 hrs/system x \$20/hr = \$3,795
  - Field Inventory: (Non-Permitted Systems)
    - Office Assistant (Scheduling) 341 systems x 0.25/hours/system x \$12/hour = \$1,023
    - Field Technician 341 systems x 2 hrs/system x \$40/hr = \$27,280
  - Permit Writing: Technician 1,100 permits x 0.5 hrs/permit x \$20/hr = \$11,000
- Auto/Gasoline based on 30 miles/day x 5 days/wk x 17 weeks x \$0.55/mile = \$1,402
- Cell phone for Field Technicians \$100/month x 4 months = \$400

**Annual Budget and User Costs** associated with Level 3: Operating Permits (High Risk and Medium Risk areas) is estimated at \$26,000 which equates to a cost of \$24 per system based on 1,100 systems. Costs are summarized in Table 3.9.

**Table 3.9**  
**Level 3: Operating Permits (High and Medium Risk Areas)**

**Annual Budget and User Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$15,144
Benefits	\$7,572
Auto/Gasoline <sup>(2)</sup>	\$990
Telephone <sup>(3)</sup>	\$300
Reminder Notice Copying <sup>(4)</sup>	\$55
Educational Material Copying <sup>(5)</sup>	\$110
Postage <sup>(6)</sup>	\$550
Information & Technology	\$500
Miscellaneous Supplies	\$200
<b>Total Annual Cost</b>	<b>\$25,421</b>
<b>Use</b>	<b>\$26,000</b>
<b>Annual User Fee Determination</b>	
Number of Properties	1,100
<b>Annual User Cost / Property</b>	<b>\$24</b>

**Notes:**

- Salaries based on the following:  
 Supervision: Program Manager \$36/hour x 1 hrs/wk x 52 wk/year = \$1,872  
 Mailings: Office Assistant \$12/hr x 16 hr/year= \$192  
 Database Updates: Office Assistant 1,100 systems x 0.25 hrs/system x \$12/hr = \$3,300  
 Field Inspections: Office Assistant (Scheduling) 220 systems x 0.25 hours/system x \$12/hr = \$660  
 Field Technician 220 systems x 2 hours/system x \$20/hour = \$8,800  
 Billing: Billing Clerk 16 hrs/year x \$20/hour = \$320
- Auto/Gasoline based on 30 miles/day x 5 days per week x 12 weeks @ \$0.55/mile = \$990
- Cell phone for Field Technician \$100/month x 3 months = \$300.
- Reminder notice copying: 1,100 copies x \$0.05/copy = \$55.
- Brochure copies: 2 pages x 1,100 copies x \$0.05/copy = \$110
- Postage: 1,100 letters x \$0.50/letter = \$550

**Advantages** of Level 3 Management - Operating Permits are as follows:

- Provides an inventory system that is useful in system tracking
- Identifies non-compliant systems and initiates corrective actions
- Operating permits require regular compliance reports
- Substandard and I/A systems are regularly looked at by qualified technicians
- Protects the homeowner's investment
- Regular maintenance will reduce the number of failures and impacts on the environment
- The Town does not have to burden the cost of maintenance contracts

**Disadvantages** of Level 3 Management - Operating Permits are as follows:

- Difficulty in tracking and enforcing compliance because it must rely on the owner or contractor to report a lapse in a valid contract for services
- Need to rely on owner or contractor to report details on required maintenance
- Requires permit tracking system
- Town may not have the legal authority to initiate this model for all systems
- Higher level of resources and technical expertise to implement
- Regulatory authority needs enforcement powers

### **3.5.6 Level 4 Management: RME Operation & Maintenance (High Risk Areas)**

Under this alternative, the Town of Colchester is the Responsible Management Entity and would take responsibility for the Operation and Maintenance of the systems for a service fee. The homeowner will still own the system and be responsible for any repairs, upgrades or replacement. There are 394 properties within the seven “high risk” areas. 141 (36%) of these properties have no electronic permit on file.

An initial assessment of the on-site wastewater systems will be performed on all properties. As part of the assessment, there will be an inventory of all wastewater treatment and disposal systems including the number and type of all components. The inventory of these components will be entered into the database to identify maintenance compliance functions. This inventory and assessment will be used to determine the appropriate level of operation and maintenance required for each system.

As part of the initial start-up costs, the Town would install access risers and covers to grade to provide easier access to the system components requiring maintenance in order to be more efficient during inspections and maintenance. Effluent filters would be added to all systems that do not have any to further protect each disposal system and prolong its useful life. Because the Town is performing the maintenance, the Town will need to make start-up purchases of tools, equipment and a truck to perform the required operation and maintenance. Even though the Town is performing the operation and maintenance, public education is still required to make homeowners aware of the purpose, use, care of the systems.

Easements would need to be obtained for access for operation and maintenance activities and a bill of sale would be required for ownership transfer to the RME.

Colchester has the legal standing to create this management model with property owners voluntarily selecting to participate or not. Colchester cannot mandate (impose) this option on an individual property owner.

**Initial Start-up Costs** associated with Level 4: RME Operation & Maintenance (High Risk areas) is estimated at \$790,000 which equates to a cost of \$2,005 per system based on 394 systems. Costs are summarized in Table 3.10.

**Table 3.10**  
**Level 4: RME Operation & Maintenance (High Risk Areas)**

**Initial Start-Up Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$36,938
Benefits	\$18,469
Auto/Gasoline <sup>(2)</sup>	\$1,650
Telephone <sup>(3)</sup>	\$500
Risers, Covers, and Effluent Filters <sup>(4)</sup>	\$630,400
Easement Assistance <sup>(5)</sup>	\$19,700
Attorney Fees <sup>(6)</sup>	\$39,400
Small Purchases	\$2,000
Maintenance Truck	\$40,000
Miscellaneous Supplies	\$200
<b>Total Cost</b>	<b>\$789,257</b>
<b>Use</b>	<b>\$790,000</b>
<b>Initial Set-Up Fee Determination</b>	
Number of Properties	394
<b>Initial Set-up Cost / Property</b>	<b>\$2,005</b>

**Notes:**

- Salaries based on the following:  
 Supervision: Program Manager \$36/hour x 1 hr/week x 52 weeks = \$1,872  
 Database Entry: Office Assistant 394 systems x 0.5 hrs/system x \$12/hr = \$2,364  
 System Inventory: Office Assist (Scheduling) 394 systems x 0.25 hours/system x \$12/hour = \$ 1,182  
 Two Field Techs 394 systems x 2 hrs/system x \$40/hr = \$31,520
- Auto/Gasoline based on 30 miles/day x 5 days per week x 20 weeks @ \$0.55/mile = \$1,650
- Cell phone for Field Technician \$100/month x 5 months = \$500.
- Risers, covers and effluent filters based on \$2,000/system x 394 systems x 80% needed= \$630,400
- Easement assistance based on \$50/system x 394 systems = \$19,700
- Attorney fees based on \$100/system x 394 systems = \$39,400

**Annual Budget and User Costs** associated with Level 4: RME Operation & Maintenance (High Risk Areas) is estimated at \$85,000 which equates to a cost of \$216 per system based on 422 systems. Costs are summarized in Table 3.11.

**Table 3.11**  
**Level 4: RME Operation & Maintenance (High Risk Areas)**

**Annual Budget and User Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$35,880
Overtime Salaries <sup>(2)</sup>	\$1,350
Benefits	\$18,615
Septic Tank Pumping <sup>(3)</sup>	\$24,625
Auto/Gasoline <sup>(4)</sup>	\$2,475
Telephone <sup>(5)</sup>	\$600
Educational Materials <sup>(6)</sup>	\$40
Information & Technology	\$500
Postage <sup>(7)</sup>	\$197
Miscellaneous Supplies	\$200
<b>Total Annual Cost</b>	<b>\$84,482</b>
<b>Use</b>	<b>\$85,000</b>
<b>Annual User Fee Determination</b>	
Number of Properties	394
<b>Annual User Cost / Property</b>	<b>\$216</b>

**Notes:**

- Salaries based on the following:  
 Supervision: Program Manager \$36/hour x 1 hrs/wk x 52 wk/year = \$1,872  
 Office (summer): Office Assistant: \$12/hr x 16 hr/week x 30 weeks/year = \$5,760  
 Office (Off-season): Office Assistant: \$12/hr x 2 hr/week x 22 weeks/year = \$528  
 O&M: Operator (Annual Inspection) 394 systems x 2/hr/system x \$25/hour = \$19,700  
 Pump Outs- 100/yr x 1 hr/pump-out x \$25/hour = \$2,500  
 Alarm Calls 2/week x 2 hours/call x 52 wks/year x \$25/hour = \$5,200  
 Billing: Billing Clerk \$20/hr x 16 hours/year = \$320
- Overtime salaries: Alarm/Emergency calls 12/year x 3 hours/call x \$37.50/hr = \$1,350
- Septic tank pumping based on \$250/pump out x 394 properties x 25%/year = \$24,625
- Auto/Gasoline based on 30 miles/day x 5 days/week x 30 weeks x \$0.55/mile = \$2,475
- Cell phone for Operator: \$50/mo. x 12 mos. = \$600.
- Educational Material: 394 copies x \$0.10/copy = \$40 (Operator leaves during inspection)
- Postage for service fee bills: 394 bills x \$0.50/letter = \$197

**Advantages** of Level 4 Management - RME Operation & Maintenance are as follows:

- High level of oversight if system performance problems occur
- High protection of the environment and protection of homeowner investment
- Town is not financially responsible for system repairs and maintenance
- Systems are regularly looked at by qualified technicians
- Regular maintenance will reduce the number of failures and impacts on the environment
- Costs are less than central sewer

**Disadvantages** of Level 4 Management - RME Operation & Maintenance are as follows:

- High initial and annual budgetary cost
- Requires easements to be obtained for access and to take ownership of the on-site systems
- Capital reserve is not available for replacement of failed systems; but the Town's loan program is available
- Homeowner responsibility for replacement of failed systems does not provide ability to do so quickly
- Conflicts may arise between RME and homeowner over performance, repairs and replacement
- This is a "voluntary" program where property owners could decide whether to participate or not

### **3.5.7 Level 5 Management: RME Ownership (High Risk Areas)**

Under this alternative, the Town of Colchester is not only the Responsible Management Entity, but would also assume ownership of each system. They would take responsibility for the Operation and Maintenance of the systems for a service fee. They would also be responsible for any system repairs or replacement. The property owner would only be responsible for system upgrade or replacement for a change of use that they control. There are 394 properties within the seven “high risk” areas. 141 (36%) of these properties have no electronic permit on file.

An initial assessment of the on-site wastewater systems will be performed on all properties. As part of the assessment, there will be an inventory of all wastewater treatment and disposal systems including the number and type of all components. The inventory of these components will be entered into the database to identify maintenance compliance functions. This inventory and assessment will be used to determine the appropriate level of operation and maintenance required for each system.

As part of the initial start-up costs, the Town would install access risers and covers to grade to provide easier access to the system components requiring maintenance in order to be more efficient during inspections and maintenance. Effluent filters would be added to all systems that do not have any to further protect each disposal system and prolong its useful life. Because the Town is performing the maintenance, the Town will need to make start-up purchases of tools, equipment and a truck to perform the required operation and maintenance. Even though the Town is performing the operation and maintenance, public education is still required to make homeowners aware of the purpose, use, care of the systems.

Easements would need to be obtained for access for operation and maintenance activities and a bill of sale would be required for ownership transfer to the RME.

Colchester has the legal standing to create this management model with property owners voluntarily selecting to participate or not. Colchester cannot mandate (impose) this option on an individual property owner.

**Initial Start-up Costs** associated with Level 5: RME Ownership (High Risk Areas) is estimated at \$790,000 which equates to a cost of \$2,005 per system based on 394 systems. Costs are summarized in Table 3.12.

