Stormwater Utility Feasibility Study

REPORT ON TASK 5 OF THE INTEGRATED WATER RESOURCES MANAGEMENT PROGRAM

TOWN OF COLCHESTER, VERMONT

April 1, 2013 FINAL REPORT

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1. EXECUTIVE SUMMARY

Colchester's economy and identity are defined in part by its bounty of local water resources. This is demonstrated by the recent (2010-2012) Heritage Project, which seeks to provide a cohesive identity for the community that includes establishing Colchester as a premier tourist and recreation area focused around water resources. The Heritage Project's goals explicitly recognize that the maintenance, management, and development of critical infrastructure, including storm water systems, is essential to nurturing Colchester's responsible and sustainable residential, business, and community growth.

This report summarizes application of the infrastructure and water resources knowledge bases developed during this demonstration grant to an engineering study of whether it is feasible (and necessary) to establish a stormwater utility to manage stormwater infrastructure an expanding requirements for stormwater remediation in Colchester. This earlier work has shown that storm runoff, and its direct and indirect impacts on sediment and nutrient concentrations in the Town's streams and Malletts Bay, represents a significant and perhaps the largest source of the degradation of Colchester's water resources.

The larger picture of stormwater management regulation is becoming more complex and challenging. As a result the level of effort needed to insure adequate maintenance of existing stormwater infrastructure and oversee the implementation of capital projects is rising. Although the Town's stormwater management activities are currently carried out by members of the Department of Public Works, there is no staff dedicated solely to the Town's stormwater services.

A program that specifically supports stormwater infrastructure management including capital projects, infrastructure maintenance, regulatory compliance and record-keeping, public engagement and education, and pollution prevention, is needed now. The need will only become more pronounced as restoration plans are implemented and existing infrastructure continues to age. Creating a comprehensive stormwater management program would allow the Town to shift towards an even more proactive management of stormwater infrastructure in Colchester, would address the Town's most critical sources of sediment and phosphorus to local streams and Lake Champlain, and would ultimately support and result in higher-quality and better-protected surface waters throughout the Town.

This report reviews the regulatory framework for stormwater regulations and programs in Vermont, and places the Town of Colchester's existing stormwater program in that regulatory context. We look at both current and anticipated stormwater regulations and requirements that will impact both short-term and long-term funding of stormwater system maintenance and repair.

Finally, we look at different budget scenarios and funding options for future consideration by the Town.

Three proposed future levels of stormwater management activities were developed based on current and expected future requirements (such as the December 2012 Municipal Separate Storm Sewer System (MS4) permit and the impending revised Lake Champlain phosphorus TMDL). Budget scenarios targeted to FY2015 were also developed for each of the three possible program levels:

- The first scenario maintains the Town's current stormwater management activities and funding levels with an annual increase for inflation (total estimated FY2015 cost of $260,000).

- The second scenario represents the expected effort to meet the new MS4 permit conditions, including new requirements for stormwater impaired watersheds, and adds a public works staff person dedicated to administering the stormwater program (total estimated FY2015 cost of $410,000).

- The third scenario anticipates the need for additional resources to improve stormwater infrastructure throughout the Town and improve stream water quality to address phosphorus and sediment reductions in Malletts Bay and Lake Champlain (total estimated FY2015 cost of $600,000).

The Town's current program is managed within the Public Works Department and is funded primarily through general fund taxes, with support from federal and state grants. Options for funding stormwater management program improvements were developed for each of the three anticipated stormwater program levels.

Three different potential fee structures were analyzed to determine a methodology best suited for the Town of Colchester: a flat fee, a variable fee, and a hybrid of the two fee types that uses impervious area to develop an equivalent unit for establishing a fee. These fee structures were compared with the equivalent tax rate for the proposed stormwater program, in order to understand whether the current funding mechanism of relying primarily on property tax revenue for program funding might also be appropriate. Ultimately, the hybrid fee likely represents the best balance of simplicity, equity, and ease of implementation and ongoing administration.

In Vermont, and especially in Chittenden County, stormwater management is gaining greater attention by municipalities both due to regulatory changes and to the public's growing understanding that stormwater pollution is degrading the beneficial use of water resources.

Two nearby municipalities, the cities of Burlington and South Burlington, have established dedicated stormwater programs supported by fees, rather than by property taxes via the General Fund. We conclude that Colchester should consider following suit.

If a dedicated, fee-supported stormwater program is desired, the next steps for Colchester include:

- Selectboard endorsement of pursuing a stormwater utility ("go" or "no go")
- Develop a stakeholder group
- Establish the purpose and need for a stormwater utility
- Define the stormwater program elements
- Agree to a fee structure
- Establish a fee that is equitable and will provide stable revenue
- Establish a billing system

This report provides ample background for each of these steps.

Based upon our review, we recommend that Colchester consider implementing a hybrid rate model to bill property owners for the cost of their annual stormwater efforts. As stormwater requirements become more stringent and costs continue to increase, reliance on the tax rate becomes less and less equitable. The hybrid model that we propose would be based on impervious surfaces and an equivalent user base.

The details of this rate model are described in the report, but in summary, each property would be assigned an equivalent unit based on the type of use and impervious surface. An equivalent unit would be established for the average impervious surface of a single family home. All single family homes would be charged one equivalent unit regardless of the extent of impervious surface on their parcel. Commercial, institutional and other properties would be charged a number of equivalent units based on their impervious surface rounded to the nearest equivalent unit. Rounding to the nearest equivalent unit takes some of the sensitivity out of the billing system which means that the billing doesn't change for relatively small changes in impervious surface. The billing rate/equivalent unit is simply determined by dividing the stormwater budget by the total number of equivalent units, which will only vary over time as significant changes to the extent of impervious surface changes at non-residential properties.

Regardless, of whether Colchester decides to pursue a different funding mechanism for funding stormwater maintenance and improvements, they will need to contend with ever-expanding requirements and regulations that will put increasing pressure on their current stormwater budget and practices and continue to divert key public works staff away from other critical infrastructure issues.

2. INTRODUCTION

The Town of Colchester secured a demonstration grant from the U.S. Environmental Protection Agency (EPA) for development of an Integrated Water Resource Management Plan (IWRMP) with the goal of improving the overall management of non-point source pollution control infrastructure in the Town, in a manner that can be supported by the community at large.

This plan has a technical component that includes the development of a sufficient knowledge base of the town's distributed infrastructure to support the creation of a comprehensive approach to address the community's needs and concerns, an educational component to convince the community that the plan is necessary, and a funding strategy, to make the plan economically feasible. These three components are intricately linked and are therefore dependent on one another, and are all critical to the successful implementation of the Town's overall plan.

This report summarizes application of the infrastructure knowledge base developed during the first year of the demonstration grant (Infrastructure Inventory (Task 1) and Water Resources Inventory, Mapping and Assessment (Task 2)), to conduct an assessment of whether it is feasible to establish a town-wide program that pro-actively and comprehensively manages stormwater infrastructure in Colchester.

During this task, the Consultant Team utilized the data collected as part of Tasks 1 and 2, including the stormwater infrastructure inventory and water resource datasets as applicable, guided by the over-arching priorities determined during the completion of Tasks 3 and 4. During these tasks, Town-wide and site-specific assessments of current (primarily on-site) wastewater treatment systems were completed, and management strategies were recommended for targeted areas along a continuum between maintaining the status quo and installing centralized sewers.

The outcomes of Tasks 3 and 4 illustrated that specific areas of Colchester—particularly the shores of Malletts Bay and Lake Champlain—may require more targeted or advanced wastewater management to achieve public health, environmental protection, or development goals. The results of Task 2, however, indicated that stormwater runoff is a major—and perhaps the primary—contributor to water quality problems **across much of the Town of Colchester**. Thus, during the efforts summarized here, substantial energy was directed toward understanding the level of effort and funding that would be required to address stormwater-related water quality issues in a Town-wide and pro-active way.

This report describes the results of the stormwater management program feasibility study. The need for an enhanced town-wide stormwater management program is summarized in Section 3. Sections 4 and 5 briefly discuss the current regulatory structure surrounding stormwater management, as well as the Town's existing stormwater program and newly passed or expected regulatory changes. Section 6 sets out three future scenarios for Town-wide stormwater management programs, and supplies cost estimates for each of the three scenarios. Sections 7 and 8 describe funding options that are generally available to the Town of Colchester, and funding models that have already been implemented to support stormwater management programs in other Vermont towns, respectively. Section 9 provides examples of how each of the potential fee structures described in Section 7 might apply to the Town of Colchester, and Section 10 describes the next steps that may be taken in order to implement a comprehensive, fee-supported stormwater management program in Town.

3. PURPOSE AND NEED

The Town of Colchester has substantial stormwater management infrastructure as catalogued under the GIS mapping work performed under Task 1 of this study. This earlier work (Task 1 Report – Table 2) identified the following stormwater infrastructure that directs wet weather flows to streams and Lake Champlain:

- 2,095 structures
- 2,282 stormwater pipelines
- 53 stormwater ponds
- 279 outfalls

This list includes all public infrastructure as well as private infrastructure to the extent that a private property owner allowed access to map the features. Not all of this infrastructure was constructed according to current design standards, some of it pre-dates modern stormwater regulations, routine maintenance is not always completed, and some facilities on both public and private properties will need upgrades and repairs.

Not all this infrastructure is the responsibility of Colchester to maintain. Some of the infrastructure is located on private property that may or may not convey stormwater onto public infrastructure. Colchester has no legal authority or fiduciary responsibility to maintain stormwater infrastructure on private property (except where specifically spelled out in permit and/or easement language). However, they may find it necessary (on a case-by-case basis) to work with private landowners to jointly make improvements to private stormwater systems that convey stormwater to public infrastructure, to improve overall water quality. Budgets prepared later in this report reflect anticipated costs to maintain public infrastructure. There was no attempt to estimate costs for maintenance and upgrade of private infrastructure, as this is generally not Colchester's responsibility.

Water quality sampling for phosphorus in Colchester's streams indicated that streams draining watersheds dominated by agricultural or higher density residential land tend to have elevated phosphorus concentrations relative to streams that drain undeveloped, forested land. The volume and phosphorus content of storm runoff may be mitigated by increasing implementation of stormwater treatment systems in developed areas, and by implementing best management practices for agricultural land. For example, near the densely developed Exit 16 I-89 interchange, stream water quality is relatively good despite the watershed being composed of nearly 40% impervious surface. Here, stormwater treatment practices, natural wetlands and ponds, and other natural buffers have been effective in maintaining reasonably good water quality in a portion of the Sunderland Brook watershed.

Conservation of natural areas, including stream corridors and riparian wetlands, combined with construction and maintenance of engineered treatment structures for new development, are integral strategies for stormwater management in Colchester.

Evaluations of stream geomorphology also suggest that stream channel adjustment may be a significant source of phosphorus and sediment pollution under high flow conditions. Portions of the channels of both Morehouse and Sunderland Brooks are highly unstable, and the potential for more degradation is high. Unstable stream channels result in degraded aquatic habitats, and represent the potential for substantial amounts of sediment and sediment-bound phosphorus to mobilize and be carried downstream degrading water quality both in the streams and in the ultimate receiving water, Lake Champlain. Strategies for riparian area protection, as well as stream bank stabilization and restoration, may become a part of a program for maintaining or improving water quality in Colchester's streams. However, there is currently no regulatory requirement that specifically addresses stream geomorphic improvements.

The larger picture of stormwater management regulation is becoming more complex and challenging. The Town of Colchester is one of 14 Vermont municipalities currently designated as a Municipal Separate Stormwater System (MS4) and is required by permit to implement a stormwater management program that includes six minimum control measures to reduce stormwater pollutants.

The latest MS4 permit, issued in December 2012, contains new requirements for the development and implementation of Flow Restoration Plans (FRPs) for stormwater-impaired streams (including Morehouse and Sunderland Brooks) In addition; the US EPA is in the process of re-drafting the Lake Champlain phosphorus TMDL. Once this TMDL is re-issued, phosphorus transported by streams and rivers in Colchester could be required to meet reduction standards in the revised TMDL.

The Town's stormwater program is currently managed within the Public Works Department. The level of effort needed to insure adequate maintenance of existing stormwater infrastructure and oversee the implementation of capital projects is rising, but there is no staff dedicated to the Town's stormwater services.

A program that specifically supports stormwater infrastructure management that includes capital projects, infrastructure maintenance, regulatory compliance and record-keeping, public engagement and education, and pollution prevention, is warranted, and the need will only become more pronounced as restoration plans are implemented and existing infrastructure continues to age. Creating a comprehensive stormwater management program would allow the Town to shift toward more proactive management of stormwater infrastructure in Colchester. It would address the Town's most critical sources of sediment and phosphorus to local streams and Lake Champlain, and would ultimately support and result in higher-quality and better-protected surface waters throughout the Town.

4. EXISTING PROGRAM

4.1 Existing Program Elements

The Town of Colchester has an existing stormwater maintenance program to meet their current regulatory and infrastructure maintenance needs. The stormwater maintenance program is a separate budget within the Department of Public Works general fund budget, however administrative costs (e.g. administration, infrastructure mapping, outfall inspections, permitting and education) are included in the Department's General Fund Administrative Budget. Capital projects related to stormwater are funded through the Transportation Capital Plan. The existing program elements include: administration, infrastructure mapping, outfall inspections, illicit discharge detection and elimination, highway maintenance, and capital projects. The Town is also responsible for meeting the regulatory requirements of state and federal stormwater permits, as well as administration of a Town stormwater permit program.

4.1.1 Administration

The Town of Colchester's Stormwater program is managed within the Public Works Department under the overall guidance of the Public Works Director. Stormwater related operations and maintenance costs are tracked separately from other Public Works Department costs. Currently staff resources for stormwater are shared with the other public works functions; there is no staff dedicated solely to stormwater services.

