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1.0 INTRODUCTION

As the City and Town of St. Albans have recently become subject to requirements of the Vermont Department of Environmental Conservation’s General Permit for Municipal Separate Storm Sewer Systems (MS4), this report has been prepared as the first step in the process of developing and implementing municipal stormwater management rules and procedures. The team of Birchline Planning LLC, Watershed Consulting Associates LLC, and Aldrich + Elliott Consulting Engineers is assisting the City and Town to develop a program that will (1) regulate development not subject to existing State of Vermont erosion control requirements and post-construction stormwater management permits, (2) provide regulatory support for protecting stream corridors in the Stevens Brook and Rugg Brook watersheds, and (3) help accomplish water quality protection and restoration as municipal investments are made, and development occurs.

This report represents the submittal for Task 4 of the Project, encompassing Exploratory Research, an Assessment of Best Practices, and review for consistency with Vermont Department of Environmental Conservation regulations and standards. Included are the team’s assessment of the effectiveness of current actions & regulations; actions that will be required to comply with the SWMPs, MS4 and Flow Restoration Plans; and our initial recommendations on opportunities for enhancement. This report also includes a completed assessment of stream corridor conditions in the Stevens Brook and Rugg Brook watersheds, focusing on the presence of impervious cover within the buffer (50’ and 100’ from top of bank) by zoning district and by different type of stream reach. The evaluation of stream corridor conditions, which satisfies a key requirement of the MS4 permit, will be used to help each municipality and the consultant team develop effective and realistic stream corridor protection provisions. These findings will be the basis for discussion over the summer, and a final exploratory report with recommendations (accompanied by a presentation) in August.

1.1 SUMMARY OF INITIAL RECOMMENDATIONS

Briefly summarized, our initial findings identified four basic components the Town and City should anticipate for the stormwater program.

1. *Adoption of a stormwater ordinance into each municipal code, incorporating construction erosion and post-construction standards.* Our initial recommendation is to adopt this as a segment of each municipal code, rather than as provisions within the land development regulations. It is anticipated that this ordinance would provide the bulk of the authority for each municipality’s actions with respect to the regulation of illicit discharges, construction-phase erosion control requirements, post-construction standards for properties not subject to Vermont permitting, and the management and maintenance of existing stormwater BMPs.
2. *Adoption (City) or enhancement (Town) of stream corridor protection provisions within each municipality’s Land Development Regulations.* The types of provisions for stream corridor protection that our team has in mind at this point, such as a required setback distance and buffer landscaping in areas where development has not occurred, are more easily administered through the building permit and DRB process rather than a separate, stand-alone ordinance. In the Town’s case, modifications to the setback provisions would be made to require greater ecological function and vegetation within the setback directly along the stream. A number of options and possibilities are discussed in this report. This will occupy much of the team’s and staff’s next work on the project.
3. *Minor (but important) amendments to each municipality’s Land Development Regulations* to provide site-scale water quality protection (i.e. keeping trash enclosures away from storm drains, ensuring review of potentially polluting uses for drainage, etc.) and to provide some level of post-construction stormwater control on sites not subject to the jurisdiction of the MS4 permit. These actions, which would be complimentary to the stormwater ordinance, will help meet the FRP and prospective phosphorous TMDL requirements.
4. *Identification of funding approach, and staff or contractor roles/responsibilities, for stormwater/erosion control plan review, required inspections, and record keeping.* There will be a number of important decisions for each municipality to make regarding “who does what” with respect to these regulatory steps, particularly the review of post-construction stormwater management plans and inspection of erosion control measures on construction sites. In this report we have identified potential options and questions that the Town and City will need to consider.

1.2 ORDINANCES VERSUS ADMINISTRATIVE PROCEDURES

A topic woven throughout this report is consideration of when procedures or policies should be adopted as formal regulations (i.e. Land Development Regulations/zoning or municipal code), which require a statutory process for adoption and amendment by the legislative body (City Council or Town Select Board); and when actions should be adopted as administrative procedures, either informal (staff-level guidance) or formal (legislative adoption). An example of this difference would be the process for adoption of amendments to the City’s sewer ordinance, which requires a warned public hearing with notice and formal action by the City Council, versus adoption of an annual schedule of fees, “...as adopted and amended from time to time by the City Council,” which can be done at a regular meeting. Generally, where some encumbrance to private property rights would be involved in the regulation – such as post-construction stormwater control requirements, illicit discharge prohibitions, or stream corridor restrictions on land use and clearing – the Team has recommended including these measures in a formal, legislatively-adopted provision. Where a standard or action would principally affect the process by which a permit is obtained or an action is conducted, and where procedures and actions may need to change annually or more frequently,

administrative procedures or staff-level actions are recommended. Any administrative procedures would be incorporated by reference into the municipal code or Land Development Regulations, but could be more easily amended in the future.