**Table 3.12**  
**Level 5: RME Ownership (High Risk Areas)**

**Initial Start-Up Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$36,938
Benefits	\$18,469
Auto/Gasoline <sup>(2)</sup>	\$1,650
Telephone <sup>(3)</sup>	\$500
Risers, Covers, and Effluent Filters <sup>(4)</sup>	\$630,400
Easement Assistance <sup>(5)</sup>	\$19,700
Attorney Fees <sup>(6)</sup>	\$39,400
Small Purchases	\$2,000
Maintenance Truck	\$40,000
Miscellaneous Supplies	\$200
<b>Total Cost</b>	<b>\$789,257</b>
<b>Use</b>	<b>\$790,000</b>
<b>Initial Set-Up Fee Determination</b>	
Number of Properties	394
<b>Initial Set-up Cost / Property</b>	<b>\$2,005</b>

**Notes:**

- Salaries based on the following:  
 Supervision: Program Manager \$36/hour x 1 hr/week x 52 weeks = \$1,872  
 Database Entry: Office Assistant 394 systems x 0.5 hrs/system x \$12/hr = \$2,364  
 System Inventory: Office Assist (Scheduling) 394 systems x 0.25 hours/system x \$12/hour = \$ 1,182  
 Two Field Techs 394 systems x 2 hrs/system x \$40/hr = \$31,520
- Auto/Gasoline based on 30 miles/day x 5 days per week x 20 weeks @ \$0.55/mile = \$1,650
- Cell phone for Field Technician \$100/month x 5 months = \$500
- Risers, covers and effluent filters based on \$2,000/system x 394 systems x 80% needed= \$630,400
- Easement assistance based on \$50/system x 394 systems = \$19,700
- Attorney fees based on \$100/system x 394 systems = \$39,400

**Annual Budget and User Costs** associated with Level 5: RME Ownership (High Risk Areas) is estimated at \$550,000 which equates to a cost of \$1,396 per system based on 394 systems. Costs are summarized in Table 3.13.

**Table 3.13**  
**Level 5: RME Ownership (High Risk Areas)**

**Annual Budget and User Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$35,880
Overtime Salaries <sup>(2)</sup>	\$1,350
Benefits	\$18,615
Septic Tank Pumping <sup>(3)</sup>	\$24,625
Auto/Gasoline <sup>(4)</sup>	\$2,475
Telephone <sup>(5)</sup>	\$600
Misc. Repairs/Maintenance <sup>(6)</sup>	9,850
Capital Reserve <sup>(7)</sup>	450,000
Educational Materials <sup>(8)</sup>	\$40
Information & Technology	\$500
Postage <sup>(9)</sup>	\$197
Insurance <sup>(10)</sup>	5,910
Miscellaneous Supplies	\$200
<b>Total Annual Cost</b>	<b>\$550,422</b>
<b>Use</b>	<b>\$550,000</b>
<b>Annual User Fee Determination</b>	
Number of Properties	394
<b>Annual User Cost / Property</b>	<b>\$1,396</b>

**Notes:**

- Salaries based on the following:  
 Supervision: Program Manager \$36/hour x 1 hrs/wk x 52 wk/year = \$1,872  
 Office (summer): Office Assistant: \$12/hr x 16 hr/week x 30 weeks/year = \$5,760  
 Office (Off-season): Office Assistant: \$12/hr x 2 hr/week x 22 weeks/year = \$528  
 O&M: Operator (Annual Inspection) 394 systems x 2/hr/system x \$25/hour = \$19,700  
 Pump Outs- 100/yr x 1 hr/pump-out x \$25/hour = \$2,500  
 Alarm Calls 2/week x 2 hours/call x 52 wks/year x \$25/hour = \$5,200  
 Billing: Billing Clerk \$20/hr x 16 hours/year = \$320
- Overtime salaries: Alarm/Emergency calls 12/year x 3 hours/call x \$37.50/hr = \$1,350
- Septic tank pumping based on \$250/pump out x 394 properties x 25%/year = \$24,625
- Auto/Gasoline based on 30 miles/day x 5 days/week x 30 weeks x \$0.55/mile = \$2,475
- Cell phone for Operator: \$50/mo. x 12 mos. = \$600.
- Misc. Repairs/Maintenance based on \$500 per repair x 394 properties x 5%/yr = \$9,850
- Capital Reserve based on replacement of 15 systems/year x \$30,000/system = \$450,000
- Educational Material: 394 copies x \$0.10/copy = \$40. (Operator leaves during inspection)
- Postage for service fee bills: 394 bills x \$0.50/letter = \$197
- Insurance estimated @ \$15/system x 394 systems = \$5,910

**Advantages** of Level 5- RME Ownership are as follows:

- High level of oversight if system performance problems occur
- Greatest protection of the environment and protection of homeowner investment
- RME responsibility for replacement of failed systems provides ability to do so quickly protecting the environment
- Systems are regularly looked at by qualified technicians
- Regular maintenance will reduce the number of failures and impacts on the environment
- Costs are less than central sewer
- Capital reserve is available for replacement of failed systems

**Disadvantages** of Level 5- RME Ownership are as follows:

- Highest initial and annual budgetary cost of all decentralized alternatives
- Requires easements to be obtained for access and to take ownership of the on-site systems
- Requires greater financial investment by the Town for acquiring new systems
- Requires greater financial investment by the Town for repair and replacement of existing systems
- This is a “voluntary” program where property owners could decide whether to participate or not

### 3.5.8 Hybrid Management Approach

There are a number of combinations and permutations of these management models that Colchester could consider. One example would be a Level 1: Homeowner Awareness Model applied town-wide, with a Level 2: Maintenance Contracts Model for all “medium risk” areas and Level 3: Operation & Maintenance Permits Model for all “high risk” areas. Using the previous budget estimates, anticipated costs for such a model would be as follows:

**Table 3.14  
Start-Up & Annual Costs  
Hybrid Model**

Management Model	Initial Start-Up Costs	Annual Budget
Level 1 Town-Wide <sup>(1)</sup>	\$2,100	\$5,300
Level 2 – Medium Risk Areas <sup>(2)</sup>	\$7,100	\$3,500
Level 3 – High Risk Areas <sup>(3)</sup>	\$34,000	\$12,000
<b>Total Cost</b>	<b>\$43,200</b>	<b>\$20,800</b>

Notes:

<sup>(1)</sup> Costs derived from Tables 3.2 and 3.3

<sup>(2)</sup> Costs based on \$10/system x 706 systems and \$5/system x 706 systems derived from Tables 3.4 and 3.5

<sup>(3)</sup> Costs derived from Tables 3.6 and 3.7

## 4. RECOMMENDED PLAN

### 4.1. Introduction

Our recommended plan includes a town-wide Level 1: Owner Awareness Program and a Level 3: Operating Permits Program for the “high risk” and “medium risk” zones. We also recommend applying Operating permits to any “I/A” or “best fix” system throughout Colchester, regardless of whether the property is in a high or medium risk zone. We would further recommend that all systems in high and medium risk zones be inspected periodically (every five years) to visually confirm that the system is indeed being maintained properly and is fully functional. This recommendation is consistent with the conclusions and recommendations of the Priority Area Needs Assessment report.

Though implementing a Level 4: RME Operation & Maintenance Model (at least in the high risk areas) appears to be economically feasible, we conclude that a Level 4 management plan, where Colchester (or another entity – RME) assumes responsibility for maintenance, is not justified given the level of risk the town would assume over a Level 3: Operating Permit model, for minimal additional gain in protection of public health and the environment.

We draw this conclusion when considering appropriate management levels for the “high risk” areas for the following reasons:

- Sunset View Road, Mills Point, Porters Point, Coates Island and Thayer Beach (all “high risk” areas) can be reasonably served with current decentralized wastewater systems. Replacement systems will likely be Innovative/Alternative (I/A) or “best fix” triggering an operating permit (if one doesn’t already exist for the property). Decentralized wastewater systems properly maintained should adequately serve the wastewater needs of these areas. There is generally no future build-out potential in any of these areas (with the exception of Coates Island). Issuing and monitoring operating permits that ensure that the property owner performs the routine maintenance requirements for their system is a reasonable approach. There is no significant further benefit if Colchester assumed responsibility for maintenance under a Level 4 Model.
- The majority of Goodsell Point and the west side of East Lakeshore Drive (both high risk areas) cannot be reasonably served with decentralized wastewater option given current development. A Level 4 management model for these marginal systems doesn’t provide Colchester with any substantial gain over operating permits. Central sewers are recommended to meet the long-term wastewater needs of these two areas.

- The current wastewater needs along West Lakeshore Drive (a “high risk” area) can be met with decentralized wastewater systems, with operating permits where systems are innovative/alternative or “best fix”. West Lakeshore Drive has build-out capacity that can only be met with central sewers.
- A Level 3 Operating Permit Program can easily be expanded town-wide to encompass any onsite wastewater system that is either innovative/alternative or “best fix” regardless of the risk classification of the neighborhood. Since wastewater management is ultimately a town-wide issue, a town-wide solution seems appropriate.

We further recommend that every system in a “high risk” or “medium risk” area be inspected every five years to visually confirm that the system is indeed being properly maintained and is in good working order. We would recommend a similar inspection requirement for any other property within Colchester that receives an operating permit as an “I/A” or “best fix” system.

There are currently 1,100 onsite systems located in “high risk” and “medium risk” areas. Colchester staff estimate that roughly 10% of these systems are “I/A” systems that currently have specific O&M requirements in their permit. Colchester needs the authority to impose and enforce O&M conditions and periodic inspections on all 1,100 systems. As described in Section 2.5.6, there are lingering questions regarding Colchester’s ability (authority) to do so.

If Colchester doesn’t have the authority to impose O&M conditions on each of these systems (or can’t get authority through changes to state statute) their options are limited. Implementing these recommendations over a long period of time is a possibility as permits are opened to make changes or replace a failed system, but this could take decades and the public health and environmental risks will only increase. The alternative is centralized sewers in the highest risk areas to address wastewater needs and mitigate the public health and environmental risks.

## 4.2. Plan Details

### 4.2.1 Owner Awareness Program

As stated previously in the report, we conclude that the majority of property owners with an onsite wastewater system have minimal knowledge and understanding of their wastewater system including:

- The major components of their system
- How the components function
- How components should be maintained and how often
- What should and should not be put through their wastewater system
- How much capacity their system can handle
- How to inspect their system for problems

The Owner Awareness Program would start with educating each property owner on the basics of onsite wastewater systems (e.g. what the major components are; how they work; and routine maintenance requirements). Since there are a number of system variations, the educational material would be rather general (not necessarily specific to their system), but would provide them with a rudimentary understanding of onsite wastewater system function and routine maintenance. Every new property owner will receive this “one time” education when a new property is developed or property ownership has transferred.

Building on this “initial education”, owners would receive periodic reminders (once or twice a year) of the need to inspect their system and consider what maintenance (if any is required). A good trigger for inspections is spring after snow melt and fall before snow comes. Reminders can be distributed by mail, posted as a bulletin in a local newspaper, included in a tax bill or sent electronically if the Owner’s e-mail address is known. Colchester could also consider maintaining the project website, modifying it to host disseminate the Owner Awareness Program.

### 4.2.2 Operating Permits

Operating permits will be specific to each system being permitted as the type of system will dictate operation and maintenance requirements that will vary from system to system. Operating permits will “stay with the land”. If a property is sold, the operating permit requirements will automatically be assigned to the new property owner.

The operating permit will generally consist of the following:

- A detailed description of the wastewater treatment and disposal system, including the size of tankage and other treatment components and size/type of disposal system.
- A detailed summary of maintenance requirements for each component including the required maintenance interval.
- A detailed summary of inspection requirements (if any) for each component including the required inspection interval. Some manufacturers of innovative/alternative systems require a periodic inspection by a manufacturer’s representative. If so, that would be documented for reporting back to the town. Regardless, Colchester may dictate a specific inspection schedule on a case-by-case basis.
- A specific compliance schedule for monitoring and reporting of maintenance activities.
- A specific compliance schedule for monitoring and reporting of inspection activities.
- Permission from the property owner granting right-of-entry to Colchester staff to inspect the system at reasonable times and intervals.
- A copy of any maintenance and inspection contracts that the property owner has entered into with qualified contractors to perform maintenance and inspection.
- A sample report for filing with the town documenting compliance with the maintenance and inspection schedule.
- A description of fines or other penalties and actions that Colchester may take against the property owner for failure to comply with the permit.