The Town is a designated MS4 and is required by permit to implement Best Management Practices to reduce stormwater pollutants to the "Maximum Extent Practicable". Specifics of the MS4 permit are described more fully in the next section. Many of the stormwater services required by the permit are "Good Housekeeping" practices that are standard practice for the Town.

4.1.2 Infrastructure Mapping

In the summer of 2009, Stone Environmental inventoried the Town's stormwater infrastructure. This information is important for the continued management and maintenance of the Town's stormwater assets. Stormwater permit information, infrastructure record drawings, and field inventory were all used to complete the mapping effort. The information is in a GIS database that is used for asset management and planning by the Town. This information is updated by the Town as a requirement of the MS4 permit.

4.1.3 Outfall Inspections

In 2003, a stormwater outfall assessment was completed by the Town and a team of consultants. This comprehensive outfall study looked at the pipe structural condition, aquatic organism passage, channel alignment and downstream scour for 129 culvert outfalls. The assessment prioritized 12 outfalls for repair; and the remaining 117 outfalls were scheduled for ongoing inspection. For the study, an outfall was defined as a structure at the end of a stormwater collection system that discharges to surface waters (or to a conduit leading to surface waters).

Since the outfall study was completed, the Town has diligently leveraged local, state and federal funding to repair or replace the 12 prioritized outfalls. The Town continues annual inspections of outfalls as recommended in the study. Substantial outfall repairs and replacements are prioritized within the Town's Transportation Capital Plan.

4.1.4 Highway Maintenance

Routine maintenance of the Town's roadways is important to prevent degradation of the Town's natural waters. Almost every service provided by a Highway Department has some direct or indirect impact on stormwater quality. Sediment and debris is routinely cleaned from highway infrastructure to improve stormwater quality. This routine maintenance includes street sweeping, catch basin cleaning, ditching, gravel road grading, and sand and salt application during winter operations.

Street Sweeping: The Town's street sweeping program is important to prevent road debris from contributing to stormwater pollution in Colchester's watersheds. The Town owns a vacuum sweeper and sweeps all Town streets at least twice a year, once in the spring after snowmelt, and once in the fall. Material collected from street sweeping is stockpiled and tested to determine the appropriate disposal method.

Catch Basin Cleaning: All new catch basins in the Town of Colchester are installed with a sump. The sump allows for settlement of debris and sediment. Catch basins are routinely cleaned with a vactor truck and jetter to remove the settled material. As with street sweeping materials, catch basin debris is stockpiled and tested to determine the appropriate disposal method.

Gravel Road Maintenance: Gravel road maintenance includes ditching, culvert repair, grading, and dust control. All of these practices are not only important to keep the travelling public safe, they are also important for stormwater quality. A properly crowned gravel road with effective and stable drainage will lessen the amount of sediment that enters streams from wash off and erosion. The Town grades gravel roads at least twice each year and maintain ditches and cross culverts as necessary to promote proper drainage. This includes the use of erosion and sediment control best management practices when ditching.

Sand and Salt Application: The Town has adopted a Snow and Ice Removal Plan. The management goals in the plan balance the need to provide safe roads for the traveling public within the fiscal constraints of the Town, while recognizing that sand and salt used during winter operations impacts water quality. To meet these goals the Town uses computerized material spreaders and tracks the use of materials during a winter storm event. The plan also has recommended application rates to make sure sand and salt are not over used.

4.1.5 Capital Projects

Over the past decade the Town has completed 16 capital projects related to stormwater with project costs ranging from $10,000 to $570,000. The majority of these capital projects have been outfall improvements. Table 4.1 lists the capital projects constructed by the Town over the last decade; the total cost of this effort was over $1.3M. The costs listed include engineering and construction.

These projects have been funded primarily through the Transportation Capitol Plan. This plan is supported through the municipal tax rate, but is separate from the Town's general operating budget. The Transportation Capital Plan has evolved from a road paving fund to include sidewalks and stormwater/drainage related projects. The capital fund has been used to leverage additional grant funding from state and federal programs such as STAG and other EPA programs.

In Table 4.1 a distinction is made between those projects constructed primarily to improve water quality and projects constructed for other reasons such as roadway stability or drainage improvements. Water quality improvements include reducing the downstream channel scour, providing for aquatic organism passage, and channel stabilization through hydraulic improvements.

Table 4.1
Completed Stormwater Capital Improvement Projects

Project Date	Location	Cost[1]	Project Purpose	Project Goal
FY05	Canyon Road	$219,212	Failed Outfall	Water Quality
FY06	Shore Acres	$88,978	Failed Outfall	Water Quality
FY06	Porters Point Road	$17,964	Failed Storm Line	Roadway Stability
FY07	Mallets Bay Ave. #1	$88,118	Failed Outfall	Water Quality
FY07	Mallets Bay Ave. #2	$47,598	Failed Outfall	Water Quality
FY07	Village Drive	$16,813	Failed Outfall	Water Quality
FY07	Young Street	$25,527	Failed Storm Line	Roadway Stability
FY08	East Lakeshore Dr	$74,012	Failed Outfall	Water Quality
FY09	Fort Ethan Allen	$573,739	Failed Outfall	Water Quality
FY10	Horizon View	$21,575	Localized St Flooding	Public Nuisance
FY12	Middle Road	$12,826	Failed Cross Culvert	Roadway Stability
FY12	Jasper Mine Road	$57,000	Failed Cross Culvert	Roadway Stability
FY13	Porters Point Road	$15,595	Failed Storm Line	Roadway Stability
FY13	East Lakeshore Dr	$28,650	Failed Outfall	Water Quality
FY13	Village drive	$9,841	Localized St Flooding	Public Nuisance
FY14	Porters Point Road	$68,822	Failed Outfall	Water Quality
Total		**$1,366,270**		

Note:
1. Costs include engineering and construction.

4.2 State Stormwater Regulations

The State of Vermont, Department of Environmental Conservation (DEC) has delegated authority from the US EPA to administer stormwater regulations under the federal Clean Water Act. The Vermont Department of Environmental Conservation's Stormwater Section issues permits for runoff from impervious surfaces, construction sites, and industrial facilities.

New construction, redevelopment projects, and expansion projects may need coverage under a State Stormwater Permit and/or a Construction Permit in order to comply with state law and the federal Clean Water Act. If a new project is industrial or is linked to an existing industrial facility, it may also need coverage under a Multi-Sector General Permit.

4.2.1 State Stormwater Permits

The State Stormwater Permit Program regulates discharges of storm runoff from impervious surfaces, including rooftops, paved or gravel roads, and parking lots. This program has specific jurisdictional thresholds based on the amount of impervious surface, as per the Stormwater Management Rules (Chapter 18 for watersheds that are not characterized as stormwater impaired, and Chapter 22 for stormwater impaired waters). Both sets of rules apply to Colchester, since several of the Town's watersheds have been characterized as stormwater impaired.

A State Stormwater Permit covering post-construction stormwater practices and management is generally required for:

- New impervious surfaces greater than one acre
- Redevelopment of existing impervious surfaces, where the redeveloped portion of the existing impervious surface is equal to or greater than one acre
- Expansions greater than 5,000 square feet if the total resulting impervious surface is greater than one acre (only the portion of the expansion over one acre is required to obtain coverage)

For a particular project, completing Section A of the Stormwater Permit Worksheet or the State Stormwater Permit State Stormwater Jurisdiction Flow Chart generally determines whether permit coverage is required. Projects must apply for coverage under General Permit 3-9015, unless the project is located within a watershed impaired for stormwater, in which case individual permit coverage is required.

Discharges of regulated stormwater runoff must obtain permit coverage consistent with the treatment standards within the 2002 Vermont Stormwater Management Manual (VSWMM). Volume I of the manual describes treatment standards, acceptable BMPs that can be used to meet the treatment standards, and a series of voluntary Stormwater Management Credits, which are awarded for using a series of Low Impact Development non-structural practices when developing projects.

4.2.2 Stormwater Construction Permits

The Construction Stormwater Permit Program addresses stormwater runoff from earth disturbance activity of one or more acres of land, and is a requirement of the federal Clean Water Act. Section B of the Stormwater Permit Worksheet can be used to determine whether Construction Stormwater Permit coverage is needed. Projects triggering the need for a Construction Permit must apply for coverage under Construction General Permit 3-9020 or an individual construction discharge permit.

Projects that are not located in watersheds impaired by stormwater are eligible for coverage under the General Permit 3-9015, and must meet the criteria outlined in Chapter 18 of the Environmental Protection Rules and in the VSWMM. Projects in watersheds impaired by stormwater (including projects within the Morehouse and Sunderland Brook watersheds in Colchester) meeting the permitting thresholds must seek coverage under an individual permit, which has stricter requirements including sediment load calculations. The state regulation covering stormwater-impaired watersheds can be found in Chapter 22 of the Environmental Protection Rules.

4.2.3 Multi-Sector General Permit

The Multi-Sector General Permit (MSGP) 3-9003 addresses stormwater runoff associated with industrial facilities, and is a requirement of the federal Clean Water Act. In Vermont, DEC is delegated to issue these permits. A facility must obtain coverage under the MSGP if the Standard Industrial Classification (SIC) code that describes the facility is listed within Table D-1 of the MSGP General Permit.

4.2.4 MS4 Program and Minimum Control Measures

Colchester is designated as an MS4 under the National Pollutant Discharge Elimination System (NPDES) Phase II stormwater requirements of the Clean Water Act. This MS4 designation requires Colchester to file a five-year Stormwater Management Plan (SWMP) which responds to six “Minimum Control Measures”. The Town’s current activities under each of these six measures are briefly described below. In addition, the Town is obligated to file an annual report describing stormwater management activities completed during the preceding planning year.

Public Education and Outreach on Stormwater Impacts - The Town of Colchester participates in the Regional Storm Water Education Program (RSEP) along with other MS4 communities from Chittenden County (http://www.smartwaterways.org/). The Town has also developed a storm water website, which displays a variety of storm water related information (http://colchestervt.gov/PublicWorks/Stormwater.shtml).

Public Involvement/Participation - Colchester's public involvement and participation efforts involve three main types of activities: storm drain stenciling, facilitating stream corridor clean-up days (with particular focus on identified illegal dumping sites in the Sunderland Brook watershed), and establishment of Storm Water Watch Groups within all sub-watersheds located within MS4 designated areas.

Illicit Discharge Detection & Elimination (IDDE) - An Illicit Discharge Ordinance (Chapter 18, Article IV of the Town Ordinances) was developed and implemented in 2005, which regulates the contribution of pollutants to the MS4 from storm water discharges by any user, prohibits illicit connections and discharges to the MS4, and establishes legal authority to carry out the IDDE Plan, including conducting inspections, monitoring, and enforcement procedures to ensure compliance with the ordinance. IDDE program activities include continued inspection, testing of outfalls, making corrective actions when illicit discharges are discovered, and providing training for municipal employees and information to the business community regarding prevention and elimination of illicit discharges.

Construction Site Stormwater Runoff Control - Town staff performs plan reviews of all projects involving land disturbance as a part of the site plan review process and the issuance of building permits. Staff also inspects all locally permitted projects causing land disturbance for compliance with the Town's erosion and sediment control ordinance (Chapter 18, Article V of the Town Ordinances). This ordinance covers "any land disturbance activities within the jurisdictional area of this article that result in less than one acre of clearing, grading, construction or land disturbance activity, unless otherwise exempted" (Sec. 18-19).

Post-Construction Stormwater Management for New Development and Redevelopment - As with construction sites, Town staff performs plan review of all projects involving land disturbance as a part of the site plan review process and the issuance of building permits, ensuring appropriate post-construction stormwater management practices will be implemented. Projects are required to conform to the Town's storm water regulations (Chapter 18, Article VI of the Town Ordinances). All permit conditions associated with projects involving land disturbance are included in the approved Findings of Fact and Order approved by the Development Review Board. This document becomes the instrument for enforcing the Board's approval. Town staff also performs inspections during construction as described above.

Pollution Prevention/Good Housekeeping for Municipal Operations - The Town has implemented pollution prevention and good housekeeping procedures in several major areas of municipal operations:

1. Maintaining improvements and procedures outlined through the Municipal Compliance Assistance Program, including implementing any recommendations stemming from compliance inspections conducted periodically by Vermont DEC.

2. Maintaining good housekeeping policies in routine municipal operation and maintenance activities, including:
   - Highway maintenance (to encompass snow removal activities, street sweeping, basin cleaning, storm water outfall inspection and maintenance, ditch and drainage way maintenance, dust control, and material storage)
   - Buildings and grounds maintenance (including sanitary facilities and wastes, solid wastes, storm water runoff, fertilization, pesticides, and animal waste)
   - Equipment maintenance (including equipment repair, storage, washing, fueling facility pollution prevention)
   - Wastewater system maintenance (especially inspection of overflow controls and containment for chemical pre-treatment)

3. Maintaining the Town's Public Works Maintenance Facility as though it were a facility that required a Multi-Sector General Permit, in order to eliminate possible stormwater discharges related to the facility's operations. Recent improvements to the facility have included covered storage for the Town's equipment and construction materials, and the replacement of an aging salt storage facility.