2.0 REVIEW OF CURRENT REGULATIONS: TMDLS AND FLOW RESTORATION PLANS

2.1 INTRODUCTION

The first step in this analysis is to review the specific actions and requirements in the MS4 permit applicable to the City and Town, and to identify the associated regulatory program components that ultimately must be adopted, along with the relevant provisions of both the TMDLs and Flow Restoration Plans (FRPs) for Stevens Brook and Rugg Brook, and the upcoming phosphorous TMDL for Lake Champlain. This assessment builds on the recent assessments Northwest Regional Planning Commission (NRPC) completed of City and Town LDRs, assessing the regulations' "friendliness" to Low Impact Development (LID) practices. These assessments point out a number of provisions that are important for stormwater management and LID in particular; the focus of this assessment is more to identify where and how the LDRs for each community do, or could if modified, address the specific post-construction stormwater control, construction erosion, and particularly stream buffer protection and enhancement.

2.2 RUGG AND STEVENS BROOK: FLOW RESTORATION PLANS AND TMDLS

Rugg Brook and Stevens Brook, which flow through the City and Town, are currently on the State of Vermont's impaired waters (EPA 303(d)) list, determined to be primarily a result of stormwater runoff. In the effort to restore Rugg Brook and Stevens Brook and lift the impaired watershed designation, a flow-based Total Maximum Daily Load (TMDL) was developed for each watershed, outlining required reductions in stormwater high flows. These flow targets are the basis for the Flow Restoration Plan (FRP), developed in accordance with the MS4 General Permit Subpart IV.C.1 as a required part of the MS4s Stormwater Management Program (SWMP).

In 2012, Watershed Consulting Associates, LLC worked with the City of St. Albans to prepare a draft FRP for Stevens Brook, under an ERP Grant project. The draft FRP was prepared as a joint effort between the contributing impervious cover owners, including the City (primary contributor), Town, and Vermont Agency of Transportation (VTrans). Preparation of the Rugg Brook FRP was completed in 2015 with a VTrans grant, in a joint effort between the Town, City and VTrans. The purpose of each FRP is to outline a plan for the retrofit of existing impervious cover with stormwater management Best Management Practices (e.g. detention basins, bioretention filters, etc.) to meet the TMDL flow reduction targets for each watershed. The TMDL set forth that watershed hydrology must be controlled in the impaired watersheds to reduce high flow discharges and increase base flow in order to restore degraded water quality and achieve compliance with the Vermont Water Quality Standards (VWQS). Components of the FRP, as outlined in the MS4 general permit, include the identification of retrofits to existing BMPs that are subject to expired State stormwater permits, identification of new BMP controls, a construction and design (C&D) schedule, a financial plan, and a regulatory analysis.

2.2.1 NON-JURISDICTIONAL GROWTH AND FRP TARGETS

Stormwater management requirements are intended to ensure that the addition of impervious surface to a watershed, is a primary contributor to stream impairments, occurs with sufficient flow controls to offset the impacts of the new impervious area. "Non-jurisdictional growth" refers to new impervious area that is added to a watershed without stormwater flow controls. Where local regulations require stormwater controls for new impervious surface that otherwise would not be subject to Vermont requirements (i.e. projects that result in less than one acre of total impervious surface), the new impervious surface or growth will not be added to the amount of new impact expected on the watershed and stream.

For Stevens and Rugg Brooks, impacts on the TMDL flow targets from new impervious surface constructed without flow controls were accounted for through a future non-jurisdictional growth factor. Based on current development patterns and potential for future growth in both watersheds, 15 acres of new non-jurisdictional impervious surface (growth) was estimated to be an appropriate future growth target. The approved Flow Targets were then adjusted to account for the additional change in flow required to manage runoff from the future impervious area (Table 1 and Table 2). A GIS-based exercise was completed for Rugg Brook to verify VT DEC's assumptions, and to develop a revised estimate for the non-jurisdictional impervious growth and the resulting modified TMDL flow targets (Table 1).

Table 1: Rugg Brook TMDL Flow Restoration Targets with Modified Future Growth

Flow Target	Target High Flow Q 0.3 (± %) Reduction	Target Low Flow* Q 95 (± %) Increase
TMDL Targets (Stormwater allocation only)	-15.0	16.8
Approved TMDL Targets with 15 acres of Non-Jurisdictional Future Growth	-16.0	16.8
Modified TMDL Targets with 4.54 acres of Non-Jurisdictional Future Growth	-15.30	NA
*The low flow target is not actionable under the TMDL, but is included because improving base flow in the watershed is still a water quality goal.		

Table 2: Stevens Brook TMDL Flow Restoration Targets

Flow Target	Target High Flow Q 0.3 (± %) Reduction	Target Low Flow* Q 95 (± %) Increase
TMDL Targets Flow Percent Change (Stormwater allocation only)	-22.6%	24.3%
TMDL Targets Flow Percent Change with 15 acres of Non-Jurisdictional Future Growth	-24.4%	24.3% (nc)
*The low flow target is not actionable under the TMDL, but is included because improving base flow in the watershed is still a water quality goal.		
Nc = no change to target from future growth		

The way the MS4 general permit is written, the City and Town are required to show in their approved FRP that the targets - with future growth included - will be met through the implementation of specific flow-control BMPs on new impervious surfaces. However, there is discussion in practice as to whether the implementation of local stormwater management regulations to address at least some of the stormwater flows resulting from non-jurisdictional growth can be substituted, at least in part, for constructing specific BMPs to treat existing impervious surface. The State has communicated that while the approved TMDL will not be re-opened for formal revision, ultimately, as stated in the MS4 permit, “the Secretary may adjust a permittee’s flow restoration targets during the term of [the] permit if justified by monitoring data or other relevant information.” (MS4 General Permit Sec. IV.e.3). In other words, the ultimate determination of compliance is if the biological health of the stream has returned to its attainment condition; measures that accomplish this can consist of a mix of new BMPs and controls on surfaces that would otherwise have contributed uncontrolled stormwater flows.