### 4.2.3 Recording of Permits

Colchester will record all permits in an asset management database that allows them to efficiently document permit conditions and track compliance with maintenance and inspection requirements. Property owners will submit reports at the interval set in their specific permit documenting the maintenance and inspection activities that took place over the reporting period.

### 4.2.4 Sewer Ordinance

Colchester’s existing sewer ordinance will need to be modified to enable operating permits as spelled out in this plan. The ordinance changes should include the following at a minimum:

- A definition of when an operating permit will be issued
- A general list of what an operating permit can encompass
- Language that specifies enforcement action for failure to comply with the permit
- Language that clearly states that the operating permit stays with the land and transfers to the new property owner upon a property transfer
- A definition of fees to be collected to support the program
- The right to conduct a “time of sale” inspection

#### **4.2.5 Enforcement of Permit Conditions**

Enforcement for failure to comply with operating permit conditions is a critical component of the program. Without the ability to enforce permit conditions through levies, fines, liens and other enforcement action, the program will not be effective. Colchester will need to consider the levels of enforcement that they feel are reasonable and effective.

## 4.3. Plan Implementation

Plan implementation tasks are broken down into the following categories:

- Update the database
- Public education and outreach
- Program development
- Ordinance revisions
- Implementation of town-wide “Awareness Program”
- Implementation of O&M permits
- Promotion of Good Stewardship

Each is described in more detail below.

### 4.3.1 Update the Database

As stated previously in the report, the current database has information on property transactions dating to certain dates in 2009. The database should be brought up-to-date by inputting all property transactions from 2009 to the present that are not already included and transferred into the new asset management software program. It is estimated that ~40 property transfers are recorded each year, so we estimate that there are ~160 property entries required to update the database to reflect current conditions.

Once the database is updated, a review of each wastewater permit should be conducted to determine which existing permits may already contain O&M permit conditions. These will typically be permits issued after 2002 for “I/A” and “best fix” systems. It isn’t likely that permits issued prior to 2002 contain specific O&M conditions. Where O&M conditions exist, they should be cataloged in a manner that they can be easily tracked and monitored for compliance.

An effort should also be made to review the 827 VTDEC permits that could not be tied to a specific parcel to ascertain if there is a need to attempt to do so now. It is likely that the majority of these permits are duplicative of Town permits issued for the same parcel.

### 4.3.2 Public Education and Outreach

Building upon the public presentations that have been conducted as part of this study, Colchester officials should continue to “make the case” for a more robust wastewater management program.

Initial presentations should focus educating property owners on:

- How their onsite system works
- What flows the system was designed to handle
- What is considered routine maintenance
- How to determine if your system has failed
- What happens if your system fails
- Your responsibility to your neighbors and community to protect public health and water resources

Colchester should also make the case for the need for operation and maintenance (O&M) permits for systems located in areas of greater environmental risk and for all I/A and “best fix” systems regardless of their location.

These public conversations are a natural outgrowth of the public presentations conducted under this study as well as the recent “Heritage Project” study that has been undertaken to envision Colchester’s future. As Colchester contemplates the appropriateness of central sewers in certain corridors of the town, it is natural to discuss overall wastewater practices and the importance of a town-wide management strategy for onsite wastewater systems.

### 4.3.3 Program Development

Development of a town-wide Owner Awareness Program is fundamentally about educating property owners about their system as spelled out in Section 4.2.1 above. There is a myriad of good literature already developed by US EPA (among others) that can be used in mailers and other promotional literature that should go to every property owner with an onsite wastewater system.

The program should build on the public education and outreach (described below) with timely notices about maintenance and inspection. Similar to the old adage to change the batteries in our smoke detectors when we turn the clocks back or ahead for daylight savings and daylight standard time, Colchester can craft a similar message to inspect your onsite wastewater system every spring and every fall to determine if maintenance is due or a problem is evident.

The O&M Permit program will need to develop incrementally as Colchester opens up permits that should include O&M requirements (typically systems in high and medium risk zones and other I/A and “best fix” systems town-wide). If State statutes need to change to allow Colchester to “reach back” and impose O&M conditions on previously permitted or “grandfathered” systems, it will be difficult to fully implement this program. We recommend that Colchester pursue said changes if they are committed to meeting the majority of their wastewater needs with decentralized wastewater alternatives.

#### **4.3.4 Ordinance Revisions**

Colchester’s existing wastewater ordinances should be reviewed and updated as needed to implement the recommended plan. Some of the items to consider are described in Section 4.2.4.

The property conditions that warrant O&M conditions in a permit should be outlined in the ordinance. They would generally be specific O&M conditions for “I/A” or “best fix” systems and a fixed routine maintenance schedule for conventional systems located in high and medium risk zones.

Enforcement and compliance procedures should be included in the wastewater ordinance. Elements of enforcement procedures are outlined in Section 2.4.10. If Colchester decides to support the cost of these recommendations through user fees, the fee basis should be established in the wastewater ordinance.

Colchester should consider an ordinance stating that they can require a “time of sale” inspection of any property. It is questionable whether Colchester’s Health Officer has the right to inspect a property’s wastewater system without first receiving a formal complaint that requires investigation. State statute does allow a municipality the right to require a time of sale inspection. This is an opportunity to inspect a wastewater system (with or without a permit) to determine if there are signs of system failure.

#### **4.3.5 Implementation of Town-Wide “Awareness Program”**

Implementation of a town-wide “Awareness Program” can begin immediately and should simply build on the Public Education and Outreach and Program Development described above in Section 4.2.2 and Section 4.2.3 respectively.

### 4.3.6 Implementation of O&M Permits

Implementation of O&M permits should start as soon as Colchester's wastewater staff is comfortable that the database can support the cataloging, tracking and monitoring. We recommend that staff first identify those properties that already have O&M conditions in their wastewater permit and build the program around that. It is suspected that there are 100 existing permits (or more) that currently have O&M conditions that can and should be monitored. Implementing a program to monitor and enforce compliance of conditions in those permits is a good way to build the procedures that will work well as the program expands over time.

Colchester must also pursue definitive answers to the questions raised in Section 2.5.6. If the answers are not satisfactory, they must then determine if they pursue statute changes to grant them the needed authority. If that fails, they then need to decide whether the implementation of O&M permits on limited basis (over a long period of time) will adequately protect public health and the environment. The alternative is centralized sewers in the highest risk areas to adequately meet wastewater demand.

### 4.3.7 Promotion of Good Stewardship

It is easy for property owners to perceive Colchester more actively involved in management of wastewater systems as onerous and not a positive development. That is why good public education and outreach is so important. Every owner of an onsite wastewater system should be taught to understand the investment they have made in their system and how it affects their property value and re-sale potential. They should also understand their responsibility to protect public health and the areas natural resources. Each property owner should feel that he/she is an important and integral part of the effort to safeguard Colchester's precious water resources.

Colchester supports good stewardship through the low interest grant and loan program that individual property owners can apply for to assist them financially when their system is in disrepair or needs to be replaced. Use of the loan/grant program is a great way to correct a problem, increase property value and protect public health and the environment.

## 4.4. Implementation and Annual Cost Estimates

We have prepared initial estimates of both implementation (set-up) and annual operating costs for the recommended plan. We have not attempted to assess whether new staff need to be hired for this program or whether some requirements will be absorbed in the duties of current staff. These budget estimates are intended to be a guide as Colchester contemplates next steps to move forward.

### 4.4.1 Initial Year Assessment and Setup Costs

The initial year implementation and set-up cost for the recommended plan is estimated at \$8,000. The cost is described in Table 4.1 below. We haven't attempted to calculate a distribution of costs across properties using the assumption that this would be a cost budgeted in the Town's General Fund.

**Table 4.1**  
**Recommended Plan**

#### **Initial Start-Up Costs**

<b>Item</b>	<b>Cost</b>
Salaries <sup>(1)</sup>	\$5,145
Benefits	\$2,573
Miscellaneous Supplies	\$200
<b>Total Cost</b>	<b>\$7,918</b>
<b>Use</b>	<b>\$8,000</b>

**Notes:**

- Salaries determined as follows:

Supervision: Program Manager \$36/hour x 2 hr/week x 52 weeks = \$624

Database Updates: Office Assistant \$12/hr x 160 permits x 0.5 hours/permit = \$960

Research Unrecorded State Permits: Office Assistant \$12/hr x 827 x 0.25/hour = \$2,481

Educational Program Development: Office Assistant \$12/hr x 40 hrs. = \$480

O&M Permit Conditions Tracking Setup: Office Assist. \$12/hr x 100 permits x 0.5 hr/permit = \$600

#### 4.4.2 Annual Operating Costs

The annual operating cost for the recommended plan is estimated at \$28,000. The cost is described in Table 4.2 below. We haven't attempted to calculate a distribution of costs across properties using the assumption that this would be a cost budgeted in the Town's General Fund. Ultimately how this cost is funded will need to be determined by the Colchester Selectboard.

**Table 4.2**  
**Recommended Plan**  
**Annual Budget**

Item	Cost
Salaries <sup>(1)</sup>	\$15,944
Benefits	\$7,972
Reminder Notice Copying <sup>(2)</sup>	\$263
Educational Material Copying <sup>(3)</sup>	\$526
Postage <sup>(4)</sup>	\$2,630
Information & Technology	\$500
Miscellaneous Supplies	\$300
<b>Total Annual Cost</b>	\$28,135
<b>Use</b>	<b>\$28,000</b>

**Notes:**

1. Salaries based on the following:
  - Supervision: Program Manager \$36/hour x 24 hr/year = \$864
  - Database Tracking Updates: Office Assist. \$12/hr x 200 Permits x 0.25 hr/permit = \$600
  - Mailings: Office Assistant \$12/hr x 40 hr/year = \$480
  - Time of Sale Property Inspections: WW Official \$20/hr x 350 inspections x 2 hrs. = \$14,000
2. Reminder notice copying: 5,260 copies x \$0.05/copy = \$263
3. Educational material copying: 2 Pages x 5,260 copies x \$0.05/copy = \$526
4. Postage: 5,260 letters x \$0.50/letter = \$2,630

## 4.5. Next Steps

The Colchester Selectboard will need to deliberate and decide which recommendations they want to implement and when. This decision should be made with direct input from the Planning & Zoning Department and Wastewater Division. The general public should also be actively engaged to gain their feedback prior to decisions being made and implemented.

The time is now to act. The public has a good awareness of the needs based on four years of public presentations concerning different facets of this study. Public awareness of the integrated impacts of wastewater, stormwater and land use practices on public health and water resources in Colchester has never been higher. We encourage Colchester to adopt the recommendations set out in this report to set them on a path toward better management of their wastewater infrastructure and resources.