4. Conducting on-going employee training.

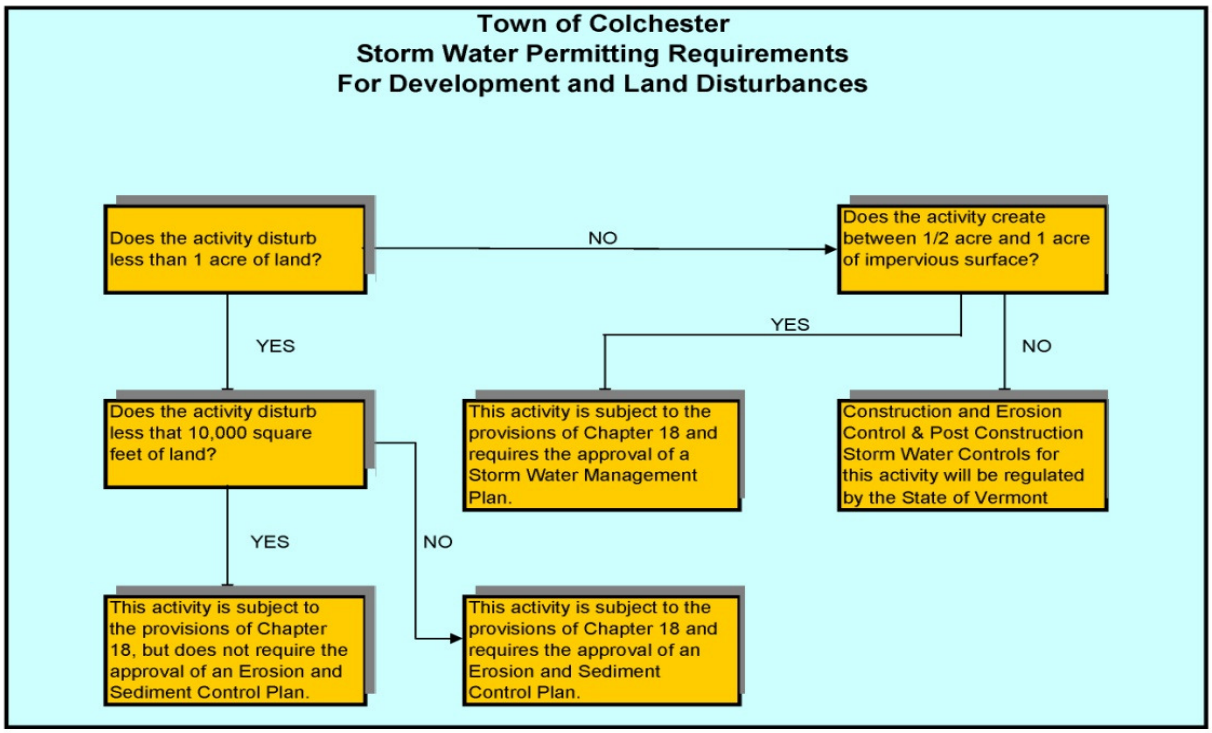
Revisions to Vermont's MS4 permit were issued on December 5, 2012, which expanded the requirements of permit-holders to proactively address stormwater issues. These expanded requirements are described in more detail in Section 5.2.1.

4.3 Local Stormwater Ordinances

The State-level rules are broad-based and can provide a foundation for more location-specific requirements. The heart of Colchester's stormwater management program is Chapter 18 of the Town Ordinances. These stormwater regulations "define" what constitutes a public nuisance relating to illicit discharges and soil erosion and stormwater management related to land disturbance activities.

These regulations provide procedures for the abatement or removal of such public nuisances as public health, safety or welfare may require. They also establish methods for controlling the discharge of sediment, stormwater and non-stormwater discharges into the MS4, and/or surface or groundwater in order to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) permit process, and General Permit No. 3-9014 as issued by the State of Vermont (Chap. 18, Article 1, Section 18-1).

Under Chapter 18, nearly any land disturbance that may require a building permit in Colchester is required to implement appropriate erosion and sediment control practices during construction. However, projects with areas of site disturbance or impervious cover that exceed Town of Colchester permitting thresholds are still permitted and regulated by Vermont DEC. The flowchart below (from the Town's website) illustrates Colchester's stormwater permitting thresholds.



Any land disturbance activities that result in greater than or equal to one acre of clearing, grading, construction or land disturbance activity, but create less than one acre of impervious surface, must have post-construction stormwater treatment practices implemented that meet design criteria in the latest versions of the Vermont Storm Water Management Manual (Volumes I and II), the Colchester Department of Public Works Specifications and Standards, and the Colchester Zoning Regulations (Chapter 18, Article VI, Sec. 18-36).

The Colchester Department of Public Works Specifications and Standards are the most influential local document regarding the types of impervious surfaces and attendant stormwater treatment practices typically implemented in Colchester. This document contains standards for most types of construction and resulting impervious surface (earthwork specifications, geometric standards and design standards for streets and sidewalks, storm drainage specifications and standard treatment practices, as well as landscaping and permanent erosion controls). However, off-street parking (layout of lots, parking space minima/maxima, attendant landscaping and trees, etc.), which often represents a substantial proportion of lot impervious cover—is governed by Article 10.01 of the Colchester Zoning Regulations (Development Standards, Off-Street Parking, Loading, and Circulation).

Colchester's Subdivision Regulations govern the preparation and review of minor and major subdivision plats, but generally refer to technical standards contained within the Zoning Regulations or the Public Works Specifications and Standards for areas of practice that impact stormwater management.

Several other articles within Colchester's Zoning Regulations have substantial impacts on overall stormwater management within the Town:

Article 6.03 (Flood Plain District FP) controls and substantially limits land use activities within areas adjacent to Colchester's major watercourses and water bodies, specifically within areas defined as 100-year floodplains.

Article 7.03 (Shore Land District SD) creates an overlay district including all lands within 500 feet from the mean watermark of Colchester Pond, Winooski River, Lamoille River, and Lake Champlain. Within this overlay district, additional standards are applied to protect existing vegetation, to prevent erosion and preserve water quality, and to regulate development and appearance of the shorelines.

Article 7.04.C, Surface Water Buffer Standards ("Stream Buffers") applies to "all land within eight-five feet horizontal distance of the center of the main channel of Allen Brook, Indian Brook, Malletts Creek, Pond Brook and Sunderland Brook and from the center of all tributaries of the above named streams and all other minor streams". The ordinance limits new uses and encroachments within the buffer area.

Article 7.04.D, Wetland Buffer Standards, is an overlay district that applies to Class I and Class II wetlands, as well as to land within 50 feet of any Class I or II wetland. These standards essentially require that land within the overlay district be left in an untouched, naturally vegetated condition unless a Conditional Use Determination is obtained from the State of Vermont and/or the Army Corps of Engineers.

4.4 Existing Program Costs

Stormwater operation, and maintenance funds have been specifically tracked within the general fund for several years, however administrative time has not. A reasonable estimate for administrative time is approximately $82,000 (consisting of Director 15%; Town Engineer 30%; Operations Manager 30%) for FY 2014. Table 4.2 shows the proposed stormwater budget for FY14 and budget information from the previous six fiscal years. The stormwater budget has generally increased over the last seven years at an average rate of 3.6%.

The Stormwater program budget pays for the operational and maintenance costs for all of the stormwater efforts that are described in the previous section. There is no staff person fully dedicated to the stormwater program in Colchester; instead the budget represents a fair apportionment of the general fund resources that are used to meet the Town's stormwater obligations.

The Town has been very proactive in addressing stormwater capital improvements over the last decade and making use of available outside funding sources. Although there is no capital projects related to stormwater planned for the near future, it is reasonable to expect that capital projects will be necessary to maintain existing infrastructure and to meet future permit requirements, especially related to the impaired watersheds and flow restoration plans.

Table 4.2
General Fund Stormwater Budget

Account	Actual ($)					Budget ($)	Proposed ($)
	FY08	FY09	FY10	FY11	FY12	FY13	FY14
ADMINISTRATION	72,160	73,800	75,440	77,080	78,780	80,360	82,000
MAINTENANCE SALARIES	69,766	72,452	73,953	73,390	77,930	79,808	82,195
OVERTIME	617	415	2,437	736	2,568	2,000	2,060
HEALTH INS	9,147	10,768	12,785	13,739	14,080	15,255	17,335
DENTAL INS	716	686	544	433	500	711	678
LIFE/DIS	1,113	1,157	1,185	1,187	1,202	1,263	1,263
INSURANCE	2,622	2,648	2,772	3,490	2,706	2,973	2,574
SOCIAL SECURITY	5,257	5,631	5,704	5,809	5,892	6,105	6,445
RETIREMENT	4,724	4,902	5,013	4,973	5,280	5,413	5,575
UNEMPLOYMENT	1,049	626	1,789	877	1,025	1,528	1,413
WORKER'S COMPENSATION	2,532	2,473	3,582	3,157	3,840	3,722	4,246
UNIFORMS	0	295	638	696	905	1,085	1,085
LEGAL	0	0	0	875	0	500	500
CATCH BASINS	3,339	4,300	5,176	2,756	4,136	4,250	4,250
SWEEPER (1986)	6,943	1,481	2,248	1,474	811	2,500	2,500
SWEEPER (2007)	0	843	2,880	3,125	1,735	2,500	2,500
WATER FOR SWEEPER	0	0	0	0	452	0	0
STORMWATER PUMPS	713	8,794	7,642	7,998	998	785	785
STORMWATER PERMITTING	3,126	5,465	4,035	4,289	4,551	5,200	5,200
TREATMENT STRUCTURES	1,560	540	864	2,026	1,820	2,880	2,880
WALL TOOLS & EQUIPMENT	28	57	32	0	0	100	100
CULVERTS	6,234	3,094	3,549	1,391	6,838	5,000	5,000
GASOLINE	0	0	2,563	5,126	5,754	6,976	7,200
MACHINERY & EQUIPMENT	0	0	0	116	11	0	0
PUBLIC EDUC./OUTREACH	5,685	5,012	5,019	5,055	5,000	5,000	5,000
WATER QUALITY TESTING	4,124	6,091	6,736	5,722	6,323	5,727	5,727
MISC BENEFITS	0	0	12	0	12	0	0
MISCELLANEOUS	0	0	0	452	500	0	0
Total Stormwater Budget	**201,455**	**211,530**	**226,598**	**225,972**	**233,649**	**241,641**	**248,511**
Yearly % Increase		5.0	7.1	-0.03	3.3	3.4	2.8
						Average Yearly % Increase:	**3.6**

5. PROJECTED PROGRAM ELEMENTS

5.1 Administration and Operation

In developing a projected stormwater management program the existing public works services and regulatory programs were considered as a starting point. Anticipated additional regulatory requirements were also analyzed to determine their potential impact on the stormwater management program. Future capital planning needs were projected to make sure that stormwater infrastructure can be maintained in the future at the same level as it has in the past.

The Town has tracked its stormwater efforts over the last several years both through the budget process and MS4 permit annual reporting. Colchester's MS4 program not only meets permit requirements, but recognizes a community responsibility for stormwater quality. Operations and maintenance responsibilities in the stormwater program are expected to continue at the current level except as may be necessary to meet future regulatory requirements as more fully described below.

Currently there is no one staff person assigned to manage and administer stormwater related activities for the Town. Other Chittenden County communities including Burlington, South Burlington, and Essex do have staff assigned specifically to their community's stormwater program. Having a dedicated staff person responsible for the stormwater program would facilitate this work as future regulatory requirements increase. These activities and duties could include:

- Developing budgets and pursuing outside funding
- Developing capital planning priorities and estimated costs
- Managing capital projects
- Supervising stormwater maintenance activities
- Coordinating and implementing new MS4 permit efforts
- Tracking measurable goals for the stormwater management plan
- Responding to the public regarding stormwater concerns
- Reviewing local stormwater permits and inspecting job sites
- Coordinating the IDDE program
- Updating inventories and mapping
- Outfall inspection
- Public education and outreach
- Encouraging and coordinating public participation
- Annual Reporting

5.2 Changing Regulatory Requirements

Colchester's stormwater management program must be prepared to adjust to a changing landscape of permit requirements. It is anticipated that stormwater regulations will change substantially over the next several years with the recent adoption of a new MS4 permit, anticipated action by the Vermont Legislature and the soon to be re-issued Lake Champlain Phosphorus TMDL. Each of these impacts is described in more detail below.

5.2.1 New MS4 Permit

Vermont's latest MS4 permit was issued on December 5, 2012. This MS4 permit is the second MS4 General Permit issued by the State of Vermont. The first MS4 permit was issued in 2003 and amended in 2004. The most significant change in the 2012 MS4 permit is the requirement for municipalities to develop Flow Restoration Plans (FRPs) to implement the TMDLs developed for stormwater-impaired watersheds. The purpose of the FRPs is to identify a suite of stormwater treatment practices (including retrofits to existing practices where appropriate) that will be sufficient to achieve the established flow targets for each of the stormwater-impaired streams, with the assumption that aquatic life will recover if the flow targets are achieved.

The issuance of the MS4 permit has direct implications for stormwater management in Colchester, especially with regard to the implementation of FRPs for Morehouse Brook and Sunderland Brook. These FRPs must be developed within three years and must include the following elements:

- Identification of the required controls
- Design and construction schedule
- A financial plan
- A regulatory analysis
- Identification of regulatory assistance
- Identification of any third party implementation

As part of the FRPs, the Town will need to estimate any associated reductions in phosphorus loading that are expected to occur as a result of implementation measures taken to meet the flow reduction targets. The MS4 permit requires that the FRP implementation schedule provide for completion of the necessary BMPs as soon as possible, but within 20 years of the effective date of the permit.

In addition to the requirements related to FRP development, the 2012 MS4 permit requires the Town of Colchester to complete the following:

- Submit a revised Stormwater Management Plan (SWMP) within 180 days of the effective date of the permit.

- Implement, or otherwise fund, a flow and precipitation monitoring program in the Morehouse Brook and Sunderland Brook watersheds.

- Develop a program to identify opportunities for and provide technical assistance to landowners seeking to implement low impact BMPs, such as maximizing disconnection, maximizing infiltration of stormwater runoff, preventing and eliminating soil erosion, and preventing and eliminating the delivery of pollutants to stormwater conveyances, within two years after the issuance of an authorization as a regulated small MS4.

- Review riparian buffer and stream fluvial geomorphological information developed by DEC as part of preparation of the stormwater TMDLs, and then adopt legal authorities or strategies to protect and regulate development in the stream corridor, within two years after the issuance of an authorization as a regulated small MS4.