The State has expressed that monitoring of TMDL implementation will be based on an adaptive management approach, wherein the stream will be monitored periodically throughout the duration of the FRP to determine if the biology has returned to a healthy condition. As a result, new local stormwater regulations to address non-jurisdictional growth can be an effective way to address future stormwater runoff and impacts to the stream. While the estimated non-jurisdictional growth is small compared to the existing impervious that needs to be managed, to the extent that new regulations on post-construction stormwater control help each municipality address the “regulatory gap,” any such reductions achieved will help move towards the FRP goals.

2.3 LAKE CHAMPLAIN PHOSPHORUS TMDL REGULATORY IMPACTS

With implementation of the Lake Champlain Phosphorus TMDL, there will be future regulatory requirements in the Lake Champlain basin to control Phosphorus runoff from a variety of sources. The TMDL, which is likely to impose more requirements overall on the City than the Town, will have wasteload allocations for phosphorous discharges from the St. Albans Wastewater Treatment Facility, and an allocation for phosphorous in runoff from developed land. No offsets or trading will be allowed among different sources (i.e. developed land, treatment plant, CSO) but timelines will be developed based on affordability. The implication of this is that the City and Town will need to address each source individually through Town and City municipal initiatives and investments.

The requirements for reductions from developed land are addressed, to a large extent, by implementation of the same types of retrofits and BMPs on developed land incorporated in the FRPs. These sources will include retrofit of existing problem areas and prevention of new Phosphorus runoff sources. This will affect the City more than the Town. While in the future some form of trading among sources within individual Lake segments may be developed, it is likely that each municipality will need to have a regulatory program addressing different potential sources of phosphorous discharge.]

In the context of the City and Town future regulatory program and impending TMDL requirements, two actions that will be needed to meet MS4 requirements are also especially critical for addressing phosphorus pollution. By developing municipal regulations to address each of these, the City and Town will be taking steps towards its ultimate TMDL requirements as well.

1. ***Stream buffers:*** Robust stream buffers are important for Phosphorus pollution mitigation as they 1) provide stability to the stream channel and prevent in-stream erosion, which is a significant source of Phosphorus in the watershed, and 2) provide filtering and infiltration of runoff from impervious surfaces that are located adjacent to the stream channel. Included in the proposed Lake Champlain TMDL, protecting and expanding buffers along stream channels is a primary strategy. The Town and the City could look to areas of the stream network where robust buffers are in-tact presently, and institute standards to preserve these undeveloped buffer areas. Preserving these areas would provide progress toward meeting the Lake Champlain TMDL goal of maintaining and enhancing forest cover at the watershed scale, improving watershed health by trapping pollutants and infiltrating runoff, and by stabilizing the stream channel and reducing or preventing in-stream erosion.
2. ***Post-construction stormwater best management practices:*** The Lake Champlain TMDL will include comprehensive requirements for improving quality of runoff from existing developed lands and mitigating runoff from newly developed lands. Reducing hydrologically connected runoff is a key strategy for successfully managing runoff from developed land. Hydrologically connected runoff occurs when an efficient conduit is established between an impervious surface and a receiving water that can readily transmit flow and pollution, including Phosphorus, to waterbodies without any control. Conduits may include pipes or open channels. Presently many hydrologic connections exist within the City and Town MS4 area, and this is a main source of the stormwater impairments in Rugg and Stevens Brooks. Implementation of the FRPs for Stevens and Rugg Brooks will serve to reduce the amount of connected impervious surface by installation of new stormwater controls to manage flows, filter runoff, and provide groundwater infiltration. To address the creation of new hydrologically connected impervious surface, post-construction stormwater standards applied to most development activities will be the most important measure the City and Town can take towards TMDL compliance.

3.0 MS4 MINIMUM CONTROL MEASURES: ASSESSMENT OF REQUIREMENTS & EFFECTIVENESS OF EXISTING REGULATIONS

3.1 INTRODUCTION

Addressing the six “Minimum Control Measures” in the MS4 permit is the core regulatory responsibility for the City and Town as regulated MS4 communities. The most important roles of a stormwater ordinance are to address MS4 permit Minimum Control Measures 3 (Illicit Discharge Detection and Elimination), 4 (Construction Site Stormwater Runoff Control), 5 (Post-Construction Stormwater Management in New Development and Redevelopment), and 6 (Pollution Prevention/ Good Housekeeping for Municipal Operations). Minimum Control Measures 1 and 2 (Public Education and Public Outreach) are provided by the Northwest Regional Planning Commission through an agreement with the City and Town.