## MANAGEMENT MODEL 1: HOMEOWNER AWARENESS

Objective: To ensure that conventional onsite systems are sited and constructed properly in accordance with appropriate state, tribal, and local regulations and codes; that they are periodically inspected; and, if necessary, that they are repaired by the Owner. The Regulatory Authority maintains a record of the location of all systems and periodically provides the Owner/User with notices regarding operation and preventive maintenance recommendations.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY
 <b>PUBLIC EDUCATION AND PARTICIPATION</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Educate Owner/User on purpose, use, and care of treatment system.</li> <li>Provide public review and comment periods of any proposed program or rule changes.</li> </ul>
	Service Provider	<ul style="list-style-type: none"> <li>Be informed of existing rules and review and comment on any proposed program and/or rule changes.</li> <li>Participate in advisory committees established by the Regulatory Authority.</li> </ul>
	Owner/User	<ul style="list-style-type: none"> <li>Be informed of purpose, use, and care of treatment system.</li> <li>Be informed of existing rules and review and comment on any proposed program and/or rule changes.</li> <li>Participate in advisory committees established by the Regulatory Authority.</li> </ul>
 <b>PLANNING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Coordinate program rules and regulations with state, tribal, and local planning and zoning and other water-related programs.</li> <li>Evaluate potential risks of wastewater discharges to limit environmental impacts on receiving environments during the rule making process.</li> <li>Limit potential risks of environmental impacts from residuals management program and evaluate available handling/treatment capacities.</li> <li>Inform local planning authority of rule changes and recommend its evaluation of potential impacts on land use.</li> </ul>
	Developer	<ul style="list-style-type: none"> <li>Hire planners, certified site evaluators, and designers to ensure that all lots of proposed subdivision plats meet requirements for onsite treatment prior to final plat.</li> </ul>
 <b>PERFORMANCE</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Establish system failure criteria to protect public health, e.g., wastewater backups in building, wastewater ponding on ground surface, insufficient separation from ground water or wells.</li> </ul>
	Owner/User	<ul style="list-style-type: none"> <li>Regularly maintain system in proper working order.</li> </ul>
 <b>TRAINING AND CERTIFICATION/LICENSING</b>	Licensing Board/Regulatory Authority	<ul style="list-style-type: none"> <li>Develop and administer training, testing, and certification/licensing program for site evaluators, designers, contractors, and pumpers/haulers.</li> <li>Maintain a current certified/licensed Service Provider listing.</li> </ul>
	Service Provider	<ul style="list-style-type: none"> <li>Obtain appropriate certification(s)/license(s) and continuing education as required.</li> <li>Obtain training from the manufacturer or vendor regarding appropriate use, installation requirements, and O&amp;M procedures of any proprietary equipment to be installed.</li> <li>Comply with applicable federal, state, tribal, and local requirements.</li> </ul>
	Owner/User	<ul style="list-style-type: none"> <li>When using third-party services, contract with only the appropriate certified/licensed Service Providers.</li> </ul>
 <b>SITE EVALUATION</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Codify prescriptive requirements for site evaluation procedures.</li> <li>Codify criteria for treatment site characteristics suitable for permitted designs that will prevent unacceptable impacts on ground and surface water resources.</li> </ul>
	Site Evaluator	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li>Describe site and soil characteristics, determine suitability of site with respect to code requirements, and estimate site's hydraulic and treatment capacity.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the evaluation of sites for wastewater treatment and dispersal.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Hire a certified/licensed site evaluator to perform site evaluation.</li> </ul>

MANAGEMENT MODEL 1: HOMEOWNER AWARENESS

MANAGEMENT MODEL 1: HOMEOWNER AWARENESS	PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY
	 <b>DESIGN</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Codify prescriptive, preengineered designs that are suitable for treatment sites that meet the appropriate prescriptive site criteria.</li> </ul>
		Designer	<ul style="list-style-type: none"> <li>• Obtain a certification/license to practice.</li> <li>• Design a treatment system that is compatible with the site and soil characteristics described by the site evaluator.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the design of wastewater treatment and dispersal systems.</li> </ul>
		Owner	<ul style="list-style-type: none"> <li>• Hire a certified/licensed designer to prepare system design.</li> </ul>
	 <b>CONSTRUCTION</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Administer a permitting program for system construction, including Regulatory Authority review of proposed system siting and design plans.</li> <li>• Perform final construction inspection for compliance assurance and inventory data collection.</li> <li>• Require that record drawings of constructed system be submitted to the Regulatory Authority by Owner.</li> </ul>
		Contractor/ Installer	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Construct the system in accordance with the approved plans and specifications.</li> <li>• Prepare record drawings of completed system and submit to Owner.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the design and construction of wastewater treatment and dispersal systems.</li> </ul>
		Designer of Record	<ul style="list-style-type: none"> <li>• Approve proposed field changes and submit to Owner.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the design and construction of wastewater treatment and dispersal systems.</li> </ul>
		Owner	<ul style="list-style-type: none"> <li>• Hire a certified/licensed contractor/installer to construct system.</li> <li>• Submit final record drawings of constructed system to Regulatory Authority.</li> </ul>
	 <b>OPERATION &amp; MAINTENANCE</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Provide Owner/User with educational materials regarding system use and care.</li> <li>• Send timely reminder to Owner of when scheduled preventive maintenance is due.</li> </ul>
		Pumper/Hauler	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Inspect and service system as necessary.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the operation and maintenance of the treatment and dispersal system.</li> </ul>
Owner		<ul style="list-style-type: none"> <li>• Perform recommended routine maintenance or hire a certified/licensed pumper/hauler to perform maintenance.</li> <li>• Hire a certified/licensed pumper/hauler to periodically inspect, service, and remove septage for proper treatment and disposal.</li> </ul>	
User		<ul style="list-style-type: none"> <li>• Follow recommendations provided by Regulatory Authority, Service Providers, and/or Owner to ensure that undesirable or prohibited materials are not discharged to system.</li> </ul>	
 <b>RESIDUALS MANAGEMENT</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Administer a tracking system for residuals hauling, treatment, and disposal and review to evaluate compliance with 40 CFR Part 503 (Use and Disposal of Sewage Sludge), 40 CFR Part 257, and applicable state, tribal, and local requirements.</li> <li>• Inventory available residuals handling/treatment capacities and develop contingency plans to ensure that sufficient capacities are always available.</li> </ul>	
	Pumper/Hauler	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the pumping, hauling, treatment, and disposal of treatment system residuals.</li> </ul>	
 <b>COMPLIANCE INSPECTIONS/ MONITORING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Conduct final construction inspections to ensure compliance with approved plans and permit requirements.</li> <li>• Perform compliance inspections at point-of-sale, change-in-use of properties, "targeted areas," and systems reported to be in violation.</li> <li>• Conduct compliance inspections of residuals hauling, treatment, and disposal.</li> </ul>	
	Pumper/Hauler	<ul style="list-style-type: none"> <li>• Inform Owner of any noncompliant items observed during routine servicing of system.</li> </ul>	
	Owner	<ul style="list-style-type: none"> <li>• Periodically perform a "walk-over" inspection of the system and correct any deficiencies.</li> </ul>	

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY
 <b>CORRECTIVE ACTIONS</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Negotiate compliance schedule with Owner for correcting documented noncompliance items.</li> <li>• Administer enforcement program, including fines and/or penalties for failure to comply with compliance requirements.</li> <li>• Obtain necessary authority to enter property to correct imminent threats to public health if the Owner/User fails to comply.</li> </ul>
	Designer	<ul style="list-style-type: none"> <li>• Provide Owner with documents (drawings, specifications, modifications, etc.) that may be required by Regulatory Authority prior to corrective action.</li> </ul>
	Contractor/ Installer	<ul style="list-style-type: none"> <li>• Perform required repairs, modifications, and upgrades as necessary.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>• Comply with terms and conditions of the negotiated compliance schedule.</li> <li>• Submit required documents for corrective actions to Regulatory Authority.</li> <li>• Hire appropriate certified/licensed Service Providers to perform required corrective actions.</li> </ul>
 <b>RECORD KEEPING, INVENTORY, &amp; REPORTING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Administer a database inventory (locations, site evaluations, record drawings, permits, performed maintenance, inspection reports) of all systems.</li> <li>• Maintain a residuals treatment and disposal tracking system.</li> <li>• Maintain a current certified/licensed Service Provider listing that is available to the public.</li> </ul>
	Pumper/Hauler	<ul style="list-style-type: none"> <li>• Prepare and submit records of residuals handling as required.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>• Maintain approved record drawings of system.</li> <li>• Maintain maintenance records of system.</li> <li>• Provide drawings, specifications, and maintenance records to new property owner at time of property transfer.</li> </ul>
 <b>FINANCIAL ASSISTANCE &amp; FUNDING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Provide the legal and financial support to sustain the management program.</li> <li>• Provide a listing of financial assistance programs available to Owner and the qualifying criteria for each program.</li> <li>• Consider implementing a state or local financing program to assist Owners in upgrading their systems.</li> </ul>

**MANAGEMENT MODEL 1: HOMEOWNER AWARENESS**

## MANAGEMENT MODEL 2: MAINTENANCE CONTRACTS

Objective: To allow use of more complex mechanical treatment options or small clusters through the requirement that maintenance contracts be maintained between the Owner and maintenance provider to ensure appropriate and timely system component maintenance by qualified technicians over the service life of the system.

MANAGEMENT MODEL 2: MAINTENANCE CONTRACTS	PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
	 PUBLIC EDUCATION AND PARTICIPATION	Regulatory Authority	<ul style="list-style-type: none"> <li>Educate Owner/User on purpose, use, and care of treatment system.</li> <li>Provide public review and comment periods of any proposed program and/or rule changes.</li> </ul>
		Service Provider	<ul style="list-style-type: none"> <li>Be informed of existing rules, and review and comment on any proposed program or rule changes.</li> <li>Participate in advisory committees established by the Regulatory Authority.</li> </ul>
		Owner/User	<ul style="list-style-type: none"> <li>Be informed of purpose, use, and care of treatment system.</li> <li>Be informed of existing rules, and review and comment on any proposed program or rule changes.</li> <li>Participate in advisory committees established by the Regulatory Authority.</li> </ul>
	 PLANNING	Regulatory Authority	<ul style="list-style-type: none"> <li>Coordinate program rules and regulations with state, tribal, local planning and zoning and other water-related programs.</li> <li>Evaluate potential risks of wastewater discharges to limit environmental impacts on receiving environments during the rule making process.</li> <li>Limit potential risks of environmental impacts from residuals management program and evaluate available handling/treatment capacities.</li> <li>Inform local planning authority of rule changes and recommend its evaluation of potential impacts on land use.</li> </ul>
		Developer	<ul style="list-style-type: none"> <li>Hire planners, certified site evaluators, and designers to ensure that all lots of proposed subdivision plats meet requirements for onsite treatment prior to final plat.</li> </ul>
	 PERFORMANCE	Regulatory Authority	<ul style="list-style-type: none"> <li>Establish system failure criteria to protect public health, e.g., wastewater backups in building, wastewater ponding on ground surface, insufficient separation from ground water or wells.</li> <li><b>Establish minimum performance criteria for manufactured component approvals.</b></li> <li><b>Establish minimum maintenance requirements for approved systems.</b></li> </ul>
		Owner/User	<ul style="list-style-type: none"> <li>Regularly maintain system in proper working order.</li> </ul>
	 TRAINING AND CERTIFICATION/LICENSING	Licensing Board/Regulatory Authority	<ul style="list-style-type: none"> <li>Develop and administer training, testing, and certification/licensing program for site evaluators, designers, contractors, operators, and pumpers/haulers.</li> <li>Maintain a current certified/licensed Service Provider listing.</li> </ul>
		Service Provider	<ul style="list-style-type: none"> <li>Obtain appropriate certification(s)/license(s) and continuing education as required.</li> <li>Obtain training from the manufacturer or vendor regarding appropriate use, installation requirements, and O&amp;M procedures of any proprietary equipment to be installed.</li> <li>Comply with applicable federal, state, tribal, and local requirements.</li> </ul>
Owner/User		<ul style="list-style-type: none"> <li>When using third-party services, contract only with the appropriate certified/licensed Service Providers.</li> </ul>	
 SITE EVALUATION	Regulatory Authority	<ul style="list-style-type: none"> <li>Codify prescriptive requirements for site evaluation procedures.</li> <li>Codify criteria for treatment site characteristics suitable for permitted designs that will prevent unacceptable impacts on ground and surface water resources.</li> <li><b>Establish alternative site acceptance criteria for approved systems providing enhanced pretreatment.</b></li> </ul>	
	Site Evaluator	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li>Describe site and soil characteristics, determine suitability of site with respect to code requirements, and estimate site's hydraulic and treatment capacity.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the evaluation of sites for wastewater treatment and dispersal.</li> </ul>	
	Owner	<ul style="list-style-type: none"> <li>Hire a certified/licensed site evaluator to perform site evaluation.</li> </ul>	