- Assess whether changes can be made to local policies, regulations and ordinances to support low impact design options (e.g., green roofs, infiltration practices such as rain gardens, curb extension, planter gardens, porous and pervious pavements, and other designs to manage stormwater using landscaping and structured or augmented soils, water harvesting devices such as rain barrels and cisterns and the use of stormwater for non-potable uses).

- Assess whether changes can be made to current street design and parking lot guidelines and other local requirements that affect the creation of impervious surfaces to support low impact design options.

- Prohibit the use of any phosphorus containing fertilizer at all facilities under municipal control, including public parks and recreational fields, unless a current soil test demonstrates the need.

A review of these requirements followed by an evaluation of whether Colchester's ordinances and specifications currently meet the requirements can be found in Section 10.3. Recommended changes to the Town's regulations in order to better conform to the new MS4 program are also provided.

5.2.2 Residual Designation Authority and Expired Discharge Permits

Section 402(p) of the Clean Water Act (CWA) gives state agencies or the US EPA the authority to residually designate and require NPDES permit coverage for any stormwater discharge that it determines "contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States." This provision spawned a 2003 lawsuit, where the Conservation Law Foundation (CLF) petitioned to require stormwater discharges to any receiving water considered to be "stormwater impaired" to obtain a NPDES permit using the CWA's residual designation authority (RDA), since these discharges contribute to violations of state water quality standards. In June 2009, following a protracted legal process, DEC notified about 400 property owners in stormwater impaired watersheds in Chittenden County that they would be required to obtain NPDES permits. DEC has confirmed that none of the affected property owners are located in the Town of Colchester.

Currently, expired stormwater discharge permits in stormwater impaired waters cannot be renewed under a General Permit unless they have been residually designated. Based on conversations with DEC staff and a review of permit data available on the DEC website (http://anrmaps.vermont.gov/websites/anra/), it appears that there are very few (less than eight) expired permits in the Town of Colchester. Further, according to DEC staff (Jim Pease), the Town is not listed as a co-permittee for any of the expired permits. As such, any future effort to renew expired stormwater discharge permits should not have major implications for the Town.

5.2.3 Act 138 - Water Quality Remediation, Implementation & Funding Report

In 2012, the Vermont Legislature passed Act 138 which directed DEC to prepare a Water Quality Remediation, Implementation, and Funding Report. The report, submitted to the Legislature in January 2013, investigates options for meeting the State's clean water investment needs across a variety of sectors, including stormwater management. The report also considers whether the State should establish a shore land program to restore and protect lake health.

The funding options and shore land protection elements of this report both have implications for the Town of Colchester, discussed briefly below. At the time of this report, both issues were being actively discussed in the Vermont Legislature. It is unclear whether the Legislature will take action on either proposal in 2013.

Water Quality Funding - Part I of the Act 138 report is focused on the gap between current spending and what is needed to achieve Vermont's water quality goals. The report estimates that restoring Vermont's waters will require an additional investment of $156M per year for ten years, beyond current funding levels.

These funding needs were grouped into broad categories: municipal nonpoint source pollution; agricultural and forestry non point source pollution; river, floodplain, and lake shore land management; and, municipal infrastructure and regulated stormwater programs. The report also evaluates a suite of potential funding mechanisms, including both new sources of revenue and modifications to existing programs to improve incentives to achieve the State's clean water goals. Among the options being considered, is the creation of a statewide water quality "utility" or "trust fund" that would be funded via a per-parcel fee assessed to all lands in Vermont.

Shore Land Protection - Part II of the Act 138 report presents recommendations for strengthening shore land management in Vermont. Draft legislation (H.223) was introduced in February 2013. This bill would require DEC to establish minimum waterfront protection standards for shore land areas within the lakeside zone (defined as being within 100 feet of a lake). These standards would include buffer/vegetative management criteria, as well as specific requirements for the construction, reconstruction, conversion, or enlargement of any structure within the lakeside zone.

5.2.4 Lake Champlain Phosphorus TMDL

In early 2011, EPA withdrew their 2002 approval of the Vermont portion of the Lake Champlain TMDL for phosphorus. In reversing their decision, EPA noted that two elements of the TMDL did not comply with EPA regulations and guidance. Specifically, EPA found that the TMDL did not provide an adequate "margin of safety" to account for uncertainty in the true capacity of the lake to accommodate phosphorus pollution, and did not offer "reasonable assurances" that the called-for reductions in non-point source pollution would actually be achieved.

EPA noted that the 2002 TMDL allowed most of Vermont's wastewater treatment facilities to have effluent phosphorus concentrations "well above levels that would otherwise be required in the absence of nonpoint source load reductions." This statement suggests that additional phosphorus removal requirements for wastewater treatment facilities are likely under consideration. In addition, EPA has indicated their intention to treat MS4s as "point sources" in the revised TMDL, meaning MS4s would be assigned a specific phosphorus waste load allocation (WLA).

Other changes that EPA may be contemplating are less clear, but could involve:

- Requiring more communities to obtain MS4 (municipal separate storm sewer system) permit coverage. Currently MS4 designations are confined to the more densely populated areas of Chittenden County, with Rutland City and St. Albans City and Town being added with the new MS4 permit signed in December 2012.

- Expanding the use of "residual designation authority" to require larger developed tracts to install stormwater management systems and obtain permit coverage.

- Requiring agricultural operations to obtain additional permit coverage beyond the medium-farm or large-farm operation (MFO or LFO) permits currently issued by the Agency of Agriculture.

At a February 2013 hearing on the TMDL, the EPA stated that they planned to release a draft of the revised Lake Champlain TMDL for public comment in mid-2013 and intend to have the final TMDL in place in early 2014.

6. PROJECTED PROGRAM COSTS

In the face of growing stormwater-related water quality problems and regulatory burdens, the Town's current activities will not be adequate to achieve its vision of maintaining a healthy, bustling shoreline consistent with the vision expressed in the Heritage Project and by stakeholders involved throughout the study. An expanded stormwater management program will require increased spending.

In this section of the report, we anticipated three different levels of potential program development and thus three potential levels of increased spending for an FY15 (future) budget. The scenarios are approximations that are intended to show different funding levels that the Town could reasonable expect in order to meet ongoing stormwater needs and comply with future permit requirements.

Budget Scenario 1 maintains the Town's existing stormwater funding level with an annual increase for inflation.

Budget Scenario 2 represents the expected effort to meet the new MS4 permit requirements (in particular the Flow Restoration Plans), and adds an additional public works staff person dedicated to administering the stormwater program.

Budget Scenario 3 anticipates the need for additional resources to improve stormwater infrastructure throughout the Town and improve stream water quality to address phosphorus and sediment reductions in Malletts Bay and Lake Champlain.

The next section of the report describes how each budget scenario was developed.

6.1 Budget Scenario 1

This first budget scenario represents a continuation of the existing stormwater program with no additional capital cost for FY15. It is the basic starting point from which a future program can be developed and is a useful comparison when developing a fee structure for the stormwater program. This scenario assumes a 5% annual increase to the stormwater operations and maintenance budget. The estimated stormwater program budget for Scenario 1 in FY15 is **$260,000**. A detailed listing of the budget components included in this total can be found in Table 6.4 - Proposed Annual Stormwater Program Budgets found at the end of this section.

6.2 Budget Scenario 2

For this budget scenario the FY15 budget projections in Scenario 1 were used as a starting point. This scenario includes the costs to meet the requirements of the MS4 permit and flow restoration plans. This scenario budgets for a full-time staff person dedicated to the stormwater program and administration of the new MS4 permit. Also included in this budget is the estimated capital cost to meet Colchester's share for achieving the goals of the flow restoration plans for Sunderland Brook and Morehouse Brook.

The flow restoration plan costs were estimated by the DEC using their Spatial Analysis and Watershed Sensitivity Analysis tool and estimates of BMP costs. The costs associated with this scenario are more fully described in Table 6.1. The flow restoration plans must be fully implemented within 20 years of the effective date of the MS4 permit (2033 based on the current permit, which is under appeal); however it is highly unlikely that the State will allow Colchester 20 years to fully implement the plans.

For this analysis it was assumed that 2/3 of the costs associated with the FRP will be spent within first five (5) year permit cycle. The FY15 budget for this scenario includes the annual cost to implement Colchester's share of the FRP. It also includes an estimate of Colchester's share of the flow monitoring costs as required in the permit. The total estimated stormwater program budget for Scenario 2 in FY15 is **$410,000**. A detailed listing of the budget components included in this total can be found in Table 6.4 - Proposed Annual Stormwater Program Budgets found at the end of this section.

Table 6.1
MS4 Permit Cost Estimate for FY15

	Total BMP Cost Estimate[1]	% Impervious in Colchester[1]	5-year Capital Cost[2]	Flow Monitoring (FY15)	FY15 Cost
Sunderland Brook	$518,107	36.62	$161,000	$3,700	$36,000
Morehouse Brook	$2,236,893	5.66	$108,000	$600	$22,000
Stormwater Administrator		**Rate**	**Benefits (50%)**	**Total Hourly**	
		$30	$15	$45	$93,600
				Total FY15 MS4 Cost: Use	**$150,000**

Notes:
1. BMP cost estimates and impervious area percentage provided by the DEC Stormwater Section.
2. Escalated at 5% per year for five years.

6.3 Budget Scenario 3

This final budget scenario builds on the costs developed for the previous budgets and includes additional costs for town-wide water quality related capital projects. This scenario continues a proactive infrastructure repair program into the future and adds stream geomorphic improvements to the stormwater program. The stream geomorphic improvements are intended to address water quality concerns in all streams in Colchester and in Lake Champlain beyond those requirements in the MS4 permit. These costs are included in the scenario as a possible future concern for the Town.

The projection of town-wide capital costs for stormwater projects makes a distinction between projects that are related to water quality and projects related solely to drainage improvement. Only projects that were related to stormwater quality were considered in this budget projection. Table 6.2 is a summary of all of the water quality related projects from Section 4.1.5 that were used in the capital projection for this scenario.

Table 6.2
Projected Capital Budget

Project Date	Location	Project Cost[1]
FY05	Canyon Road	$219,212
FY06	Shore Acres	$88,978
FY07	Mallets Bay Ave. #1	$88,118
FY07	Mallets Bay Ave. #2	$47,598
FY07	Village Drive	$16,813
FY08	East Lakeshore Dr	$74,012
FY09	Fort Ethan Allen	$573,739
FY13	East Lakeshore Dr	$28,650
FY14	Porters Point Road	$68,822
	Total	**$1,206,000**
	Annual Average	**$120,000**

Note:

1. The project cost includes engineering and construction.

Stream geomorphic assessments have been completed for Colchester's streams and could rightfully be addressed by a stormwater utility to improve water quality. These improvements are particularly important for all streams in Colchester when considering the impending Lake Champlain TMDL and the need for continued reduction of phosphorus and sediment into the lake.

It should also be noted that the impaired stream TMDL requirements in the MS4 is based on flow restoration plans assuming that the aquatic life impairment will improve by meeting attainment flows. If the aquatic life impairment in a stream does not sufficiently respond to flow restoration, further geomorphic improvements may be necessary to meet water quality standards. However, it is important to note that there is no current requirement for the Town to address the stream geomorphic improvements.

Three types of projects have been identified for improving water quality degradation caused by fluvial geomorphic instability. They include:

- Culvert replacement due to failed or undersized culverts
- Stream channel improvements to restore natural channel design or replant riparian areas
- Stormwater Best Management Practices to mitigate impervious surfaces discharging to problematic outfalls

Table 6.3 lists the stream geomorphic improvements based on assessments completed for streams in Colchester. Costs for the improvements have been approximated based on standard estimates as noted in the table. The total estimated cost for stream geomorphic improvements for those streams assessed in Colchester is $2.6M.

Table 6.3
Fluvial Geomorphic Improvements[1]

Watershed	Culvert Replacement		Channel Restoration		Stormwater Management BMPs[2]		Total Costs
	Description	Cost	Description	Cost[3]	Description	Cost[4]	
Morehouse Brook	--	--	800 ft unstable banks	$60,000	9 acres	Included in FRP	$60,000
Pond Brook	East Road Culvert 60'x6' box	$60,000	2500 ft straightened channel	$100,000	8 acres	$621,000	$681,000
Smith Creek	--	--	950 ft straightened channel	$40,000	19.5 acres	$1,513,000	$1,553,000
Sunderland Brook	--	--	7,000 ft straightened channel	$280,000	29 acres	Included in FRP	$280,000
Indian Brook	--	--	2,500 ft un-vegetated banks	$12,500	--	--	$12,500
Winooski River	--	--	3,000 ft un-vegetated banks	$15,000	--	--	$15,000
						Total Cost:	**$2,601,500**

Notes:

1. Summary from Stream Geomorphic Assessment reports.
2. Impervious area contribution is an approximation and does not include area covered under existing stormwater permits.
3. Channel restoration $40-$70/LF. Riparian bank replanting $5/LF of bank.
4. The per acre cost for implementing stormwater management BMPs (including land costs) is estimated at $77,600/impervious acre. These practices include flow disconnection and attenuation. This unit cost has been used by the DEC for estimating flow restoration costs in impaired waters (Emily Schelley, DEC)

This budget scenario includes a rough approximation of the financial resources necessary for continued repair of stormwater infrastructure and implementation of stream geomorphic improvements to address town-wide water quality. It may be an overestimate, understanding that the Town has been very active over the last decade assessing and repairing infrastructure that was likely neglected since its original installation. This estimate also does not account for grant funding that has been used to fund projects in the past.