In general, and as the primary recommendation of this report, the team recommends considering adoption of a stand-alone ordinance in each community that provides specific legal authority for managing the separate (and where applicable within the City, portions of the combined) storm sewer system. The example ordinances from the Town of Colchester and Town of Essex Junction included as Appendix A with this Report provide a starting point that addresses each of the provisions in the MS4 permit and SWMPs. Since the systems are materially different between the City and Town, there may be a need for the City ordinance to have additional provisions addressing the existing combined system areas.

Specific issues and initially-recommended approaches for each Minimum Control Measure are discussed below. Throughout this section, tables have been provided that list (1) the MS4 provisions for the six Minimum Control Measures (MCMs) and

other regulatory requirements; (2) the response of the City or Town in its Stormwater Management Program (SWMP); (3) the actions, regulations or program currently in place relevant to the requirement or SWMP response; and (4) what measures or actions may be recommended to fill any effectiveness gaps. This provides a foundation for recommending components of the City and Town stormwater programs as work proceeds.

3.2 ILLICIT DISCHARGE DETECTION AND ELIMINATION

Regulatory authority is needed in each community to be able to require remediation of a variety of prohibited discharges to the MS4. Within the City's Code, Title 9, Chapter 10 (Sewer Use and Allocation Ordinance) currently provides some legal foundation for preventing illicit discharge into the sanitary sewer system. Since approximately 15-20% of the City's land area is on a combined system, this ordinance has the effect of prohibiting unauthorized discharges, or drainage from surface areas. However, more explicit provisions will provide a stronger basis both for public and staff understanding of what constitutes an "illicit discharge," and for dealing with potential violations. The Town does not presently have a regulation directly applicable to illicit discharges, making this a key "regulatory gap."

As noted in the table below, the MS4 permit requires each municipality to identify and assess whether some types of non-stormwater discharges to the MS4 – generally from "clear water" sources that typically do not contain pollutants – are significant contributors of pollutants. To date, the consultant team has not noted that any of these types of non-stormwater discharges are significant, and would require regulation in either the city or Town.

Table 3. Illicit Discharge Requirements

MS4 Permit Requirement	City/ Town SWMP Response	Existing Regulations	Recommended Actions
3. Illicit Discharge Detection and Elimination	<p>The City currently uses the existing Sewer Use and Allocation Ordinance for enforcement to prohibit illicit discharges. Development of a program and ordinance to eliminate illicit discharges will be evaluated.</p> <p>The existing plan for identification of illicit discharges is to notify the owner of the violation, provide a timeframe for correction, and follow-up to ensure corrective actions were taken. This program approach will be modified with the development and adoption of an ordinance.</p>	<p>City: ARTICLE VIII Prohibited Drainage No commercial or industrial waste drainage shall be drained into the sanitary sewer system without authorization of the City Council permitting the connection and drainage and certified in writing by the City Clerk. No roofs, paved areas, yards, courtyards, or other drained areas shall be connected with the City's sanitary sewerage system.</p>	<p>- Adopt provisions specifically prohibiting discharges such as dumping waste liquids or paints, etc.</p> <p>-</p>
<i>(1) Develop, implement and enforce a program to detect and eliminate illicit discharges into its small MS4;</i>	Continue monitoring program to detect illicit discharges		Address administratively, not in ordinance
<i>(2) Develop and maintain a storm sewer geographic (GIS) or AutoCAD map of the small MS4, showing the location of all outfalls and the names and location of all waters of the State and waters of the United States that receive discharges from these outfalls;</i>	Update the stormwater system mapping (note: include stream corridor information from this project)	Being updated by NRPC	Does not require ordinance or procedure
<i>(3) To the extent allowable under State or local law, effectively prohibit, through ordinance, or other regulatory mechanism, non-stormwater discharges into the permittee's storm sewer system and implement appropriate enforcement procedures and actions;</i>	Review existing ordinances for illicit discharge ordinance		Address in ordinance
<i>(4) Develop and implement a plan to detect and address non-stormwater discharges, with emphasis on outfalls in the stormwater impaired watershed(s) and random illegal dumping to the system;</i>	Develop an illicit discharge detection plan		Address through planning; do not include in ordinance
<i>(5) Inform public employees, businesses, and</i>	The City will inform the public employees,	Created information sheet; WCA	Include illicit discharge information on website