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
 <b>DESIGN</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Codify prescriptive, preengineered designs that are suitable for treatment sites that meet the appropriate prescriptive site criteria.</li> <li>• Administer an evaluation program for approving manufactured components for use with pre-engineered designs.</li> </ul>
	Designer	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Design a treatment system that is compatible with the site and soil characteristics described by the site evaluator.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the design of wastewater treatment and dispersal systems.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>• Hire a certified/licensed designer to prepare system design.</li> </ul>
 <b>CONSTRUCTION</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Administer a permitting program for system construction, including Regulatory Authority review of proposed system siting and design plans.</li> <li>• Perform final construction inspection for compliance assurance and inventory data collection.</li> <li>• Require that record drawings of constructed system be submitted to the Regulatory Authority by Owner.</li> <li>• <b>Require Owner to submit a copy of system O&amp;M manual to the Regulatory Authority.</b></li> </ul>
	Contractor/ Installer	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Construct the system in accordance with the approved plans and specifications.</li> <li>• Prepare record drawings of completed system and submit to Owner.</li> <li>• <b>Provide Owner with an O&amp;M manual describing component manufacturer's maintenance and troubleshooting requirements/recommendations.</b></li> <li>• Comply with applicable federal, state, tribal, and local requirements in the design and construction of wastewater treatment and dispersal systems.</li> </ul>
	Designer of Record	<ul style="list-style-type: none"> <li>• Approve proposed field changes and submit to Owner.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the design and construction of wastewater treatment and dispersal systems.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>• Hire a certified/licensed contractor/installer to construct system.</li> <li>• Submit final record drawings of constructed system to Regulatory Authority.</li> <li>• <b>Submit a copy of system O&amp;M manual to Regulatory Authority to record required maintenance.</b></li> </ul>
 <b>OPERATION &amp; MAINTENANCE</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Provide Owner/User with educational materials regarding system use and care.</li> <li>• Send timely reminder to Owner when scheduled preventive maintenance is due.</li> <li>• Administer a program that requires the Owner to attest periodically that he or she holds a valid contract with a certified/licensed operator to perform scheduled and any necessary maintenance according to the maintenance requirements described in submitted O&amp;M manual.</li> <li>• <b>Require Owner to submit a maintenance report signed/sealed by certified/licensed operator immediately following scheduled maintenance.</b></li> </ul>
	Operator	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• <b>Inspect and service system as necessary in accordance with the submitted O&amp;M manual.</b></li> <li>• <b>Certify to Owner that the required maintenance was performed in a timely manner, describing any system deficiencies observed.</b></li> <li>• Comply with applicable federal, state, tribal, and local requirements in the operation and maintenance of the treatment and dispersal system.</li> </ul>
	Pumper/Hauler	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Inspect and service system as necessary.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the operation and maintenance of treatment and dispersal system.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>• Hire a certified/licensed pumper/hauler to periodically inspect, service, and remove septage or other residuals for proper treatment and disposal.</li> <li>• <b>Maintain contractual agreement with a certified/licensed operator to perform scheduled maintenance as required.</b></li> <li>• <b>Inform Regulatory Authority of any change in maintenance contract status.</b></li> </ul>
	User	<ul style="list-style-type: none"> <li>• Follow recommendations provided by Regulatory Authority, Service Providers, and/or Owner to ensure that undesirable or prohibited materials are not discharged to system.</li> </ul>

MANAGEMENT MODEL 2: MAINTENANCE CONTRACTS

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

MANAGEMENT MODEL 2: MAINTENANCE CONTRACTS	PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
	 RESIDUALS MANAGEMENT	Regulatory Authority	<ul style="list-style-type: none"> <li>Administer a tracking system for residuals hauling, treatment, and disposal and review to evaluate compliance with 40 CFR Part 503 (Use and Disposal of Sewage Sludge), 40 CFR Part 257, and applicable state, tribal, and local requirements.</li> <li>Inventory available residuals handling/treatment capacities and develop contingency plans to ensure that sufficient capacities are always available.</li> </ul>
		Pumper/Hauler	<ul style="list-style-type: none"> <li>Comply with applicable federal, state, tribal, and local requirements in the pumping, hauling, treatment, and disposal of treatment system residuals.</li> </ul>
	 COMPLIANCE INSPECTIONS/MONITORING	Regulatory Authority	<ul style="list-style-type: none"> <li>Conduct final construction inspections to ensure compliance with approved plans and permit requirements.</li> <li>Perform compliance inspections at point-of-sale, change-in-use of properties, "targeted areas," and/or systems reported to be in violation.</li> <li>Conduct compliance inspections of residuals hauling, treatment, and disposal.</li> <li><b>Administer program for confirming that Owners hold valid maintenance contracts with certified/licensed operators and for monitoring timely submittals of certified maintenance reports.</b></li> </ul>
		Operator or Pumper/Hauler	<ul style="list-style-type: none"> <li>Inform Owner of any noncompliant items observed during routine servicing of system.</li> </ul>
		Owner	<ul style="list-style-type: none"> <li>Periodically perform a "walk-over" inspection of the system and correct any deficiencies.</li> <li><b>Attest to the Regulatory Authority that a valid contract exists with a certified/licensed operator to perform necessary system maintenance.</b></li> <li><b>Submit a maintenance report signed/sealed by a certified/licensed Service Provider immediately following scheduled maintenance.</b></li> </ul>
	 CORRECTIVE ACTIONS	Regulatory Authority	<ul style="list-style-type: none"> <li>Negotiate compliance schedule with Owner for correcting documented noncompliant items.</li> <li>Administer enforcement program, including fines and/or penalties for failure to comply with compliance requirements.</li> <li>Obtain necessary authority to enter property to correct imminent threats to public health if the Owner/User fails to comply.</li> </ul>
		Designer	<ul style="list-style-type: none"> <li>Provide Owner with documents (drawings, specifications, modifications, etc.) that may be required by Regulatory Authority prior to corrective action.</li> </ul>
		Contractor/Installer	<ul style="list-style-type: none"> <li>Perform required repairs, modifications, and upgrades as necessary.</li> </ul>
		Owner	<ul style="list-style-type: none"> <li>Comply with terms and conditions of the negotiated compliance schedule.</li> <li>Submit required documents for corrective actions to Regulatory Authority.</li> <li>Hire appropriate certified/licensed Service Providers to perform required corrective actions.</li> </ul>
 RECORD KEEPING, INVENTORY, & REPORTING	Regulatory Authority	<ul style="list-style-type: none"> <li>Administer a database inventory (locations, site evaluations, record drawings, permits, performed maintenance, inspection reports) of all systems.</li> <li>Maintain a residuals treatment and disposal tracking system.</li> <li>Maintain a current certified/licensed Service Provider listing that is available to the public.</li> <li><b>Administer an Owner/Service Provider maintenance contract compliance and certified maintenance report tracking system.</b></li> <li><b>Record maintenance contract requirement on property deed.</b></li> <li><b>Administer a certified maintenance report tracking system.</b></li> </ul>	
	Operator	<ul style="list-style-type: none"> <li>Provide certified report of all maintenance and observed system deficiencies to Owner.</li> </ul>	
	Pumper/Hauler	<ul style="list-style-type: none"> <li>Prepare and submit records of residuals handling as required.</li> </ul>	
 FINANCIAL ASSISTANCE & FUNDING	Owner	<ul style="list-style-type: none"> <li>Maintain approved record drawings and <b>O&amp;M manual</b> of system.</li> <li>Maintain maintenance records of system.</li> <li>Provide drawings, specifications, <b>O&amp;M manual</b>, and maintenance records to new property owner at time of property transfer.</li> </ul>	
	Regulatory Authority	<ul style="list-style-type: none"> <li>Provide the legal and financial support to sustain the management program.</li> <li>Provide a listing of financial assistance programs available to Owner/User and the qualifying criteria for each program.</li> <li>Consider implementing a state or local financing program to assist Owners in upgrading their systems.</li> </ul>	

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

## MANAGEMENT MODEL 3: OPERATING PERMITS

Objective: To issue renewable/revocable operating permits to system Owner that stipulate specific and measurable performance criteria for the treatment system and periodic submittals of compliance monitoring reports. The performance criteria are based on risks to public health and water resources posed by wastewater dispersal in the receiving environment. Operating permits allow the use of clustered or onsite systems on sites with a greater range of site characteristics.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
 <b>PUBLIC EDUCATION AND PARTICIPATION</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Educate Owner/User on purpose, use, and care of treatment system.</li> <li>Provide public review and comment periods of any proposed program and/or rule changes.</li> </ul>
	Service Provider	<ul style="list-style-type: none"> <li>Be informed of existing rules, and review and comment on any proposed program or rule changes.</li> <li>Participate in advisory committees established by the Regulatory Authority.</li> </ul>
	Owner/User	<ul style="list-style-type: none"> <li>Be informed of purpose, use, and care of treatment system.</li> <li>Be informed of existing rules, and review and comment on any proposed program or rule changes.</li> <li>Participate in advisory committees established by the Regulatory Authority.</li> </ul>
 <b>PLANNING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Coordinate program rules and regulations with state, tribal, and local planning and zoning and other water-related programs.</li> <li>Evaluate potential risks of wastewater discharges to limit environmental impacts on receiving environments during the rule making process.</li> <li>Limit potential risks of environmental impacts from residuals management program and evaluate available handling/treatment capacities.</li> <li>Inform local planning authority of rule changes and recommend its evaluation of potential impacts on land use.</li> </ul>
	Developer	<ul style="list-style-type: none"> <li>Hire planners, certified site evaluators, and designers to ensure that all lots of proposed subdivision plats meet requirements for onsite treatment prior to final plat.</li> </ul>
 <b>PERFORMANCE</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Establish system failure criteria to protect public health, e.g., wastewater backups in building, wastewater ponding on ground surface, insufficient separation from ground water or wells.</li> <li>Establish minimum maintenance requirements for approved systems.</li> <li><b>Establish performance criteria necessary to protect public health and water resources for each defined receiving environment in Regulatory Authority's jurisdiction.</b></li> </ul>
	Owner/User	<ul style="list-style-type: none"> <li>Operate and regularly maintain system in proper working order.</li> <li><b>Operate system to comply with performance criteria stipulated in operating permit.</b></li> </ul>
 <b>TRAINING AND CERTIFICATION/LICENSING</b>	Licensing Board/Regulatory Authority	<ul style="list-style-type: none"> <li>Develop and administer a training, testing, and certification/licensing program for site evaluators, designers, contractors, operators, pumpers/haulers, and inspectors.</li> <li>Maintain a current certified/licensed Service Provider listing.</li> </ul>
	Service Provider	<ul style="list-style-type: none"> <li>Obtain appropriate certification(s)/license(s) and continuing education as required.</li> <li>Obtain training from the manufacturer or vendor regarding appropriate use, installation requirements, and O&amp;M procedures of any proprietary equipment to be installed.</li> <li>Comply with applicable federal, state, tribal, and local requirements.</li> </ul>
	Owner/User	<ul style="list-style-type: none"> <li>When using third-party services, contract with only the appropriate certified/licensed Service Providers.</li> </ul>
 <b>SITE EVALUATION</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Codify prescriptive requirements for site evaluation procedures.</li> <li>Codify criteria for treatment site characteristics suitable for permitted designs that will prevent unacceptable impacts on ground and surface water resources.</li> <li><b>Establish defining characteristics for each receiving environment in the Regulatory Authority's jurisdiction.</b></li> </ul>
	Site Evaluator	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li>Describe site and soil characteristics, determine suitability of site with respect to code requirements, and estimate site's hydraulic and treatment capacity.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the evaluation of sites for wastewater treatment and dispersal.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Hire a certified/licensed site evaluator to perform site evaluation.</li> </ul>