Budget Scenario 3 builds on the costs developed in Scenario 2 and adds an additional $190,000 per year to establish a reserve fund for town-wide improvements to address stormwater quality town-wide. The total estimated budget for Scenario 3 in FY15 is **$600,000**. A detailed listing of the budget components included in this total can be found in Table 6.4 - Proposed Annual Stormwater Program Budgets found at the end of this section.

6.4 Budget Scenario Comparisons

Table 6.4 lists the three proposed budget scenarios based on the line items in the Town's existing stormwater budget.

Table 6.4
Proposed Annual Stormwater Program Budgets

Account	Budget Scenario 1	Budget Scenario 2	Budget Scenario 3
SALARIES AND BENEFITS	$215,800	$309,400	$309,400
FUEL	$7,500	$7,500	$7,500
SHARED EQUIPMENT COSTS	$6,500	$6,500	$6,500
WALL TOOLS & EQUIPMENT	$200	$200	$200
STORMWATER PERMITTING	$5,500	$5,500	$5,500
CATCH BASINS	$4,500	$4,500	$4,500
CULVERTS	$5,500	$5,500	$5,500
TREATMENT STRUCTURES	$3,500	$3,500	$3,500
PUBLIC EDUCATION/OUTREACH	$5,000	$5,000	$5,000
WATER QUALITY TESTING	$6,000	$6,000	$6,000
FLOW MONITORING	--	$4,300	$4,300
IMPAIRED WATERSHED COSTS	--	$53,700	$53,700
CAPITAL PROJECTS	--	--	$190,000
Total Stormwater Budget	**$260,000**	**$410,000**	**$600,000**
% Increase Above Existing	5%	65%	140%

7. STORMWATER FUNDING ALTERNATIVES

There are several alternatives for funding a municipal stormwater program. The existing stormwater program is funded through general fund taxes and federal and state grants. Funding a small stormwater program through the general fund with property taxes is typical. However, even in a town the size of Colchester, stormwater programs are evolving from simply highway maintenance functions into water quality protection and regulatory functions. Financing stormwater programs as they expand to consider water quality can be challenging and communities are beginning to look at new creative ways to adequately (and equitably) fund their stormwater needs.

Colchester's economy and identity are defined in part by the Town's water resources. This is demonstrated by the recent Heritage Project, which seeks to provide a cohesive identity for the community that includes establishing Colchester as a premier recreation area focused around water resources, principally Malletts Bay and Lake Champlain. There is a cost to protect these valued water resources and provide safe public access. A fee for service, such as a stormwater utility, recognizes these costs and provides long-term stable revenue to protect water resources into the future.

While this study focuses on a town-wide fee structure, there are other opportunities that Colchester can consider to raise revenue for funding water quality programs. In addition to relying on property taxes, additional fees for services could be established such as access to beaches, boat slips and moorings and the use of public lands. These fees, similar to a stormwater utility, are targeted at paying for a service provided by the community.

7.1 Utility Models

For most communities, the only way to fully meet stormwater management needs is to establish a long-term, sustainable funding source that is dedicated to stormwater management. A stormwater utility is one mechanism for establishing such a funding stream. The utility raises capital that can be used to maintain existing stormwater infrastructure and develop and implement new, enhanced management practices.

Funding models for stormwater utilities generally fall into one of four categories: Flat fee, tiered fee, variable fee, and correlative fee. Table 7.1 summarizes the four funding models, their advantages and disadvantages, and whether each model could reasonably be applied in Colchester.

Table 7.1
Utility Funding Models

Model	Description	Advantages	Disadvantages	Suitability in Colchester
Flat Fee	Every property owner pays the same amount monthly or yearly.	Easy to implement and manage No need to measure specific properties or classify impervious surface Every owner pays same amount	Does not account for actual impervious surface on properties Few chances to work in incentives/credits for improving stormwater management on properties	Single family homes/duplexes
Tiered Fee	Property owners pay set fees that are based on specific types of building sizes and classifications.	More equitable dispersal of costs related to stormwater management Allows more detailed and accurate representation of fee basis More opportunities to offer credits/incentives for improving stormwater management	More detailed analysis of impervious area on properties needed Somewhat increased implementation and management complexity	Single family homes/duplexes Multi-unit residential developments
Variable Fee	Fees are assessed by applying Equivalent Residential Units (ERUs) to assess utility fees—the ERU is usually an average of the amount of impervious surface on residential properties in a jurisdiction.	Allows accurate and individualized assessment of fees based on impervious surface Most equitable dispersal of costs related to stormwater management On-site stormwater management efforts can be recognized by the utility through reductions in utility fees Similar to existing billing structure for potable water customers in Colchester	More detailed analysis of impervious area on properties needed Increased implementation and management complexity Determining what constitutes an ERU can be a complex undertaking	Residential properties (similar to Flat or Tiered Fee for single-family homes/ duplexes) Commercial, multi-use, and institutional properties
Correlative Fee	Stormwater utility fee is added and correlated to a fee or tax that already exists.	Easy to implement and manage Reduced need for administrative oversight or site visits Can be correlated to existing rate structures, such as water service or property value Often utilized during initial stormwater utility implementation, and discontinued once more accurate fee basis is in place	Fees have no connection to the amount of impervious surface on a given property Aside from property tax, no existing fee structure encompasses all Colchester properties Does not adequately correlate to the service provided, which opens it to legal challenges	Limited applicability in Colchester

Each of these funding models is defined below, and relevant case examples are provided.

7.1.1 Flat Fee

Under a *flat fee* model, every residence and property owner pays the same amount monthly or yearly. This model is very easy to manage, since there is no need to go out and measure specific properties. Every property owner pays the same amount, whether they own a large apartment complex or a small family home. The disadvantage of this method is that not every property has the same amount of impervious surface, and there are few chances to receive credit for improving stormwater treatment or retention on the property. Examples of stormwater utilities that utilize a flat fee funding model include:

City of Reading, Massachusetts

Reading, Massachusetts has a population of around 24,000 people and they have implemented a Stormwater Enterprise Fund. The fund was developed in 2008 which was the deadline for the town to meet its National Pollutant Discharge Elimination System (NPDES) Phase II permit. This is a flat fee for all residential properties (single family and duplexes). The fee is $10 quarterly or $40 per year. All other properties pay a variable fee of about $40/ERU (equivalent residential unit) per year (see Section 7.1.3 for more on variable fees).

City of Newton, Massachusetts

Newton, Massachusetts has a population of 85,000 and also has a flat fee system for residential properties which was established in 2006. The fee for residential properties is $6.25 quarterly, or $25 per year. All other properties pay a variable fee of about $40/ERU quarterly or $150/ERU annually. The City of Newton uses these fees to maintain stormwater infrastructure and protect natural resources such as Crystal Lake, the Charles River, and ponds in the City. Homeowners with flooding issues can obtain technical assistance, and educational programs have been developed for residents and schools.

7.1.2 Tiered Fee

Tiered fees are set fees for specific types of building sizes and classifications. This fee model starts to account for the varying impacts to stormwater that different properties uses may have. Tiered fees somewhat increase the complexity of management because more detailed analysis of buildings and properties is needed. This added complexity, however, allows for more detailed and more accurate representation of stormwater impact to be reflected in the fee.

City of South Burlington, Vermont

The City of South Burlington, Vermont adopted a tiered fee system in 2003. South Burlington has a population of about 15,000, making its population a close comparison to that of the Town of Colchester. The tiered fee is based on the average square feet of impervious surface (such as rooftops, driveways, and walkways) for a single-family home, which for the City of South Burlington is about 2,700 square feet. Fees were calculated using a careful analysis of impervious surface area on properties throughout South Burlington and are billed quarterly. The annual cost is $71.28 for single-family homes, $35.64 for duplexes, and $23.76 for triplexes. The city also assesses a variable fee for non-residential buildings. Credit against the stormwater utility fee is also available to all non-single family residential properties.

City of Lewiston, Maine

Another tiered fee adopted in 2007 by the City of Lewiston, Maine (population of about 41,000) has a slight variation for non-residential properties. Single family and duplex residences are charged $40 and $60 respectively but all other properties use an ERU of 2,900 square feet with a base fee of $40, then an additional $0.045 per square foot is added on for every square foot over the ERU. This more complex model needs more detailed analysis of impervious area on properties, but provides a more equitable dispersal of the costs related to stormwater management.

7.1.3 Variable Fees

Variable fees are assessed by applying Equivalent Residential Units (ERUs) to assess utility fees—in much the same way that potable water customers in Colchester are billed based on their individual water use. The ERU is an average of the amount of impervious surface on residential properties in a jurisdiction, usually determined by random sampling. Properties with larger impervious surface areas are assessed based on how many ERUs worth of impervious surface are present on each property. This model allows for an accurate and individualized assessment of fees based upon the actual amount of impervious surface on a given property. It also allows on-site stormwater management efforts implemented by property owners to be recognized by the utility through reductions in the property owner's utility fees.

City of Pittsburg, Kansas

The City of Pittsburg, Kansas, which has a population of around 20,000, implemented a stormwater utility in 2003. The City has implemented a variable stormwater utility fee based on an ERU of about 3,100 square feet. Every residence pays a fixed rate of $3.56 per residential unit per month, while the commercial stormwater fee is based on the total amount of impervious area on each property. Commercial rates are based on the number of ERUs calculated by dividing the customer's total impervious area by the ERU.

Douglas County, Washington

Douglas County, Washington implemented a stormwater utility in 1998. The County's variable fee for stormwater management was developed similarly to Pittsburg, though the fee in Douglas County's program is referred to as an Equivalent Service Unit. Currently, the ERU equivalent in square feet of impervious area is 2,750 square feet, and the fee per ERU is $40 annually. Single family and duplexes are charged as one ERU, and triplexes and fourplexes are considered to be two ERUs. For all other properties, the total square footage of impervious area is divided by the ERU value of 2,750 square feet to determine the number of ERUs for billing purposes. In addition to the fees charged to individual properties, Douglas County and the City of East Wenatchee pay fees to the utility for their impervious surfaces, including county/town streets, roads, trails, and parking lots. Douglas County also has a discount/credit system in place. Low income seniors and people with disabilities may be eligible for discounts, and stormwater facilities designed to reduce stormwater volume may be eligible to receive stormwater utility credit.

7.1.4 Correlative Fees

Correlative Fees reduce the need for administrative oversight or site visits by adding the stormwater utility fee to a fee or tax that already exists. In this case, the fee is correlative to an existing fee structure or tax, *not* to a given square footage of impervious area. For example, the stormwater utility fee might be based on metered water use recorded at each property, or upon the assessed value of the property. Many governments choose this model during the initial implementation of a stormwater utility, while measurements of impervious surfaces and a more accurate methodology for determining ERUs are completed. Colchester currently uses this method, as their stormwater program is funded on the tax base.

City of Hood River, Oregon

The City of Hood River, Oregon, has a population of about 7,000 and is located within the Columbia River Gorge National Scenic Area. The City adopted a correlative fee in 2006 as an interim solution while the city engineer performed a rate analysis and prepared to administer a full scale utility. The fee was based on water meter size serving a property, and was added to the water and sewer bill. In 2007, the City established a variable fee system, which has been active since.

Village of Rantoul, Illinois

The Village of Rantoul, Illinois has a population about 14,000. The Village implemented a storm drainage tax in 2001 to fund their maintenance needs. Tax rates are based on land use type, where residential properties have a flat tax per property ($41.17 annually in 2010), and the tax for non-residential properties is based on the parcel size and land use.

Revenue from the tax pays for the maintenance and repair of the existing storm sewer systems, as well as Village's Street Sweeping and Leaf Pickup programs, which together account for about 38% of the utility's budget. The remaining funds are used for storm water project related expenses and the repayment of storm water bonds. While it is difficult to implement a new tax, it may remove legal troubles for the utility in the future.

7.1.5 Hybrid Fee Model

A hybrid model that employs a flat or tiered fee structures for residential properties, and a variable fee structure for commercial, multi-use, and institutional properties may be most suitable for Colchester. The flat or tiered fee for residential properties could be based on an equivalent average of the amount of impervious surface on single-family residential properties in Town (ERU). Commercial, multi-use, institutional and other properties (including roadways) would be assigned a pro-rated ERU value based on the ratio of impervious surface divided by the amount of impervious surface in one ERU, rounded to the nearest whole number.

Charging residential properties a simple flat or tiered fee would minimize the administrative burden of implementing the program, but would also limit opportunities to offer incentives or credits for on-lot stormwater management improvements completed by these property owners. Conversely, employing a variable fee structure would provide flexibility to incentivize on-property stormwater management improvements on commercial, institutional, and multi-use properties that tend to involve more significant amounts of impervious surfaces.

If the Town chooses to more strongly incentivize stormwater management actions on individual properties, and since the majority of development in Colchester is single-family residential development, a variable fee could be assessed to all properties and coupled with incentives or credits that are accessible to all land uses. The potential for accomplishing greater gains in on-lot stormwater management would be much higher if credits or incentives were offered to residential property owners, but this approach would also greatly increase the need for administration and accurate tracking of on-lot stormwater management improvement implementation and performance. The use of incentives (stormwater credits) generally doesn't have a direct cost correlation between the amount of the credit and a corresponding reduction in the stormwater budget. It is more generally a financial incentive to get property owners to install and maintain reasonable stormwater improvements (e.g. rain barrels, rain gardens and other low impact design elements).

7.2 Geographic Area

The geographic area included in a stormwater utility is an important consideration. Within the Town of Colchester properties are impacted differently by the various stormwater regulations. For instance, the entire Town is not within the jurisdictional boundary of the MS4 permit, and similarly the impaired watersheds do not encompass the entire Town. The Town itself may decide that certain storm sewer systems have a higher priority due their proximity to a public beach or lakeside community.

In some communities the geographic area included in a stormwater utility is bounded by the service of other utilities such as water or wastewater in order to simplify billing. However, when developing a fee structure for a community it is important to balance complexity with equity. A fee system that has different fees for different priority locations within the community may be perceived as more equitable, but if the fee system is too complex to easily understand and implement, it will fail.