MS4 Permit Requirement	City/ Town SWMP Response	Existing Regulations	Recommended Actions
<i>the general public of hazards associated with illegal discharges and improper disposal of waste;</i>	businesses, and general public of the Ordinance and provide updates on the City website. Training of employees is described under minimum control measure 6. Inform public of illicit discharge and disposal hazards	conducted study + outreach	and mailings; use photos from study, City of South Burlington website to illustrate issues with illicit discharges
<i>(6) Address the following categories of non-stormwater discharges or flows (i.e., illicit discharges) only if the permittee identifies them as significant contributors of pollutants to the small MS4: waterline flushing, landscape irrigation, diverted stream flows, rising groundwaters, uncontaminated groundwater infiltration, uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, flows from riparian habitats and wetlands, and discharges from fire-fighting activities</i>	Address specific categories of illicit discharges, if necessary	To date, these have not been identified as being significant sources of pollution in the MS4.	Address municipal authority to adopt provisions related to non-stormwater discharges in the Stormwater Ordinance, should any be identified as a source of pollutants.
<i>(7) Provide the Secretary with an annual status report of monitoring activities conducted and corrective actions taken.</i>	The management and implementation of the program is the responsibility of the Public Works Director and Superintendent. An annual status report of the IDDE monitoring activities conducted and corrective actions will be submitted to the Agency as part of the MS4 annual report. This report will be organized to address specific categories of illicit discharges. Prepare annual report of monitoring and corrective actions taken		Address administratively; do not include in ordinance
	2. When the City conducts monitoring of illicit discharges pursuant to Subpart IV.H.3.a.4. all samples and measurements taken shall be representative of the monitored activity. 3. Records of monitoring information shall include:(a) The date, exact place, and time of sampling or measurement;(b) The name(s) of the individual(s) who performed the sampling or measurements;(c) The date(s) analyses were performed; (d) The names of the individuals who performed the analyses; (e) The analytical techniques or methods used; and (f) The results of such analyses. 4. Discharge Monitoring Report. Monitoring results will be reported on a Discharge Monitoring Report (DMR).	Form has not been adopted to date; City staff are aware of need to develop this form.	Staff development of DMR recording form; does not require administrative adoption, but consider using identical form for City and Town to facilitate joint information management in future

3.3 CONSTRUCTION SITE STORM WATER RUNOFF CONTROL

One of the more challenging areas for the City and Town is to begin implementing construction-phase stormwater runoff controls, and to decide what level of enforcement to apply to projects of different sizes. The MS4 permit requires the City and Town to have enforceable standards meeting Vermont requirements for construction projects that would disturb a land area of one acre or more, whether as an individual project or as part of a common plan of development. In addition, the MS4 permit language requires the City and Town to “at a minimum, regulate[s] development activities not subject to state or federal erosion control requirements.” This puts the municipalities in the position of essentially being responsible for both ensuring that State standards are met for larger projects, and ensuring that some erosion control requirements are in place and enforced for other activities, depending on how “development activities” are defined.

3.3.1 EXISTING REGULATIONS & PROVISIONS

At present, the Town and City have only minimal erosion control requirements. For example, Section 706(B)(3) of the City's LDRs on Design Review Standards & Criteria for Approval includes general language on landscaping stating "Functional landscaping should be considered...design techniques that...reduce erosion...should be employed." Section 221(5) of the Town's LDRs, under General Development Standards, includes "Adequate provision shall be made to minimize erosion during and after construction," and also includes erosion prevention as an objective for the Lakeshore District (Section 315(3)).

To formalize these standards and comply with the MS4 permit, adoption of construction ordinance provisions as part of a stand-alone Stormwater Ordinance is recommended. The team recommends that provisions in a municipal ordinance refer to and incorporate standards from the Vermont Construction General Permit for larger projects disturbing an acre or more, and the Vermont Low-Risk Site Handbook for projects below the acre disturbance threshold. There are many details to be worked through in determining "how much is enough" with respect to regulations for different sizes of construction activities; what the Town's role should be in reviewing applications that do require coverage under the Vermont Construction General Permit or Individual permit procedures; whether provisions should be more aggressive within impaired watersheds or other high risk areas; and administratively, how to ensure sufficient plan review and inspection of whatever program is ultimately adopted.

3.3.2 IDENTIFICATION OF JURISDICTIONAL PROJECTS & GUIDANCE

Two very straightforward steps would address requirements in the MS4 permit, and enhance local water quality, without requiring any legislative action. First, the City and Town can amend all applications for land development (i.e. zoning permits, site plan, variance, sketch plan, subdivision, and conditional use applications) to require applicants to state the total square feet of area to be disturbed, the total square feet of impervious surface that will result upon completion of the project, and if the project meets the definition of a "common plan of development," the total area to be disturbed for the project. This will immediately satisfy the MS4 permit requirement for the construction and post-construction MCMs to identify projects that would meet various regulatory thresholds. In addition a provision could be adopted into the municipal ordinance to state that all municipal projects would be subject to these standards, satisfying another MS4 permit requirement. Second, the Town can provide erosion control and stormwater management guidance appropriate to small projects when permit applications for any land-disturbing activity are submitted.

3.3.3 ESTABLISHING EROSION CONTROL REQUIREMENTS & JURISDICTIONAL THRESHOLDS

Beyond these two steps, program development becomes more complicated. Since the City and Town are essentially "starting from scratch," the table below is intended to provide a menu for potentially assigning certain requirements to projects of different sizes, and to consider what types of activities or locations might be subject to less stringent or fewer requirements. This can then be reflected in both the ordinance (which would specify thresholds for different requirements and procedures for enforcement if violations occur), and administrative documents (which would provide guidance to applicants and specify plan requirements). The Team suggests that the requirements for the content of construction erosion control plans, and the specific technical standards that would apply, be placed within administrative standards. In this way, guidance on plan content and specific control measures can be modified more readily as the program matures.