MANAGEMENT MODEL 3: OPERATING PERMITS

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

MANAGEMENT MODEL 3: OPERATING PERMITS

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
 DESIGN	Regulatory Authority	<ul style="list-style-type: none"> <li>Codify prescriptive, preengineered designs that are suitable for treatment sites that meet the appropriate prescriptive site criteria.</li> <li><b>Administer a plan review program for engineered designs to meet stipulated performance criteria.</b></li> <li><b>Require submission of routine operation and emergency contingency plans that will sustain system performance and avoid unpermitted discharges.</b></li> </ul>
	Designer	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li>Certified/licensed designer to design treatment system that is compatible with the site and soil characteristics described by the site evaluator.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the design of wastewater treatment and dispersal systems.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Hire a certified/licensed designer to prepare system design.</li> </ul>
 CONSTRUCTION	Regulatory Authority	<ul style="list-style-type: none"> <li>Administer a permitting program for system construction, including Regulatory Authority review of proposed system siting and design plans.</li> <li><b>Require designer of record to certify that completed system construction is in substantial compliance with approved plans and specifications.</b></li> <li>Require that record drawings of constructed system be submitted to the Regulatory Authority by Owner.</li> <li>Require Owner to submit a copy of system O&amp;M manual to the Regulatory Authority.</li> </ul>
	Contractor/ Installer	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li>Construct the system in accordance with the approved plans and specifications.</li> <li>Prepare record drawings of completed system and submit to Owner.</li> <li>Provide Owner with an O&amp;M manual describing component manufacturer's maintenance and troubleshooting requirements/recommendations.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the design and construction of wastewater treatment and dispersal systems.</li> </ul>
	Designer of Record	<ul style="list-style-type: none"> <li>Approve proposed field changes and submit to Owner.</li> <li><b>Certify that construction of the system is substantially in conformance with the approved plans and specifications.</b></li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Hire a certified/licensed contractor/installer to construct system.</li> <li>Submit final record drawings of constructed system to Regulatory Authority.</li> <li>Submit a copy of system O&amp;M manual to Regulatory Authority to record required maintenance.</li> </ul>
 OPERATION & MAINTENANCE	Regulatory Authority	<ul style="list-style-type: none"> <li>Provide Owner/User with educational materials regarding system use and care.</li> <li><b>Administer a program of renewable/revocable operating permits that are issued to Owner stipulating system performance criteria, compliance monitoring reporting schedule, term of permit, and renewal option upon documented compliance with permit.</b></li> <li><b>Track and review compliance monitoring reports to ensure that systems are operating in accordance with operating permits.</b></li> </ul>
	Operator	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li><b>Inspect and service system as necessary in accordance with the submitted O&amp;M manual and/or operating permit stipulations.</b></li> <li>Certify to Owner that the required maintenance was performed in a timely manner, describing any system deficiencies observed.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the operation and maintenance of the treatment and dispersal system.</li> </ul>
	Pumper/Hauler	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li>Inspect and service system as necessary.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the operation and maintenance of the treatment and dispersal system.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Hire a certified/licensed pumper/hauler or operator to maintain system.</li> <li>Maintain system in proper working order.</li> <li><b>Operate and maintain the system in accordance with O&amp;M manual and/or operating permit stipulations.</b></li> <li><b>Submit compliance monitoring reports to the Regulatory Authority according to the schedule stipulated in the operating permit.</b></li> </ul>
	User	<ul style="list-style-type: none"> <li>Follow recommendations provided by Regulatory Authority and/or Service Providers to ensure that undesirable or prohibited materials are not discharged to system.</li> </ul>

<sup>1</sup>Activities in bold are activities added to program elements from the preceding Management Model.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
 <b>RESIDUALS MANAGEMENT</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Administer a tracking system for residuals hauling, treatment, and disposal and review to evaluate compliance with 40 CFR Part 503 Use and Disposal of Sewage Sludge, 40 CFR Part 257, and applicable state, tribal, and local requirements.</li> <li>Inventory available residuals handling/treatment capacities and develop contingency plans to ensure that sufficient capacities are always available.</li> </ul>
	Pumper/Hauler	<ul style="list-style-type: none"> <li>Comply with applicable federal, state, tribal, and local requirements in the pumping, hauling, treatment, and disposal of treatment system residuals.</li> </ul>
 <b>COMPLIANCE INSPECTIONS/ MONITORING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Perform inspection programs at point-of-sale, change-in-use of properties, "targeted areas," and/or systems reported to be in violation.</li> <li>Conduct compliance inspections of residuals hauling, treatment, and disposal.</li> <li><b>Administer a program to monitor timely submittals of acceptable compliance maintenance reports.</b></li> <li><b>Notify Owner of impending scheduled submittals of compliance monitoring reports.</b></li> <li><b>Perform system inspections randomly and/or at time of operating permit renewal.</b></li> </ul>
	Operator or Pumper/Hauler	<ul style="list-style-type: none"> <li>Inform Owner of any noncompliant items observed during routine servicing of system.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Submit compliance monitoring reports to Regulatory Authority as stipulated in operating permit.</li> <li><b>Submit compliance inspection report signed/sealed by a certified/licensed inspector prior to applying for renewal of operating permit.</b></li> </ul>
 <b>CORRECTIVE ACTIONS</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Negotiate compliance schedule with Owner for correcting documented noncompliant items.</li> <li>Administer enforcement program including fines and/or penalties for failure to comply with compliance requirements.</li> <li>Obtain necessary authority to enter property to correct imminent threats to public health if the Owner/User fails to comply.</li> <li><b>Require system inspection by certified inspector at time of operating permit renewal.</b></li> </ul>
	Designer	<ul style="list-style-type: none"> <li>Provide Owner with documents (drawings, specifications, modifications, etc.) that may be required by Regulatory Authority prior to corrective action.</li> </ul>
	Contractor/ Installer	<ul style="list-style-type: none"> <li>Perform required repairs, modifications, and upgrades as necessary.</li> </ul>
	Inspector	<ul style="list-style-type: none"> <li><b>Obtain certification/license to practice.</b></li> <li><b>Inspect treatment system for compliance with operating permit prior to permit renewal.</b></li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Comply with terms and conditions of the negotiated compliance schedule.</li> <li>Submit required documents for corrective actions to Regulatory Authority.</li> <li>Hire appropriate certified/licensed Service Providers to perform required corrective actions.</li> </ul>
 <b>RECORD KEEPING, INVENTORY, &amp; REPORTING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Administer a database inventory (locations, site evaluations, record drawings, permits, performed maintenance, and inspection reports) of all systems.</li> <li>Maintain a residuals treatment and disposal tracking system.</li> <li>Maintain a current certified/licensed Service Provider listing that is available to the public.</li> <li><b>Administer a tracking system for operating permits.</b></li> <li><b>Administer a tracking database for compliance reports.</b></li> </ul>
	Operator or Inspector	<ul style="list-style-type: none"> <li>Provide certified report of all maintenance and observed system deficiencies to Owner.</li> <li><b>Perform system monitoring as stipulated in Owner's operating permit.</b></li> </ul>
	Pumper/Hauler	<ul style="list-style-type: none"> <li>Prepare and submit records of residuals handling as required.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Maintain approved record drawings and O&amp;M manual of system.</li> <li>Maintain maintenance records of system.</li> <li>Submit compliance monitoring reports to Regulatory Authority.</li> <li>Provide drawings, specifications, O&amp;M manual, and maintenance records to new property owner at time of property transfer.</li> </ul>
 <b>FINANCIAL ASSISTANCE &amp; FUNDING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Provide the legal and financial support to sustain the management program.</li> <li>Provide a listing of financial assistance programs available to Owner/User and the qualifying criteria for each program.</li> <li>Consider implementing a state or local financing program to assist Owners in upgrading their systems.</li> </ul>

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

## MANAGEMENT MODEL 4: RME OPERATION AND MAINTENANCE

Objective: To ensure that onsite/decentralized systems consistently meet their stipulated performance criteria through Responsible Management Entities that are responsible for operation and performance of systems within their service areas.

MANAGEMENT MODEL 4: RME OPERATION AND MAINTENANCE	PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
	 PUBLIC EDUCATION AND PARTICIPATION	Regulatory Authority	<ul style="list-style-type: none"> <li>Educate Owner/User on purpose, use, and care of treatment system.</li> <li>Hold public meetings to inform the public of any proposed program and/or rule changes.</li> </ul>
		Service Provider	<ul style="list-style-type: none"> <li>Be informed of existing rules, and review and comment on any proposed program or rule changes.</li> <li>Participate in advisory committees established by the Regulatory Authority.</li> </ul>
		Owner/User	<ul style="list-style-type: none"> <li>Be informed of purpose, use, and care of treatment system.</li> <li>Be informed of existing rules and review and comment on any proposed program and/or rule changes.</li> <li>Participate in advisory committees established by the Regulatory Authority.</li> </ul>
		RME	<ul style="list-style-type: none"> <li><b>Inform Owner/User of care and use of system.</b></li> <li><b>Inform Owner/User of RME requirements and prohibited uses of system.</b></li> </ul>
	 PLANNING	Regulatory Authority	<ul style="list-style-type: none"> <li>Coordinate program rules and regulations with state, tribal, and local planning and zoning and other water-related programs.</li> <li>Evaluate potential risks of wastewater discharges to limit environmental impacts on receiving environments during the rule making process.</li> <li>Limit potential risks of environmental impacts from residuals management program and evaluate available handling/treatment capacities.</li> <li>Inform local planning authority of rule changes and recommend their evaluation of potential impacts on land use.</li> </ul>
		Developer	<ul style="list-style-type: none"> <li>Hire planners, certified site evaluators, and designers to ensure that all lots of proposed subdivision plats meet requirements for onsite treatment prior to final plat.</li> </ul>
		RME	<ul style="list-style-type: none"> <li><b>Develop criteria (e.g., site evaluation, design, construction) to be required of systems for acceptance into O&amp;M program and inform Owners.</b></li> <li><b>Continuously evaluate existing wastewater treatment needs and forecast future needs.</b></li> </ul>
	 PERFORMANCE	Regulatory Authority	<ul style="list-style-type: none"> <li>Establish system failure criteria to protect public health, e.g., wastewater backups in building, wastewater ponding on ground surface, insufficient separation from ground water or wells.</li> <li>Establish minimum maintenance requirements for approved systems.</li> <li>Establish performance criteria necessary to protect public health and water resources for each defined receiving environment in the Regulatory Authority's jurisdiction.</li> </ul>
		Owner	<ul style="list-style-type: none"> <li>Regularly maintain system components in proper working order.</li> <li><b>Comply with any RME requirements regarding care and use of the system.</b></li> </ul>
RME		<ul style="list-style-type: none"> <li><b>Operate systems to comply with performance criteria stipulated in the operating permits.</b></li> </ul>	
 TRAINING AND CERTIFICATION/LICENSING	Licensing Board/Regulatory Authority	<ul style="list-style-type: none"> <li>Develop and administer training, testing, and certification/licensing program for site evaluators, designers, contractors, operators, pumpers/haulers, and inspectors.</li> <li>Maintain a current certified/licensed Service Provider listing.</li> </ul>	
	Service Provider	<ul style="list-style-type: none"> <li>Obtain appropriate certification(s)/license(s) and continuing education as required.</li> <li>Obtain training from the manufacturer or vendor regarding appropriate use, installation requirements, and operation and maintenance procedures of any proprietary equipment to be installed.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the evaluation of sites for wastewater treatment and dispersal.</li> </ul>	
	Owner	<ul style="list-style-type: none"> <li>When using third-party services, contract only with the appropriate certified/licensed Service Providers.</li> </ul>	
	RME	<ul style="list-style-type: none"> <li><b>When using third-party services, contract with only the appropriate certified/licensed Service Providers.</b></li> <li><b>Ensure that RME staff who operate and/or maintain systems obtain appropriate certification(s)/license(s) to practice.</b></li> <li><b>Arrange for supplemental training as needed for Service Providers and/or staff to manage, operate, and/or maintain systems.</b></li> </ul>	