In Colchester a town-wide fee is justified. Although stormwater permit jurisdictions may apply to particular watersheds or population densities, the water quality benefits are realized by the entire community. Furthermore, it is only practical to implement the required maintenance practices and local ordinances on a town-wide basis.

7.3 Impervious Area Analysis

Impervious surface maps for the Town of Colchester were developed in 2009. This mapping is useful for estimating a stormwater fee based on impervious area. Although the impervious area data has been updated, it still requires additional analysis before being applied to a final billing system for stormwater fees.

The 2009 impervious surface data and maps were based on a remote-sensing land cover analysis of the 2004 Chittenden County LiDAR data by the University of Vermont Spatial Analysis Lab. Stone has updated and enhanced the data to include impervious surfaces constructed between 2004 and 2010 and made corrections to the earlier data as needed (referred to herein as the "enhanced layer"). The total acreage of impervious surface is 2,189 acres, or roughly 10% of the overall Town area (excluding water bodies).

Stone staff classified all impervious surfaces in the Town into the following usage/ownership categories: commercial; institutional; local/public; state/federal; residential (including many subclasses); and unknown. The data was further classified by type of impervious surface: rooftop, parking lot, road or other. The 2009 impervious surface data did not include as detailed a breakdown of categories and surface types. The data was classified only as building, road, or other.

The impervious surface data was updated by incorporating the Lake Champlain Basin Project's (LCBP) impervious surface (2008) database and updated building footprints and parking lots compiled by Stone. The 2008 LCBP impervious surface was derived from the 2008 NAIP imagery. The building footprints and parking lot layers originally created in 2009 were updated by hand-digitizing any new development using Bing Imagery (2010).

Finally, a manual review of the updated impervious surface was conducted and compared against the Bing Imagery (2010). During the review, any areas not captured by the source layers were included in the impervious surface layer by hand-digitizing. Any areas found not to be impervious were removed from the layer.

The impervious surface areas were categorized as:

- Commercial
- Institutional
- Public
- State/Federal
- Unknown
- Residential (including subclasses)
  - Single Family
  - Multi-Family
  - Mobile Home
  - Private Road

The most recent parcel boundaries (2010) were assigned to one of the six categories using the emergency e911 eSites (2010) and the Assessor's class and zoning data (2008). The RPC class information from the roads layer from the Vermont Agency of Transportation (2012) was used to assign a category of residential, commercial, institutional, public, or state/federal to the impervious roads surface layer. Roads that were not included in the parcel layer as right-of-way were buffered and included in the classification. The unknown category are areas of impervious surface that fell across a parcel boundary defined as undeveloped by the Assessor's data.

The type of impervious surface was also classified for the enhanced layer. The building footprints and parking lots layers were used to classify the roofs and parking lots. The roads layer and right-of-way parcels were used to classify roads. All other areas were classified as other. Anomalies in the source data are classified as "other".

As a result, the total acreage of impervious surface is now calculated to be less than the amount reported in 2009. Table 7.2 summarizes the enhanced impervious surface by the categories and type classes discussed above.

Table 7.2
Enhanced Impervious Surface Summary by Type and Category

Category/Type	Parking Lot		Road		Roof		Other[1]		Category Total	
	Acres Impervious								Acres Total	% of Total
Commercial	124.6		26.3		103.8		219.1		473.9	27.1%
Institutional	35.8		7.1		24.1		27.2		94.2	5.4%
Single Family	0.0		15.0		202.3		174.2		391.5	22.4%
Multi Family	12.0		20.3		35.0		21.5		88.7	5.0%
Mobile Home	0.0		3.4		10.2		9.1		22.8	1.3%
Residential, Private Road	0.0		46.4		0.0		0.0		46.4	2.7%
Undeveloped/ Under Development[2]	0.0		1.8		0.0		14.0		15.8	0.9%
Local/Public	29.5		330.2		16.5		52.0		428.2	24.5%
State/Federal	2.5		182.5		0.1		0.0		185.1	10.6%
Type Total (Acres and % of Total)	**204.4**	**11.7%**	**633.1**	**36.3%**	**392.0**	**22.4%**	**517.1**	**29.6%**	**1,746.6**	**100.0%**

Notes:

1. Type 'Other' includes driveways and patios.

2. The undeveloped category is from impervious surface areas that fell across a boundary of a parcel with the Assessor's class of undeveloped; a number of sites include roads with no attendant development.

The impervious surface data (described above) is based on the 2008 NAIP imagery and categorized using eSites and the Assessor's class and zoning data. While this information provides an excellent **starting point for understanding the relative distribution of different types of impervious surfaces** in the Town across usage/ownership categories, the data is not sufficiently accurate for calculating parcel-specific impervious cover. A software program calculated impervious surface by category/type.

This data was then "calibrated" by hand digitizing 10% of all parcels and adjusting the totals based on a comparison of the hand digitized results (which are assumed to be quite accurate) to the totals calculated by the software program that made the original determinations. We note that the data indicates that the average single family home has 4,100 sf of impervious surface. Based on our experience with other similar communities, we would expect that value to be 2,800 – 3,200 sf.

While the adjusted data is adequate for making general recommendations, if Colchester chooses to use impervious surface data for setting stormwater rates and billing, the entire town should be hand-digitized to provide precise calculations of impervious surface for each parcel. Some limited field verification would likely also be needed. The estimated cost for hand-digitizing the entire town is $20,000.

8. VERMONT STORMWATER FUNDING

Vermont communities are beginning to take a closer look at how they fund stormwater programs, mainly due to the requirements of stormwater regulations. Communities are required to address the water quality impacts of stormwater through the MS4 permit. The financial cost to address these requirements will only increase with the inclusion of impaired stream TMDLs and the Lake Champlain TMDL (when approved).

Until recently, most communities in Vermont have relied on general fund taxes and grants/loans from state and federal programs such as the Clean Water SRF, ARRA, and STAG funding. The cities of Burlington and South Burlington, Vermont have both implemented city-wide stormwater fees and several other Vermont communities (like Colchester) are considering stormwater fees.

A stormwater fee, like any other municipal fee, must be based on a legally defensible methodology by which customers pay in relation to the demands they impose on the municipal services. When developing a utility, it is important to distinguish this "user pays" approach from a tax. A stormwater fee is imposed on all entities that benefit from the stormwater program (including entities exempt from property taxes). The fee provides stable revenue for stormwater specific programs including administration, planning, maintenance, and capital improvements.

Tax revenue can be a challenging method for long-term financing, because stormwater management needs are in direct competition with all other important municipal services. Furthermore, properties such Saint Michael's College, the Air National Guard, and other state, federal and non-profit properties are not charged taxes even though these facilities do place demand on stormwater infrastructure

The Vermont Legislature recognized the need for long-term, stable financing for municipal stormwater services in Title 24 - Chapter 97 of the Vermont State Statutes. This Statute permits fees to be charged for stormwater services in the same manner that they are charged for water and wastewater services.

8.1 Stormwater Funding – Burlington, VT

The City of Burlington adopted a new stormwater ordinance in 2008 addressing stormwater fees, permitting, and the project review process for the entire city. Residential properties in Burlington (including single family, duplex, and triplex properties) are charged a fixed annual fee. The annual cost is $36 for a single family home, $36 for duplexes, and $43.20 for a triplex. Other properties, including all commercial or institutional properties and seasonal uses, are charged according to the parcel-specific impervious area they have. Stormwater utility fees are added to the property tax bill for billing and collection.

The city also has a stringent project review process. All projects disturbing 400 square feet of land or more are reviewed by the stormwater program, even if a city permit is not required. Fees can be offset through a credit system, but the City currently only allows this option for properties that do not pay a flat fee.

8.2 Stormwater Funding - South Burlington, VT

The City of South Burlington adopted the State's first stormwater utility in 2005. The fee structure is based on the average square feet of impervious surface (such as rooftops, driveways, and walkways) for a single-family home (which for the City of South Burlington is about 2,700 square feet). Fees were calculated using a careful analysis of impervious surface area on properties throughout South Burlington and are billed quarterly. The annual cost is $71.28 for single-family homes, $35.64 for duplexes, and $23.76 for triplexes. The city also assesses a variable fee for non-residential buildings.

Credit against the stormwater utility fee is also available in the City of South Burlington. Credits are available to all non-single family residential properties, and include:

Stormwater Treatment Practice Credit: This credit is available to properties that build and maintain Stormwater Treatment Practices (STPs) as defined in the Vermont Stormwater Management Manual.

Education Credit: This credit is available to public and private schools that include the importance of water quality and responsible stormwater management practices into their curricula.

MS4 Credit: This credit is available to municipal separate storm sewer systems that comply with the MS4 permit issued by the State of Vermont. Within (or partially within) the City of South Burlington, there are three publicly owned, non-traditional separate storm sewer systems (the University of Vermont, Burlington International Airport, and the Vermont Agency of Transportation) which are required to maintain coverage under the MS4 program. Since these entities maintain their own permit coverage, they are granted credit for their activities by the City of South Burlington's stormwater utility.

In addition, non-single family residential properties ("non-MS4 supporting entities") that use best management practices "specifically intended to reduce impacts on non-point source stormwater runoff and/or provide an on-going public benefit related to stormwater management" are also eligible to receive this credit, even if it is federally mandated. An example of a "non-MS4 supporting entity" within the City is the Champlain Water District.

9. FEE EXAMPLES

Three different fee structures have been developed for this study to determine a methodology best suited for the Town of Colchester.

- A flat fee based on the number of parcels
- A variable fee based on impervious area
- A hybrid of the two based on an impervious area equivalent units

When developing a fee structure it is important to consider the community needs. A complicated fee structure can be confusing to the public and much less acceptable. A small stormwater program in a community with a similar range of land uses, such as Colchester, does not need a complicated fee structure. The fee must also be equitable, meaning that is represents a fair apportionment of the cost of providing services related to stormwater. The most important consideration in choosing a fee structure is to balance the equity of fees between property owners and complexity of the fee structure.

9.1 Flat Fee

A flat fee is the simplest fee structure and likely the most inequitable in that it does not have a direct relationship to the service being provided. In this manner it is similar to a tax. For Colchester, a flat fee can be established for each parcel in Town including undeveloped parcels. There are 6,703 parcels in the Town of Colchester including tax exempt parcels as listed in Table 9.3. For FY15 a flat fee for the three budget scenarios is listed in Table 9.1.

Table 9.1
Flat Fee per Parcel

Budget Scenario	Revenue	Annual Rate[1]
1	$260,000	$39
2	$410,000	$61
3	$600,000	$90

Note:

1. Based on 6,703 total parcels.

9.2 Variable Fee

A stormwater utility can charge a fee based on the exact amount of impervious cover on a property. This is a common fee structure that directly relates to the service being provided. It is well understood that the amount of runoff from a property is directly related to the amount of impervious surface. While this may be the most equitable structure for charging a stormwater fee, it can also be the most complex to implement and manage.
Subtle differences in impervious area on parcels can cause significant discrepancies in stormwater bills. It is important to have precise data for impervious area, which can be costly to manage.

The total impervious area for the Town of Colchester is 1,746.6 acres (see Table 7.2). It is important to note that the impervious surface data was updated in 2010, and would need further refinement including hand digitizing in order to implement a rate based solely on impervious surface. For FY15 a variable fee for the three budget scenarios is listed in Table 9.2.

Table 9.2
Variable Fee per Acre Impervious

Budget Scenario	Revenue	Annual Rate[1]
1	$260,000	$149
2	$410,000	$234
3	$600,000	$343

Note:
1. Based on 1,750 impervious acres

9.3 Hybrid Fee

The most widely used stormwater utility fee combines a flat fee for residential housing and a variable fee for all other land uses. This is similar to the fee structure used by both Burlington and South Burlington and is therefore well understood in Chittenden County.

The practical way to implement this fee structure is to develop an equivalent unit for establishing a base rate. For stormwater utilities, the equivalent unit is typically based on the average impervious area of a single family home.

Table 9.3 establishes the average impervious surface for common land use categories in Colchester. A base rate for one equivalent unit would be established for all single family homes. For Colchester the equivalent unit is 4,100 impervious square feet per parcel (based on impervious surface totals provided in Table 7.2). As stated above, this value will likely change once a more detailed inventory of impervious surfaces is performed, but is used for our example as the best available information at this time. All other properties would be assessed a fee based on actual impervious area divided by an equivalent unit. A minimum of one equivalent unit would be charged to each property.

Table 9.3
Parcel Impervious Area

Parcel Class	Number of Parcels	Impervious Area Total (Acres)	Impervious (Square Feet/Parcel)	Equivalent Unit[1]
Commercial	430	473.9	48,000	5,035
Institutional	53	94.2	77,400	1,001
Multi Family	852	88.7	4,500	942
Public	131	428.2	142,400	4,549
Private Road - Residential	35	46.4	57,700	493
Single Family	4,167	391.5	4,100	4,167
Mobile Home	504	22.8	2,000	242
State/Federal	9	185.1	895,900	1,967
Undeveloped	522	15.8	1,300	168
Totals	**6,703**	**1,746.6**	**--**	**18,564**

Note:

1. One equivalent unit equals 4,100 square feet impervious area.

This fee structure combines many of the advantages of the two previously discussed fee structures. Similar to the variable fee, it is a fair and reasonable measure of the impact on stormwater quality because it is based on impervious area. However, it simplifies the application of the fee by providing a base rate for single family residences, which is the predominant land use in Colchester.

The concept of equivalent units also simplifies the data requirements necessary to implement a stormwater fee. Introducing a base rate and rounding equivalent units to the nearest whole number for each parcel makes the analysis less sensitive to small changes or disputes in the impervious area calculation. It is less precise than a straight impervious area calculation, but provides simplicity in administering the fee.