Whatever system is chosen, the Town and City will then need to consider the potential staff or contractor needs, and how to budget for these expenses. At this point, the Consultant Team recommends each municipality consider a having a formal process in place for a contracted consultant or to review post-construction stormwater plans, and for a contracted individual to provide erosion control plan review and site inspection services¹. There are many options for structuring and funding each of these activities; however, it is clear from the Team's review of each community's regulations, discussions with municipal staff, and experience with MS4 programs that this is a high-priority action for ensuring compliance. The Town and City would have the option to (1) contract with a consultant; (2) discuss a contractual agreement with Northwest Regional Planning Commission, if NRPC has sufficient expertise in-house with available time; or (3) consider a shared position between the City and Town for review and inspection. Either (1) or (2) also could be used as an interim measure as the City and Town consider staffing needs in response to the MS4 permit as well.

¹ With respect to construction enforcement, frequency of inspections is often a question. While this gets to a level of detail that the Team plans to address at a later point, options for keeping inspection as efficient as possible can include limiting actual site inspections to a period after rain (or preferably just before a forecast rainfall), and a "sweep" of community once weekly based on permits issued during busier periods.

Another question that is perhaps less urgent is whether the Town and City would wish to hold an escrow for construction-phase inspection and erosion control, as well as installation of permanent stormwater controls, for larger or higher-risk projects. This is a method that comparably sized municipalities in Southeast Wisconsin are using to ensure that the municipality has the resources to stabilize or shut down a site, remediate erosion problems, or install or fix permanent BMPs if necessary. This could be handled through existing bond and letter of credit procedures in place in each community, or a separate process only for specific projects.

The table below lists the specific requirements of the MS4 permit, the Town's response, the status of existing regulations, and team recommendations. These recommendations are expanded further in the second table.

Table 4. Construction Site Stormwater Runoff Control Requirements

MS4 Permit Provision	City/ Town SWMP Response	Existing Regulations	Recommended Actions
<p>Construction Site Storm Water Runoff Control</p> <p><i>Pursuant to federal regulations 40 C.F.R. 122.34(b)(4), the permittee must to the extent allowable under State or local law develop, and enforce a program to reduce pollutants in any stormwater runoff to the small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of stormwater discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger plan of development or sale that would disturb one acre or more</i></p>		Not identified directly in application or submittal requirements	Recommendation: Revise zoning and all DRB review applications to ask with explicit question & of total area of disturbance. Include provisions in ordinance.
<p><i>(1) Develop and implement procedures to assure that construction activities undertaken by the permittee are properly permitted and implemented in accordance with the terms of the construction permit.</i></p>	Develop and implement procedures to ensure MS4 construction activities are properly permitted		Recommendation: Include statement in ordinance binding municipality to secure coverage under (or individual) Vermont construction permits
<p><i>(2) The permittee shall review existing policies; planning, zoning and subdivision regulations; and ordinances to determine their effectiveness in managing construction-related erosion and sediment and controlling waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at construction sites that may cause adverse impacts to water quality. The policies, regulations, and ordinances must also be reviewed for their consistency with the requirements of the Secretary's general permits for stormwater runoff from large and small construction sites and construction erosion guidelines for low impact development. The permittee may adopt requirements that complement or are more stringent than the requirements of the Secretary.</i></p>	Review existing MS4 regulations for effectiveness in managing construction related E&S and consistency with state construction permit	No policies currently in place for construction waste	<p>Recommendation: Add provisions addressing (1) demarcation of limits of disturbance on site, (2) identification of storage areas for waste or construction equipment, (3) procedures for waste/debris handling, and (4) measures to prevent tracking of sediment at project entry/exit and to prevent waste and debris from escaping.</p> <p>Provide link on website and printed on land development application to Vermont standards for waste handling, and to large and small construction sites</p>
<p><i>(3) Develop and implement an erosion control ordinance, or zoning and subdivision regulation, or other regulatory mechanism which, at a minimum, regulates development activities not subject to state or federal erosion control requirements.</i></p>	Develop and implement an erosion control ordinance that regulates development not subject to State permitting		Recommendation: Incorporate into new stormwater ordinance

As an initial point of discussion, the team would like to suggest the City and Town review some options for program requirements and thresholds. As noted above, the suggestion is to use the stormwater ordinance to set thresholds for requirements, and to specify plan requirements and technical standards in an administrative document. The table below lists the Vermont Low Risk Site Handbook requirements (as well as construction waste and debris management, which must be addressed) and suggests where and how these could be applied to projects of different sizes and types in St. Albans City and Town.