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
 SITE EVALUATION	Regulatory Authority	<ul style="list-style-type: none"> <li>Codify prescriptive requirements for site evaluation procedures.</li> <li>Codify criteria for treatment site characteristics suitable for permitted designs that will prevent unacceptable impacts on ground and surface water resources.</li> <li>Establish the defining characteristics of each receiving environment in the Regulatory Authority's jurisdiction.</li> <li><b>Approve and oversee site evaluation procedures required by RME for system acceptance in the O&amp;M program to ensure that system designs are appropriate for the sites and their stipulated performance criteria.</b></li> </ul>
	Site Evaluator	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li>Describe site and soil characteristics, determine suitability of site with respect to code requirements, and estimate site's hydraulic and treatment capacity.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the evaluation of sites for wastewater treatment and dispersal.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Hire a certified/licensed site evaluator to perform site evaluation.</li> <li><b>Comply with any additional siting requirements established by RME for system acceptance in the O&amp;M program.</b></li> </ul>
 DESIGN	Regulatory Authority	<ul style="list-style-type: none"> <li>Codify prescriptive, pre-engineered designs that are suitable for treatment sites that meet the appropriate prescriptive site criteria.</li> <li>Administer a plan review program for engineered designs to meet stipulated performance criteria.</li> <li>Require submission of routine operation and emergency contingency plans that will sustain system performance and avoid unpermitted discharges.</li> </ul>
	Designer	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li>Design treatment system that is compatible with the site and soil characteristics described by the site evaluator.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the design of wastewater treatment and dispersal systems.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Hire a certified/licensed designer to prepare system design.</li> <li>Comply with any additional design requirements established by the RME for system acceptance in the O&amp;M program.</li> </ul>
 CONSTRUCTION	Regulatory Authority	<ul style="list-style-type: none"> <li>Administer a permitting program for system construction, including Regulatory Authority review of proposed system siting and design plans.</li> <li>Require designer of record to certify that completed system construction is in substantial compliance with approved plans and specifications.</li> <li>Require that record drawings of constructed system be submitted to the Regulatory Authority by Owner.</li> <li>Require Owner to submit a copy of system O&amp;M manual to the Regulatory Authority and RME.</li> </ul>
	Contractor/ Installer	<ul style="list-style-type: none"> <li>Obtain certification/license to practice.</li> <li>Construct system in accordance with the approved plans and specifications.</li> <li>Prepare record drawings of completed system and submit to Owner.</li> <li>Provide Owner with an O&amp;M manual describing component manufacturer's maintenance and troubleshooting requirements/recommendations.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the design and construction of wastewater treatment and dispersal systems.</li> </ul>
	Designer of Record	<ul style="list-style-type: none"> <li>Approve proposed field changes and submit to Owner.</li> <li>Certify that construction of the system is substantially in conformance with the approved plans and specifications.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li><b>Comply with any additional construction requirements established by the RME for system acceptance in the O&amp;M program.</b></li> <li>Hire a certified/licensed designer to prepare system design.</li> <li>Submit final record drawings of constructed system to Regulatory Authority.</li> <li>Submit a copy of the system O&amp;M manual to the Regulatory Authority and RME to record required maintenance.</li> </ul>

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

MANAGEMENT MODEL 4: RME OPERATION AND MAINTENANCE	PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
	 OPERATION & MAINTENANCE	Regulatory Authority	<ul style="list-style-type: none"> <li>• Provide Owner/User with educational materials regarding system use and care.</li> <li>• Administer a program of renewable/revocable operating permits that are issued to RME, stipulating system performance criteria, compliance monitoring reporting schedule, term of permit, and renewal option upon documented compliance with operating permit stipulations.</li> <li>• Track and review compliance monitoring reports to ensure that systems are operating in accordance with operating permits.</li> <li>• <b>Consider replacing individual system operating permits with general permits issued to the RME for classes of systems.</b></li> </ul>
		Operator	<ul style="list-style-type: none"> <li>• Inspect and service the system as necessary in accordance with the submitted O&amp;M manual and/or operating permit stipulations.</li> <li>• Perform system monitoring as stipulated in RME's operating permit.</li> <li>• Certify to RME that the required maintenance and monitoring was performed in a timely manner and noting any system deficiencies.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the operation and maintenance of the treatment and dispersal system.</li> </ul>
		Pumper/Hauler	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Inspect and service system as necessary.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the operation and maintenance of treatment and dispersal system.</li> </ul>
		Owner/User	<ul style="list-style-type: none"> <li>• Follow recommendations provided by Regulatory Authority, Service Providers, and/or Owner to ensure that undesirable or prohibited materials are not discharged to system.</li> <li>• Maintain system components in proper working order.</li> <li>• <b>Comply with any RME requirements regarding care and use of system.</b></li> </ul>
		RME	<ul style="list-style-type: none"> <li>• <b>Operate and maintain systems in accordance with the stipulated operating permit requirements.</b></li> <li>• <b>Submit compliance monitoring reports to the Regulatory Authority according to the schedule stipulated in the operating permit.</b></li> <li>• Hire a certified/licensed pumper/hauler or operator to maintain system.</li> </ul>
	 RESIDUALS MANAGEMENT	Regulatory Authority	<ul style="list-style-type: none"> <li>• Administer a tracking system for residuals hauling, treatment, and disposal and review to evaluate compliance with 40 CFR Part 503 Use and Disposal of Sewage Sludge, 40 CFR Part 257, and applicable state, tribal, and local requirements.</li> <li>• Inventory available residuals handling/treatment capacities and develop contingency plans to ensure that sufficient capacities are always available.</li> </ul>
		Pumper/Hauler	<ul style="list-style-type: none"> <li>• Comply with applicable federal, state, tribal, and local requirements in the pumping, hauling, treatment, and disposal of wastewater treatment system residuals.</li> </ul>
		RME	<ul style="list-style-type: none"> <li>• Hire a certified/licensed pumper/hauler to remove, treat, and dispose of residuals.</li> <li>• <b>Comply with applicable federal, state, tribal, and local requirements in the pumping, hauling, treatment, and disposal of treatment system residuals.</b></li> <li>• <b>Inventory available residuals handling/treatment capacities and develop contingency plans when insufficient capacities are available.</b></li> </ul>
	 COMPLIANCE INSPECTIONS/ MONITORING	Regulatory Authority	<ul style="list-style-type: none"> <li>• Perform inspection programs at point-of-sale, change-in-use of properties, "targeted areas," and/or systems reported to be in violation.</li> <li>• Conduct compliance inspections of residuals hauling, treatment, and disposal.</li> <li>• Administer a program to monitor timely submittals of acceptable compliance maintenance reports.</li> <li>• Perform system inspections randomly and/or at time of operating permit renewal.</li> </ul>
Inspector		<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• <b>Perform system compliance inspections for RME in accordance with prevailing Regulatory Authority requirements.</b></li> </ul>	
RME		<ul style="list-style-type: none"> <li>• Submit compliance monitoring reports to the Regulatory Authority as stipulated in operating permit.</li> <li>• <b>Submit compliance inspection report signed/sealed by a certified/licensed inspector prior to applying for renewal of operating permit.</b></li> <li>• <b>Conduct regular reviews of management program with Owner/User and Regulatory Authority to optimize system operation program.</b></li> <li>• Hire a certified/licensed inspector to inspect system compliance status.</li> </ul>	

<sup>1</sup>Activities in bold are activities added to program elements from the preceding Management Model.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
 <b>CORRECTIVE ACTIONS</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Negotiate compliance schedules with RME for correcting documented noncompliance items.</li> <li>Administer enforcement program including fines and/or penalties for failure to comply with compliance requirements.</li> <li>Obtain necessary authority to enter property to correct imminent threats to public health if the Owner/User fails to comply.</li> <li>Require system inspection by certified inspector at time of operating permit renewal.</li> <li>Negotiate compliance schedules with RME, Owner/User, or both, for correcting documented noncompliance items.</li> </ul>
	Designer	<ul style="list-style-type: none"> <li>Provide Owner/RME with documents (drawings, specifications, modifications, etc.) that may be required by the Regulatory Authority prior to corrective actions.</li> </ul>
	Contractor/ Installer	<ul style="list-style-type: none"> <li>Perform required repairs, modifications, and upgrades as necessary.</li> </ul>
	Inspector	<ul style="list-style-type: none"> <li>Inspect treatment system for compliance with operating permit prior to permit renewal.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Comply with terms and conditions of the negotiated compliance schedule for component replacement/repairs.</li> <li>Submit required documents for corrective actions to Regulatory Authority.</li> <li>Hire appropriate certified/licensed Service Providers to perform required corrective actions.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>Comply with terms and conditions of the negotiated compliance schedule for system performance.</li> </ul>
 <b>RECORD KEEPING, INVENTORY, &amp; REPORTING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Administer a database inventory (locations, site evaluations, record drawings, permits, performed maintenance, and inspection reports) of all systems.</li> <li>Maintain a residuals treatment and disposal tracking system.</li> <li>Maintain a current certified/licensed Service Provider listing that is available to the public.</li> <li>Administer a tracking system for operating permits.</li> <li>Administer a tracking database for compliance reports.</li> <li>Administer periodic financial, management, and technical audits of RME.</li> </ul>
	Operator or Inspector	<ul style="list-style-type: none"> <li>Provide certified report of all maintenance and observed system deficiencies to RME.</li> <li>Provide certified report of all observed system deficiencies to Owner.</li> <li>Perform system monitoring as stipulated in RME's operating permit.</li> </ul>
	Pumper/Hauler	<ul style="list-style-type: none"> <li>Prepare and submit records of residuals handling as required.</li> </ul>
	Owner	<ul style="list-style-type: none"> <li>Maintain approved record drawings and O&amp;M manual of system.</li> <li>Maintain maintenance records of system.</li> <li>Provide drawings, specifications, O&amp;M manual, and maintenance records to new property owner at time of property transfer.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>Maintain system monitoring and service records.</li> <li>Inventory, collect, and provide permit information to Regulatory Authority.</li> </ul>
 <b>FINANCIAL ASSISTANCE &amp; FUNDING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Provide the legal and financial support to sustain the management program.</li> <li>Provide a listing of financial assistance programs available to Owner/User and the qualifying criteria for each program.</li> <li>Consider implementing a state or local financing program to assist Owners in upgrading their systems.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>Conduct regular reviews of management program with Owner/User and Regulatory Authority to optimize operations.</li> </ul>

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

## MANAGEMENT MODEL 5: RME OWNERSHIP

Objective: To provide professional management of the planning, siting, design, construction, operation, and maintenance of onsite/decentralized systems through Responsible Management Entities that own and manage individual and clustered systems within their service areas.