For FY15 the equivalent unit fee for the three budget scenarios is listed in Table 9.4. This rate also represents what a single family home in Colchester would pay per year for the three budget scenarios, because one equivalent unit is equal to a typical single family residence.

Table 9.4
Equivalent Unit Base Rate

Budget Scenario	Revenue	EU Rate
1	$260,000	$14
2	$410,000	$22
3	$600,000	$32

Note:

1. Based on 18,564 equivalent units

The average impervious area per parcel listed in Table 9.3 shows that there is only a minor difference between the single family residential and multi-family land use categories. To simplify the fee structure even further the base rate of one equivalent unit could apply to each these land use categories. In order to justify including these land use categories in the base rate would require additional analysis of the variability of the impervious area within the land uses. If the multi-family category does have significant average impervious area variability, it could be further refined to separate out duplexes.

9.4 Equivalent Tax Rate

The Town of Colchester currently pays for stormwater services with general fund tax revenues. The general fund budget includes a program specific to stormwater, which provides for a fair apportionment of public works funds to stormwater services. If the Town were to continue paying for stormwater services with property taxes rather than implementing a stormwater utility, the tax burden required to fund the stormwater program will likely increase as suggested by the three budget scenarios presented.

For comparison purposes, Table 9.5 shows the tax rate required to fund the proposed FY15 budget scenarios.

Table 9.5
Tax Rate Equivalent

Budget Scenario	Revenue	Municipal Tax Rate[1]	Tax Equivalent for a $200,000 Home
1	$260,000	0.0133	$26.6
2	$410,000	0.0210	$42.00
3	$600,000	0.0307	$61.40

Note:

1. Based on a grand list of $19,562,000

It should be recognized that for all the rate structures proposed (if implemented) there would be a reduction in the general fund. The FY14 proposed budget for the stormwater program is $248,511. This equates to an existing tax rate of 0.0127 for the Colchester stormwater program.

9.5 Fee Comparison

Table 9.6 is a comparison between typical uses in the Town of Colchester and the annual stormwater fee that would be paid under the three proposed budget scenarios.

- The flat fee is the same for each parcel in Town, and consequently is the most inequitable.
- The variable fee is the most equitable because it is based on the actual impervious area.
- The hybrid fee demonstrates that a single family home with an impervious area under the equivalent unit of 4,100 square feet will still have to pay a minimum of one equivalent unit. For the larger uses in the hybrid fee structure the table demonstrates the rounding effect of using an equivalent unit rather than a straight variable fee based on impervious area.

It should also be noted that **under all the proposed fee structures a church (and any other tax-exempt property) pays a stormwater fee**.

Table 9.6
Fee Comparison

Budget Scenario	Single Family Res. (4,100 SF)	Small Business (10,000 SF)	Average Commercial (60,000 SF)	Large Commercial (200,000 SF)	Church (50,000 SF)
Flat Fee per Parcel					
1	$39	$39	$39	$39	$39
2	$61	$61	$61	$61	$61
3	$90	$90	$90	$90	$90
Variable Fee per Acre Impervious					
1	$8	$27	$164	$546	$137
2	$13	$43	$258	$859	$215
3	$19	$63	$377	$1,258	$315
Hybrid Fee per Equivalent Unit (4,100 SF)					
1	$14	$34	$205	$683	$171
2	$22	$54	$322	$1,073	$268
3	$32	$78	$468	$1,560	$390

9.6 Credits and Other Considerations

One very important difference between a utility fee and a tax is that a fee can provide a mechanism for a user to control their cost by reducing or conserving their use of the service. Stormwater utilities have been able to provide this mechanism in their fee structures by the use of credits. A system of credits can be established to provide cost control and promote conservation.

For example, a property owner could have their fee reduced for implementing stormwater best management practices on their property, or the school system could be issued a credit for incorporating stormwater education in their curriculum. The intent of the credit (in theory) should be to compensate a user for reducing the cost to provide stormwater services, which in turn promotes conservation and provides for additional equity in the application of the stormwater fee.

It is important to be clear that a stormwater fee is not a tax. It is a fee for services rendered. Although a municipality cannot tax the federal government and other tax exempt entities, a municipality can charge a fee for service similar to a water or sewer bill. It has been well established that the federal government must pay reasonable user fees for services rendered. In regard to stormwater fees the issue continues to be contested especially when charging a fee for state roads. The fee analysis in this report includes federal and state lands and roads in the fee estimate.

In South Burlington this issue was recently resolved with VTrans recognizing their requirement to pay a fee. Through an MOU with the city, VTrans pays an annual stormwater fee of $50,000, for which South Burlington provides routine maintenance (e.g. street sweeping, culvert inspections, indirect discharge detection and evaluation). While it is not known for sure, we suspect that this is a “negotiated cost” and that VTrans would be required to pay in excess of $50,000 if they paid fees strictly based on the extent of their impervious surfaces..

An additional consideration is whether or not to include municipal lands and roads in the analysis. The argument to exclude public land is that the fee “robs Peter to pay Paul”, because the Town would be collecting tax revenue to pay stormwater fees. However, a stormwater fee is similar to a water or wastewater bill for municipal facilities, which are typically paid by the municipality. From an accounting standpoint it makes sense to track the actual transfer of funds between programs. For this reason municipal property and lands were included in this stormwater utility analysis.

The flat fee and hybrid fee structure would provide a mechanism for Colchester to charge a minimum fee for undeveloped lands. It may seem counterintuitive to charge a fee for land that does not have impervious area; however, the concept is similar to an allocation fee that is charged for water and wastewater services.

In order for a property to be developed in the future the municipality has to pay for services and infrastructure now. These sunk costs, whether for stormwater infrastructure or permit requirements, are necessary in order for the land to be able to be developed in the future. The logic continues that all properties no matter the amount of impervious surface coverage should financially participate in recapturing these sunk costs.

9.7 Billing Options

There are generally three options for a stormwater billing system. The common method in Chittenden County is to use an existing water or sewer bill. The other options are to include the stormwater fee with property taxes or to generate a separate bill solely for stormwater.

Residents in Colchester are familiar with utilities and paying for services rendered. There are five separate water utilities in Colchester: Colchester Fire District #1, #2, #3, the Mallets Bay Water District, Town of Colchester Water District, and the Town of Colchester Sewer District. Residents also pay various other utility fees such as electrical service and gas service. The advantage of including a stormwater fee with another utility bill is that it is clearly associated with a user fee and not a tax, and enforcement action can be tied to shutting off existing services such as water. Using an existing bill also saves costs in establishing and maintaining the billing system. Unfortunately in the Town of Colchester, not all residents pay a municipal utility fee.

In South Burlington, stormwater fees are billed through the same system that water and sewer bills are administered through. In their case, Champlain Water District (CWD) performs the billing for South Burlington. South Burlington pays an annual fee of ~$30,000, which covers the costs of billing along with routine updates to the database. CWD also bills properties in South Burlington that do not receive water and sewer bills. South Burlington DPW indicated that updating the parcel data for billing is difficult. They had originally planned on updates every two years, but are currently only updating data every five years, at time of transfer when a parcel is sold or through the Planning Office if a substantial change to the property takes place.

In Burlington, the stormwater utility fees are added to the property tax bill as another line item charge.

Property owners in the Town of Colchester pay property taxes except for tax exempt institutions and property owned by the state and federal government. Using the tax bill has the advantage of using the parcel information for billing purposes without having to create another billing mechanism. The main disadvantage of using the tax bill is that it blurs the distinction between a property tax and a fee for service. A separate bill would need to be created for tax-exempt properties.

Creating a stand-alone billing system clearly defines that the fee is for stormwater service, however, there are added costs associated with creating and administering an entirely new billing system. We discussed options with the vendor who maintains Colchester's property tax billing system (NEMRC). They advised us that a stand-alone billing system is recommended for the following reasons:

- The stormwater utility would be billed based on ERUs, not grand list.
- When billing utility costs on a tax bill, it isn't clear whether the utility bill is a tax or something else. This causes confusion when dealing with the Vermont Department of taxes and their income tax and rebate programs.
- The stormwater utility billing system can be easily created using the Parcel ID from the grand list.
- Creating a separate stormwater utility billing system is relatively economical. The software cost is estimated at $3,000, with an additional $4,500 for data conversion and training.
- Colchester can still use property liens as an enforcement option under this billing system.
- Tax-exempt properties can be easily incorporated into the billing system.
- Adjustments to the ERU's for individual parcels are easily updated by Colchester staff once trained.

Based on the above, we recommend that Colchester incur the cost to create a stand-alone billing system. For the relatively small cost to create a stand-alone billing system, Colchester avoids the confusion of combining this with the property tax bill and unanticipated future problems.

10. IMPLEMENTATION PLAN

Stormwater Management is an evolving program for many municipalities (including Colchester). In Vermont, stormwater management is gaining greater attention by municipalities statewide both due to regulatory changes and a growing understanding by the public that stormwater pollution is degrading the beneficial uses of our waters. As stormwater management needs grow, many communities have turned to a utility to define and consolidate their stormwater programs.

A stormwater utility can be used to establish a dedicated program within a municipality for addressing administration, operations, and maintenance needs related to stormwater that were otherwise divided among many public works responsibilities.

10.1 Recommended Plan

We recommend that Colchester implement a hybrid model for a stormwater utility based on impervious surface and equivalent units as described in Section 9.3. The model would set the average impervious surface of a single family home as one equivalent unit. All single family homes would be assigned one equivalent unit regardless of the extent of impervious surface on the property. Mobile homes, duplexes and condominiums would be assigned an equivalent unit of one or more, depending on the average impervious surface of those property types compared to a single family home.

Commercial, institutional and other uses would be assigned an equivalent unit value based on the total impervious surface for the specific parcel divided by the square footage of the average single family home (one equivalent unit). The final value would be rounded to the nearest equivalent unit which provides some flexibility in the billing system for minor changes in impervious surface. Once the impervious surface for a parcel is determined and an equivalent unit value is established, it would only change if there was a substantial increase or decrease in impervious surface. The stormwater rate would be set by simply dividing the stormwater budget by the total number of equivalent units.

To make this determination, Colchester will need to complete a detailed evaluation of impervious surfaces by hand-digitizing the impervious surface for each parcel. Some field verification will likely also be needed. This data will be the basis for setting the value of one equivalent unit and the basis for establishing the equivalent units assigned to various non-residential parcels.

Colchester will also need to decide how to bill this new stormwater utility. Currently, stormwater efforts are funded through the general budget and the tax rate. For reasons articulated in Section 9.7, we recommend a stand-alone billing system for the stormwater utility.

Based on the above, the following are estimated budgets for both implementation of the recommendations (Table 10.1) and annual costs (Table 10.2) associated with the stormwater billing system.

Table 10.1
Recommended Plan
Implementation Costs

Budget Item	Implementation Cost
Salaries [1.]	$4,320
Benefits [2.]	$2,160
Billing System [3.]	$7,500
Impervious Surface Determinations [4.]	$20,000
Total Budget	**$33,980**
Use	**$34,000**

Notes:
1. Salaries are based on the following:
   Management/Oversight: Manager - 60 hours x $36/hour = $2,160
   Database Verification: Assistant – 80 hours x $18/hour = $1,440
   Limited Field Verification: Technician – 40 hours x $18/hour = $720
2. Benefits are calculated at 50% of salaries
3. Cost for billing software, data migration and owner training (quote from NEMRC)
4. Cost to hand-digitize all impervious surfaces by parcel (quote from SEI)

The above costs cover what would be required to create a stormwater utility billing system. It is assumed that the costs to create ordinances (or modify existing ordinances) and other stormwater policies required for a stormwater utility would be negligible as current Colchester staff would create them as part of their current duties.

Table 10.2
Recommended Plan
Annual Budget

Budget Item	Annual Cost
Salaries [1.]	$819
Benefits [2.]	$410
Total Annual Budget	**$1,229**
Use	**$1,300**

Notes:

1. Salaries are based on the following:
   General Oversight (Billing): Manager – 4 hours/year x $36/hour = $144
   Data Updates: Assistant – 150 parcels/year x 0.25 hours/parcel x $18/hour = $675
2. Benefits are calculated at 50% of salaries

The cost to develop the stormwater utility in South Burlington was estimated to cost $400,000. As the first community in Vermont to develop such a utility, they had no precedent or guidance from other Vermont communities that had already developed a similar plan. These fees included $70,000 for a utility feasibility study; and then an additional $330,000 to develop and implement the utility, including such items as development of policy papers, a credit manual, ordinances and public outreach. It was noted by South Burlington DPW that the cost to develop a stormwater utility in Burlington cost substantially less as Burlington could utilize a lot of the structure that South Burlington had to create from scratch.

10.2 Next Steps for a Stormwater Utility

In order for Colchester to begin to implement a stormwater utility there are four foundational elements that should be considered:

- Program Definition
- Financial Planning
- Stakeholder Participation
- Administrative and Data Framework

In developing a utility it is important to understand and define the purpose and need for the program. The Town of Colchester has already started this by developing a stormwater program specific budget within the general fund. This feasibility study provides the framework for further defining the Town's program. It begins by defining existing stormwater needs within the community and then forecasting future needs in order to develop a compelling case for a dedicated source of stormwater funding.

With the program goals established, a detailed financial analysis of the future program costs and revenue generation capability should be completed. The final analysis should answer specific questions as to what services will be provided and who will pay how much. It is important to establish a rational nexus between the services provided and the rates to be charged. The culmination of this process would be a stormwater rate ordinance.

In order to build support and win approval for a stormwater utility, stakeholders must be involved in the implementation. A stakeholder group should be established that includes members of the public, the Town's Finance Department, the Public Works Department, and representation from VTrans, and large institutions such as Saint Michael's College. Input from a diverse group of informed stakeholders is necessary to gain the necessary support for development of a successful utility. This support will be important when defending against future opposition and legal challenge to the utility.