Table 5. Initial Options for Erosion Control Requirements

Project Size/Scope:			
Measures required in the Vermont Low Risk Site Handbook	Project is subject to Vermont Construction General Permit OR disturbs \geq 1 acre of area	Project is not subject to general permit, but is: - In an impaired watershed OR - On a property with land within a stream buffer OR - Disturbs > XXX SF	All other projects
Waste/Debris (MS4 permit requirement)	Follow Vermont CGP protocols (http://www.anr.state.vt.us/DEC/wastediv/candd/main.htm)	Option: Provide link on application form and permit to Vermont recommendations and local waste control/ recycling resources	Option: Applicant signs off that erosion control & waste management guidance has been received when a building permit is issued
EROSION CONTROL STANDARDS (From Vermont Low Risk Site Handbook)			
(1) Mark site boundaries, flag trees, post signs, install fence (may or may not be needed)	Follow Vermont requirements based on risk category		
(2) Limit disturbance area; <i>NOTE, it is strongly recommended that applicants mark the limits of disturbance and the storage areas for construction equipment and materials, and any areas (including trees) that are to be protected from compaction and disturbance. If the Town were to add this, it would represent a significant improvement in water quality protection over the existing State guidance.</i>	Follow Vermont requirements AND mark limits of disturbance and areas of construction vehicle/material storage on site, including mature trees	Option: Mark limits of disturbance with stakes, ribbon and mark areas of construction vehicle/material storage on site, including mature trees	Option: Recommend marking off limits of disturbance with stakes, ribbon
(3) Stabilize the construction entrance	VT requirements	Consider: Recommend or require if any off-site vehicles involved in project	Consider: Recommend if driveway is not currently paved/ hard surfaced
(4) Install silt fence on the downhill side of the construction activities between any ditch, swale, storm sewer inlet, or waters of the State and the disturbed soil	VT requirements	Consider: Require if project could result in flow to a stream, wetland or storm drain	Consider: Recommend or require if project could result in flow to stream, wetland or storm drain
(5) Divert upland runoff with a berm if 1. one or more acres of soil would be exposed at any one time (excluding roads) or 2. The average slope of the disturbed area is 20% or steeper.	VT requirements	Recommendation: Require when upslope drainage has the potential to run onto exposed soils on the construction site	Recommendation: Not required

Project Size/Scope:			
Measures required in the Vermont Low Risk Site Handbook	Project is subject to Vermont Construction General Permit OR disturbs \geq 1 acre of area	Project is not subject to general permit, but is:	
		- In an impaired watershed OR - On a property with land within a stream buffer OR - Disturbs > XXX SF	All other projects
(6) If there is a concentrated flow (e.g. in a ditch or channel) of stormwater on your site, install stone check dams to slow down flow	VT requirements	Recommendation: not required	Recommendation: not required
(7) Construct permanent controls	VT requirements	Recommendation: Not required	Recommendation: Not required
(8) Install temporary or permanent stabilization of exposed soil within 7, 14, or 21 days of initial disturbance	VT requirements	Recommendation: VT requirements	Recommendation: Require within [3-7] days of initial disturbance
(9) Follow winter construction procedures if land disturbance occurs between October 15 and April 15	VT requirements	Recommendation: Not required	Recommendation: Not required
(10) Stabilize soil at final grade	VT requirements	Recommendation: VT requirements	Recommendation: Require within [3-7] days of completion
(11) Treat water pumped from dewatering activities so that it is clear when leaving the construction site.	VT requirements	Recommendation: VT requirements	Recommendation: VT requirements
(12) Inspect the site	VT requirements; require bond/escrow to ensure inspection for high-risk projects <i>*Recommend expanding scope to include construction-phase inspection of permanent stormwater BMPs</i>	Recommendation: Inspection within 7 days of project commencement and within 48 hours of measurable rainfall	Recommendation: Inspection within 7 days of project commencement and within 48 hours of measurable rainfall

3.4 POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

3.4.1 REQUIRED REGULATIONS

Pursuant to the MS4 permit, the City and Town must adopt a number of new standards and requirements related to post-construction stormwater control, or permanent stormwater BMPs. The central requirement places responsibility on the City and Town to require post-construction stormwater management “equivalent” to Vermont standards for those projects disturbing more than one acre of area, but that will not result in the one acre or more of total impervious surface that triggers State permitting requirements. The City and Town must include provisions to ensure maintenance of these post-construction BMPs, and provisions to ensure that municipally-sponsored projects also provide stormwater control and maintenance.

In a similar vein to the construction erosion discussion above, the City and Town also must consider “how much is enough” for requiring post-construction stormwater control measures below the acre-disturbance threshold. While the MS4 permit does not explicitly require this, any permanent stormwater controls implemented above and beyond the MS4 requirement will have two benefits. First, applicants will have less incentive to modify sites or subdivisions to be “just under” the one-acre disturbance

threshold and thus avoid all stormwater management measures. Second, having some baseline requirement would provide the City and Town with “credits” under the Flow Restoration Plan, since new impervious surface that would have been added without flow controls will instead receive some treatment. This principle also applies to potential future phosphorous limits under the TMDL for Lake Champlain, since there will be some requirements to manage phosphorous from developed land.

Table 6 below lists the MS4 Post-Construction Requirements, City and Town SWMP Response, Existing Regulations and Recommended Actions. These are discussed in detail in the subsections that follow.