MANAGEMENT MODEL 5: RME OWNERSHIP	PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
	 PUBLIC EDUCATION AND PARTICIPATION	Regulatory Authority	<ul style="list-style-type: none"> <li>Educate Owner/User on purpose, use, and care of treatment system.</li> <li>Provide public review and comment periods of any proposed program and/or rule changes.</li> </ul>
		Service Provider	<ul style="list-style-type: none"> <li>Be informed of existing rules, and review and comment on any proposed program or rule changes.</li> <li>Participate in advisory committees established by the Regulatory Authority.</li> </ul>
		RME	<ul style="list-style-type: none"> <li>Inform User of care and use of system.</li> <li>Inform User of RME requirements and prohibited uses of system.</li> </ul>
		User	<ul style="list-style-type: none"> <li>Be informed of purpose, use, and care of treatment system.</li> </ul>
	 PLANNING	Regulatory Authority	<ul style="list-style-type: none"> <li>Coordinate program rules and regulations with state, tribal, and local planning and zoning and other water-related programs.</li> <li>Evaluate potential risks of wastewater discharges to limit environmental impacts on receiving environments during the rule making process.</li> <li>Limit potential risks of environmental impacts from residuals management program and evaluate available handling/treatment capacities.</li> <li>Inform local planning authority of rule changes and recommend their evaluation of potential impacts on land use.</li> </ul>
		Developer	<ul style="list-style-type: none"> <li>Hire planners, certified site evaluators, and designers to ensure that all lots of proposed subdivision plats meet requirements for onsite treatment prior to final plat.</li> </ul>
		RME	<ul style="list-style-type: none"> <li>Continuously evaluate existing wastewater treatment needs and forecast future needs.</li> <li><b>Require developers to submit proposed subdivision plats to RME for review and comment to ensure compatibility with RME requirements.</b></li> <li><b>Plan most cost-effective approach to meeting treatment needs through appropriate mix of central sewerage, clusters, and individual onsite systems.</b></li> </ul>
	 PERFORMANCE	Regulatory Authority	<ul style="list-style-type: none"> <li>Establish system failure criteria to protect public health, e.g., wastewater backups in building, wastewater ponding on ground surface, insufficient separation from ground water or wells.</li> <li>Establish minimum maintenance requirements for approved systems.</li> <li>Establish performance criteria necessary to protect public health and water resources for each defined receiving environment in the Regulatory Authority's jurisdiction.</li> </ul>
		RME	<ul style="list-style-type: none"> <li>Operate, maintain, and repair systems to comply with performance criteria stipulated in the operating permits.</li> </ul>
User		<ul style="list-style-type: none"> <li>Comply with any RME requirements regarding care and use of the system.</li> </ul>	
 TRAINING AND CERTIFICATION/LICENSING	Licensing Board/Regulatory Authority	<ul style="list-style-type: none"> <li>Develop and administer training, testing, and certification/licensing program for site evaluators, designers, contractors, pumpers/haulers, inspectors, and operators.</li> <li>Maintain a current certified/licensed Service Provider listing.</li> </ul>	
	Service Provider	<ul style="list-style-type: none"> <li>Obtain appropriate certification(s)/license(s) and continuing education as required.</li> <li>Obtain training from the manufacturer or vendor regarding appropriate use, installation requirements, and operation and maintenance procedures of any proprietary equipment to be installed.</li> <li>Comply with applicable federal, state, tribal, and local requirements in the evaluation of sites for wastewater treatment and dispersal.</li> </ul>	
	RME	<ul style="list-style-type: none"> <li>When using third party services, contract with only certified/licensed Service Providers.</li> <li>RME staff who site, <b>design, construct</b>, operate, and/or maintain systems must obtain appropriate certification(s)/license(s) to practice.</li> <li>Arrange for supplemental training as needed for Service Providers and/or staff to manage, operate, and/or maintain systems.</li> </ul>	

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
 SITE EVALUATION	Regulatory Authority	<ul style="list-style-type: none"> <li>• Codify prescriptive requirements for site evaluation procedures.</li> <li>• Codify criteria for treatment site characteristics suitable for permitted designs that will prevent unacceptable impacts on ground and surface water resources.</li> <li>• Establish the defining characteristics of each receiving environment in the Regulatory Authority's jurisdiction.</li> <li>• Approve and oversee site evaluation procedures used by RME to ensure that system designs are appropriate for the sites and their stipulated performance criteria.</li> </ul>
	Site Evaluator	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Describe site and soil characteristics, determine suitability of site with respect to code requirements, and estimate site's hydraulic and treatment capacity.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the evaluation of sites for wastewater treatment and dispersal.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>• Hire a certified/licensed site evaluator to perform site evaluation.</li> </ul>
 DESIGN	Regulatory Authority	<ul style="list-style-type: none"> <li>• Codify prescriptive, pre-engineered designs that are suitable for treatment sites that meet the appropriate prescriptive site criteria.</li> <li>• Administer the plan review program for engineered designs to meet stipulated performance criteria.</li> <li>• Require routine operation and emergency contingency plans that will sustain system performance and avoid the submission of unpermitted discharges.</li> </ul>
	Designer	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Design treatment system that is compatible with the site and soil characteristics described by the site evaluator.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the design of wastewater treatment and dispersal systems.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>• Hire a certified/licensed designer to prepare system design.</li> </ul>
 CONSTRUCTION	Regulatory Design	<ul style="list-style-type: none"> <li>• Administer a permitting program for system construction, including Regulatory Authority review of proposed system siting and design plans.</li> <li>• Require designer of record to certify that completed system construction is in substantial compliance with approved plans and specifications.</li> <li>• Require that record drawings of constructed system be submitted to the Regulatory Authority by RME.</li> </ul>
	Contractor/ Installer	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Construct system in accordance with the approved plans and specifications.</li> <li>• Prepare record drawings of completed system and submit to RME.</li> <li>• Provide RME with an O&amp;M manual describing component manufacturer's maintenance and troubleshooting requirements/recommendations.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the design and construction of wastewater treatment and dispersal systems.</li> </ul>
	Designer of Record	<ul style="list-style-type: none"> <li>• Approve proposed field changes and submit to RME.</li> <li>• Certify that construction of the system is substantially in conformance with the approved plans and specifications.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>• Hire a certified/licensed designer to prepare system design.</li> <li>• Submit final record drawings of constructed system to Regulatory Authority.</li> <li>• Submit a copy of system O&amp;M manual to the Regulatory Authority to record required maintenance.</li> </ul>

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
 <p><b>OPERATION &amp; MAINTENANCE</b></p>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Provide User with educational materials regarding system use and care.</li> <li>• Administer a program of renewable/revocable operating permits that are issued to RME that stipulate system performance, compliance monitoring reporting schedule, term of permit, and renewal option upon documented compliance with operating permit stipulations.</li> <li>• Track and review compliance monitoring reports to ensure that systems are operating in accordance with operating permits.</li> <li>• Consider replacing individual system operating permits with general permits issued to RME for classes of systems.</li> </ul>
	Operator	<ul style="list-style-type: none"> <li>• Inspect and service system as necessary in accordance with the submitted O&amp;M manual and/or operating permit stipulations.</li> <li>• Perform system monitoring as stipulated in RME's operating permit.</li> <li>• Certify to RME that the required maintenance and monitoring were performed in a timely manner and noting any system deficiencies.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the operation and maintenance of the treatment and dispersal system.</li> </ul>
	Pumper/Hauler	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Inspect and service system as necessary.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the operation and maintenance of the treatment and dispersal system.</li> </ul>
	User	<ul style="list-style-type: none"> <li>• Follow recommendations provided by Regulatory Authority, Service Providers, and/or Owner to ensure that undesirable or prohibited materials are not discharged to system.</li> <li>• Comply with any RME requirements regarding care and use of system.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>• Operate and maintain systems in accordance with the stipulated operating permit requirements.</li> <li>• Submit compliance monitoring reports to the Regulatory Authority according to the schedule stipulated in the operating permit.</li> <li>• Hire a certified/licensed pumper/hauler or operator to maintain system.</li> </ul>
 <p><b>RESIDUALS MANAGEMENT</b></p>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Administer a tracking system for residuals hauling, treatment, and disposal and review to evaluate compliance with 40 CFR Part 503 Use and Disposal of Sewage Sludge, 40 CFR Part 257, and applicable state, tribal, and local requirements.</li> <li>• Inventory available residuals handling/treatment capacities and develop contingency plans when capacities available are insufficient.</li> </ul>
	Pumper/ Hauler	<ul style="list-style-type: none"> <li>• Comply with applicable federal, state, tribal, and local requirements in the pumping, hauling, treatment, and disposal of wastewater treatment system residuals.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>• Hire a certified/licensed pumper/hauler to remove, treat, and dispose of residuals.</li> <li>• Comply with applicable federal, state, tribal, and local requirements in the pumping, hauling, treatment, and disposal of treatment system residuals.</li> <li>• Inventory available residuals handling/treatment capacities and develop contingency plans when capacities available are insufficient.</li> </ul>
 <p><b>COMPLIANCE INSPECTIONS/ MONITORING</b></p>	Regulatory Authority	<ul style="list-style-type: none"> <li>• Perform inspection programs at point-of-sale, change-in-use of properties, "targeted areas," and/or systems reported to be in violation.</li> <li>• Conduct compliance inspections of residuals hauling, treatment, and disposal.</li> <li>• Administer a program to monitor timely submittals of acceptable compliance maintenance reports.</li> <li>• Perform system inspections randomly and/or at the time of operating permit renewal.</li> </ul>
	Inspector	<ul style="list-style-type: none"> <li>• Obtain certification/license to practice.</li> <li>• Perform system compliance inspections for RME in accordance with prevailing Regulatory Authority requirements.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>• Submit compliance monitoring reports to Regulatory Authority as stipulated in operating permit.</li> <li>• Submit a compliance inspection report signed/sealed by a certified/licensed inspector prior to applying for renewal of operating permit.</li> <li>• Conduct regular reviews of management program with Regulatory Authority to optimize system operation program.</li> <li>• Hire a certified/licensed inspector to inspect system compliance status.</li> </ul>

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.

PROGRAM ELEMENT	RESPONSIBLE PARTY	ACTIVITY <sup>1</sup>
 <b>CORRECTIVE ACTIONS</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Negotiate compliance schedules with RME for correcting documented noncompliance items.</li> <li>Administer the enforcement program including fines and/or penalties for failure to comply with compliance requirements.</li> <li>Require system inspection by a certified inspector at time of operating permit renewal.</li> <li>Negotiate compliance schedules with RME for correcting documented noncompliance items.</li> </ul>
	Designer	<ul style="list-style-type: none"> <li>Provide RME with documents (drawings, specifications, modifications, etc.) that may be required by the Regulatory Authority prior to corrective action.</li> </ul>
	Contractor/ Installer	<ul style="list-style-type: none"> <li>Perform required repairs, modifications, and upgrades as necessary.</li> </ul>
	Inspector	<ul style="list-style-type: none"> <li>Inspect treatment system for compliance with operating permit prior to permit renewal.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>Comply with terms and conditions of the negotiated compliance schedule.</li> <li>Submit required documents for corrective actions to the Regulatory Authority.</li> <li>Hire appropriate certified/licensed Service Providers to perform required corrective actions.</li> </ul>
 <b>RECORD KEEPING, INVENTORY, &amp; REPORTING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Administer a database inventory (locations, site evaluations, record drawings, permits, and inspection reports) of all systems within the Regulatory Authority's jurisdiction.</li> <li>Maintain a residuals treatment and disposal tracking system.</li> <li>Maintain a current certified/licensed Service Provider listing, which is available to the RMEs.</li> <li>Administer a tracking system for operating permits.</li> <li>Administer a tracking database for compliance reports.</li> <li>Administer financial, management, and technical audits of RME.</li> </ul>
	Operator or Inspector	<ul style="list-style-type: none"> <li>Provide a certified report of all maintenance and observed system deficiencies to RME.</li> <li>Provide a certified report of all observed system deficiencies to Owner.</li> <li>Perform system monitoring as stipulated in RME's operating permit.</li> </ul>
	Pumper/Hauler	<ul style="list-style-type: none"> <li>Prepare and submit records of residuals handling as required.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>Maintain system monitoring and service records.</li> <li>Inventory, collect, and provide permit information to Regulatory Authority.</li> </ul>
 <b>FINANCIAL ASSISTANCE &amp; FUNDING</b>	Regulatory Authority	<ul style="list-style-type: none"> <li>Provide the legal and financial support to sustain the regulatory program.</li> <li>Provide a listing of financial assistance programs available to RME and the qualifying criteria for each program.</li> <li>Consider implementing a state or local financing program to assist RME in upgrading systems.</li> </ul>
	RME	<ul style="list-style-type: none"> <li>Conduct regular reviews of management program with Regulatory Authority to optimize operations.</li> </ul>

MANAGEMENT MODEL 5: RME OWNERSHIP

<sup>1</sup> Activities in bold are activities added to program elements from the preceding Management Model.