The next steps for the Town of Colchester to develop a stormwater utility are:

- Selectboard endorsement for pursuing a stormwater utility (go/no go decision)
- Develop a stakeholder group
- Establish the purpose and need for a stormwater utility
- Define the stormwater program elements
- Agree to a fee structure
- Establish a fee that is equitable and will provide stable revenue
- Establish a billing system

10.3 New MS4 Requirements

The recently re-issued MS4 permit includes several new requirements related to "authorities" that the Town of Colchester will be expected to fulfill within the next two years (Section IV.C.1.e (4)–(6), page 14 of the permit). Each requirement is excerpted below, and is followed by an evaluation of whether Colchester's ordinances and specifications currently meet the requirement.

> *(4) Commencing two years after the issuance of an authorization or designation as a regulated small MS4, the permittee shall develop a program to identify opportunities for and provide technical assistance to landowners in the implementation by landowners of low impact BMPs such as maximizing disconnection, maximizing infiltration of stormwater runoff, preventing and eliminating soil erosion, and preventing and eliminating the delivery of pollutants to stormwater conveyances.*

The Town of Colchester already participates in the Regional Storm Water Education Program (RSEP) along with other MS4 communities from Chittenden County. The program website states "Chittenden County RSEP uses television, radio, print, and this website to distribute messages linked to specific stormwater problems, such as proper pet waste disposal, minimizing debris from home projects, proper disposal of toxic chemicals, safer car washing, reducing erosion and over fertilization of lawns and gardens. In addition to the multi-channel media campaign, educational events hosted throughout Chittenden County also raise awareness and encourage positive behavior change in residents".

An opportunity for providing technical assistance to landowners in Colchester is available through the Chittenden County Stream Team (http://www.ccstreamteam.org/), a project "to engage citizens across an eight-town area (Burlington, Essex, Essex Junction, Milton, Shelburne, and South Burlington, Williston & Winooski) to implement projects to reduce non-point source pollution and stormwater volume at the local level". The Town of Colchester does not currently participate in the Stream Team's activities, though this program provides technical assistance to landowners in all of the other Chittenden County municipalities with stormwater-impaired watersheds.

> *(5) Commencing two years after the issuance of an authorization or designation as a regulated small MS4, the permittee shall prepare and submit to the Agency a report on legal authorities or strategies that the permittee has adopted to protect and regulate development in the stream corridors of stormwater impaired waters.*

Within Colchester's Zoning Regulations, Article 7.04.C, Surface Water Buffer Standards ("Stream Buffers") applies to "all land within eight-five (85) feet horizontal distance of the center of the main channel of Allen Brook, Indian Brook, Malletts Creek, Pond Brook and Sunderland Brook and from the center of all tributaries of the above named streams and all other minor streams". The ordinance limits new uses and encroachments within the buffer area. We recommend a few minor changes to this ordinance to be implemented as part of a proposed comprehensive stormwater management program:

Section 7.04.C.1 (a): Morehouse Brook, one of the stormwater-impaired waters whose watershed is partially located within Colchester, is not currently listed in this ordinance, but should be added.

Section 7.04.C.4 (e): Public recreation paths and bridges are considered an allowed conditional new use or encroachment within stream buffers. However, these paths constitute substantial possibility for new impervious surface and soil compaction within stream buffers. If they must be allowed, consider requiring pervious pathway materials and construction to encourage infiltration.

Section 7.04.C.4 (f): Stormwater treatment facilities and routine maintenance thereof, including necessary clearing of vegetation and dredging, are considered allowed conditional new uses or encroachments within stream buffers. However, this use is disruptive to the stream buffer at best. We recommend that the Town consider not allowing these facilities in the surface water/stream buffer, or at any rate using the buffer for construction of stormwater facilities only as a last resort.

Section 7.04.C.4 (g): Roadways or access drives are only allowed to access land on the opposite side of the buffer, or to provide safe access to an approved use, in cases where there is no feasible alternative. Culverts, bottomless plate arches, or bridges are recommended for stream crossings depending on stream width at the point of crossing. However, no standard for peak discharge is recommended for crossings of streams less than 6 feet wide, and roadway bridges or plate arches are only required to pass a 50-year peak discharge. We recommend that the Town consider requiring any stream conveyance, whether culvert, plate arch, or bridge, to be capable of passing at least the 100-year peak discharge—and to consider preferring natural-bottom structures wherever possible.

(6) Commencing two years after the issuance of an authorization or designation as a regulated small MS4, the permittee shall prepare and submit a plan for outlining options for enhanced protection of stream corridors of stormwater impaired waters. The plan should include a map of stream corridors depicting areas that have been converted to impervious surface and areas that are undeveloped or have not been converted to impervious surface. In preparing this plan, the permittee should review riparian buffer and stream fluvial geomorphologic information provided to the permittee by the Agency as a result of the Agency's preparation of the stormwater TMDLs.

(a) For those areas of stream corridors that have not been developed or otherwise converted to impervious surface, the permittee's plan should identify options for ensuring enhanced protection, which may include: (1) minimum widths of stream channel buffers requiring protections, 2) minimum setback requirements and 3) proposed planning and zoning regulations, municipal ordinances or codes, policies or other requirements to enhance protection of undeveloped stream corridors.

The Town of Colchester has already implemented a Surface Water Buffer Standards ("Stream Buffer" ordinance (Article 7.04.C of the Zoning Regulations) which covers the stream corridors of all stormwater-impaired streams in Colchester except Morehouse Brook. This ordinance requires protection of an 85-foot buffer and contains both minimum setback requirements and limitations regarding the types of activity or new uses that are allowed within the buffer. Morehouse Brook should be added to the list.

(b) For those areas of stream corridors that have been developed or otherwise converted to impervious surfaces, the permittee's plan should identify options for stream corridor restoration, which may include: 1) restoring stream buffers and 2) relocation of development outside stream corridors for development projects.

Geomorphic assessments of many of Colchester's streams, including those streams designated as stormwater-impaired, were completed by Vermont DEC as described above. These assessments identified several opportunities for culvert replacement, stream buffer restoration, and stormwater management projects within several Colchester watersheds, which are summarized in Table 10.3 below. Of the streams and rivers listed in the table, only Indian, Morehouse, and Sunderland Brooks are currently listed as stormwater-impaired.

While the "relocation of development outside stream corridors for development projects" does not seem to be a realistic short-term strategy for stream buffer restoration, the Town's stream buffer ordinance insures that little to no new impervious surface will be constructed within the corridors of stormwater-impaired streams. The Town should, however, consider making stream buffer restoration during redevelopment projects a priority, particularly where the project work involves disturbance in an already impervious area of a stream buffer.

Table 10.3
Summary of Priority Project Needs

Priority	Watershed Name	Identified Need: Culvert Issues/Replacement	Identified Need: Riparian Planting/River Bank Protection	Stormwater Management Need and Applicable Permits in Project Watershed
High Priority	**Indian Brook**		1) 2,500 ft of un-vegetated stream bank in stream reach M01. 2) Develop conservation easements for parcels occupying area of reaches M01-M02.	
	Morehouse Brook			~9 acres of impervious area(1) ~3 acres of this impervious area is covered under SW Permit #4182-9015
	Pond Brook	1) East Road Culvert- 60 ft length x 12 ft stream width 2) Route 7 Culvert- 250 ft length x 15 ft stream width(2)	2,500 ft of straightened channel and lack of vegetative buffer in stream reach M02 and M03	~8 acres of impervious area along stream reach T1.04
	Smith Hollow Creek	East Lakeshore Dr culvert washout- 150 ft length x 12 ft stream width		~19.5 mixed impervious area contributing to Creek along M02 ~10 acres of this impervious area is covered by SW Permit #s 6240-9015, 3131-9010, 5278-9015, 3142-9010
	Sunderland Brook			~58 acres of mixed impervious area on south side of stream reach M08. About half of the impervious is treated by a 1 acre pond or overland flow covered by SW Permit #s 5598-INDO and 6363-INDS.
Medium Priority	**Morehouse Brook**		800 ft of unstable banks extending up to 130 ft on both sides of reach M01	
	Pond Brook	Middle Road Culvert- 80 ft in length x 15 ft stream width (M04 stream reach)		~20 acres of mixed impervious area on west side of T1.01
	Smith Hollow Creek		1) ~600 ft. of straightened channel through culverts under I-89 (accounts for 15% of M03 stream reach). 2) ~350 ft. of straightened channel through culverts under Route 127 (accounts for 25% of M04 stream reach).	1) ~4.4 acres of mixed impervious north of M03 2) ~11 acres of mixed impervious along M04; covered under renewed Permit# 3417-9010
	Sunderland Brook		Over 7,000 ft. of straightened channel and restricted floodplain access.	
Low Priority	**Winooski River**		3,000 ft. of un-vegetated banks in stream reach M01	

1. Impervious area contributions summarized in this table are approximations based on elevation/contour data. No data on impervious area, no stormwater utility data. Note from SGA report states that the storm system increases the overall drainage area by 20%.
2. Should be assessed for fish passage and channel adjustments downstream of structure. Blank fields indicate that no needs were identified in this category

The 2012 MS4 permit also contains new requirements regarding an assessment of local ordinances and their capacity to support the implementation of low-impact design options (Section IV.H.5.c, page 28 of the permit):

> *(3) Assess whether changes can be made to such policies, regulations and ordinances in order to support low impact design options (e.g. green roofs, infiltration practices such as rain gardens, curb extensions, planter gardens, porous and pervious pavements, and other designs to manage stormwater using landscaping and structured or augmented soils and water harvesting devices such as rain barrels and cisterns and the use of stormwater for non-potable uses); and*
>
> *(4) Assess whether changes can be made to current street design and parking lot guidelines and other local requirements that affect the creation of impervious surfaces to support low impact design options.*
>
> *Based on these reviews, the permittee may adopt requirements that complement or are more stringent than the requirements of the Secretary.*

The Town's local ordinances and development regulations already contain fairly strong emphasis on non-structural low impact BMPs. The Town's Subdivision Regulations, for instance, are for the most part aligned with non-structural principles and practices of Low Impact Development. A few examples include:

Section 306 is targeted towards energy conservation, but many of the practices encouraged in this section (smallest areas of roadway, least length utility lines, clustering development) are also effective low-impact development strategies for reducing site disturbance and minimizing impervious cover.

Section 309.A requires the preservation of wetlands, streams, water bodies, floodplains, associated buffers, trees, and other unique natural features – an approach similar to the low-impact non-structural strategy of conserving sensitive areas during development or re-development activities. Section 317 also contains provisions that encourage the protection of open space and conserved, undisturbed areas during and after development.

Section 309.B requires the minimizing of grading activities to "retain, insofar as possible, the natural contours, limit storm water runoff, and conserve the natural cover and soil"—an approach that maps closely to the low-impact strategy of minimizing site disturbance.

The Town's Ordinances and Zoning Regulations contain language regarding preventing and eliminating soil erosion that is stricter than required by the MS4 permit. For instance, the Town's Erosion and Sediment Control Ordinance (Sec. 18-18 through 18-28) applies to any land disturbance that requires a building permit, regardless of the extent of the disturbance. The ordinance ensures that erosion and sediment control practices are applied wherever appropriate, and require an Erosion and Sediment Control Plan be prepared and adhered to during development or redevelopment activities.

The Town's regulations encourage the preservation of existing trees, especially during development activities (as described above) and in rights-of-way (for example, Sec. 13-23(d) specifically calls for the protection of trees during excavation work). In addition, the Colchester Street Tree Master Plan (Appendix D, Department of Public Works Specifications and Standards) provides guidelines and prioritization for planting trees throughout the Town, focusing primarily on public rights-of-way in Colchester's existing residential neighborhoods, where trees were often not planted when the neighborhoods were originally constructed.

The Town's regulations are almost completely silent, however, regarding the runoff reduction benefits of retaining existing trees, planting new ones, and/or maximizing disconnection of runoff into pervious areas, including into tree-rich landscapes. Similarly, the Town's current standards for landscaping and permanent site stabilization contain minimum requirements for topsoil depth and vegetative ground cover (for example, Article 10.04 of the Zoning Regulations), but are silent regarding the restoration of soil infiltration capacity lost due to compaction during construction activities.

The suite of structural best management practices currently offered in the Town's regulations encompasses those in Vermont's 2002 Stormwater Management Manual (VSWMM) and those in the Town's Public Works Specifications and Standards. While VSWMM does include some structural practices that encourage stormwater infiltration (such as infiltration beds/trenches and bio-retention practices), the practices listed and specified in the Public Works Specifications and Standards include "driveway culverts, catch basins, ditches, swales, stormwater pipes and stormwater ponds and detention basins" (Section 1.2.D). The existing language does not encourage infiltration, disconnection of impervious surfaces, runoff retention on the landscape, beneficial re-use of rainwater, etc. If only conventional stormwater management practices are specified as the basis for design, property owners will be reluctant to use practices that maximize infiltration or other "green" techniques, as the path for approval of their designs is not immediately clear.

10.4 Pending Regulatory Changes

As outlined in Section 5.2, we anticipate other regulatory requirements to be placed on Colchester over the next several years (e.g. Act 138 and the Lake Champlain Phosphorus TMDL) that may significantly increase requirements for managing and improving stormwater systems and related costs. Colchester can reasonably assimilate the new MS4 requirements under their existing system of funding stormwater programs through the property tax, but supporting stormwater management this way will become increasingly hard to justify as regulations get more stringent and the cost of programs increases.

As the cost of stormwater programs rise, residents of Colchester are likely to insist on a more equitable formula for supporting these programs. We recommend moving to a stormwater utility model now, while program costs are relatively easy to predict, so the model is established and understood by the community before facing some of the tougher choices that will inevitably come with more stringent regulations and requirements.