Table 6. MS4 Requirements, Post-Construction Stormwater Management in New Development & Redevelopment

MS4 Permit Provision	City/ Town SWMP Response	Existing Regulations	Recommended Actions
<i>There is a regulatory gap consisting of activities that disturb greater than one acre of earth but that do not result in creation of new or expansion of existing impervious surface of greater than one acre. Consequently, a permittee must develop, implement, and enforce a program to reduce pollutants in any post-construction stormwater runoff to the small MS4 from activities that result in a land disturbance of greater than or equal to one acre and that are not subject to regulation under the Agency's post-construction stormwater management permit program.</i>			
<i>(a) The permittee must review existing policies, planning, zoning and subdivision regulations, and ordinances to:</i>			
<i>(1) Determine their effectiveness in managing stormwater runoff that discharges into the small MS4 from new development and redevelopment projects to prevent adverse impacts to water quality;</i>		Town: Section 221 (2 and 10 year storm control required); 2 year storm is less effective for WQ and hydromod than 1 year or 0.9" WQ volume	Requirement for “Regulatory Gap” projects to meet State standards, but with multiple waivers and additional practices allowed
<i>(2) Determine their consistency with the requirements of the Secretary's rules and general permits regulating post-construction stormwater runoff;</i>		City: Miscellaneous regulations in Section 515, 516, 809 and Article 7 that could be used to review for water quality impacts, but no explicit requirement	Requirement in ordinance for site plan and subdivision to provide WQ and larger-storm management; modify LDRs to refer to ordinance and provide integration with required landscaping, buffering
<i>(3) Assess whether changes can be made to such policies, regulations and ordinances to support low impact design options; and</i>			Adopt (administratively) list of additional waivers and BMPs (including LID practices) allowed to meet requirement
<i>(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</i>	“The Town shall adopt revisions to its Technical Roadway Standards. The revised standards will allow for most roadways to be constructed at a narrower width, and as well, allow increased options for open drainage systems to promote pre-treatment of storm water runoff. Standards have been developed to support High Density Mixed Use development, which requires that front yards contain a minimum of 50% green space unless in a designated area of growth that allows more compact development to maintain the more rural surrounding areas. The Town Zoning regulations require at least 30% green space on all development within its commercial areas and 40% within its light industrial/commercial areas. PUDs are allowed waivers to reduce parking areas unless more parking is warranted by actual need and shared parking is encouraged to reduce impervious areas where appropriate.”		Minor amendments to Town roadway standards may be useful Amendments to Section 515 and 516 and Article 7 of City LDRs can encourage more integrated design for water quality
<i>(d) The permittee must develop and implement procedures to identify new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale.</i>			- Include SF disturbed and existing/ total SF impervious, common plan of development at top of all land development applications; - See response to (a)(1) to (3) above
<i>For stormwater runoff that discharges into the small MS4 from new development and redevelopment projects that disturb greater than or equal to one acre and that are not subject to regulation under the Agency's post-construction stormwater management program, the permittee must adopt, an ordinance, planning, zoning and subdivision regulation or other regulatory mechanism that:</i>			
<i>(1) Prevents or minimizes water quality impacts from post-construction stormwater</i>			See response to (a)(1) to (3) above

MS4 Permit Provision	City/ Town SWMP Response	Existing Regulations	Recommended Actions
<p><i>runoff from such developments; and</i></p> <p><i>(2) Utilizes a combination of structural, non-structural and low impact best management practices (BMPs) which are appropriate for the community, and meet, at a minimum, requirements in the 2002 Vermont State Stormwater Management Manual; and</i></p>			<p>Recommend WQ volume (0.9”) and 10 year storm as parameters</p> <p>Recommend multiple additional allowable practices and waivers beyond current VSMM</p>
<p><i>(3) Ensures adequate long-term operation and maintenance of BMPs.</i></p>		<p>Town has Stormwater Management Agreement for Outside MS4 Impaired Areas</p>	<p>- Develop model maintenance agreement for post-construction BMPs</p> <p>- Require maintenance agreement & financial surety in stormwater ordinance</p>
<p><i>(1) Develop and implement procedures for inspecting development and redevelopment projects for compliance with the conditions of the permittee’s regulations.</i></p>			<p>- Adopt administrative procedures for construction-phase or as-built inspection of stormwater BMPs, referred to in stormwater ordinance; coordinate with construction erosion inspection</p> <p>- Adopt tracking mechanism to ensure that annual inspections of BMPs are received</p>
<p><i>(2) Develop and implement procedures to assure that development and redevelopment activities undertaken by the permittee, including road projects, are properly permitted and maintained.</i></p>			<p>Clarify in stormwater ordinance that City/ Town is subject to same provisions depending upon area of disturbance</p>

3.4.2 EXISTING STANDARDS & EFFECTIVENESS

At present, the Town and City have a few provisions in their respective LDRs that either directly or indirectly provide some authority to review and condition applications for impacts on post-construction stormwater controls. As is the case in many smaller municipalities, The Town’s regulatory language related to stormwater management consists principally of general language on “drainage,” rather than specific numeric requirements or design standards. However the Town does have explicit provisions in the Subdivision Regulations in the LDRs requiring post-construction stormwater control. Article III, Section 221 (see box at right) requires applicants for subdivision approval to provide “drainage facilities” “...sufficient to accommodate the two and ten year return period storm runoff from all roads, lots and upstream drainage areas.” This represents the one specific provision in either community’s bylaws related to post-construction stormwater controls, and it would cover subdivisions that fall within the “regulatory gap” of an acre of disturbed area.

Town of St. Albans Subdivision Regulations Section 221 – Design Standards
 Drainage Facilities shall be provided sufficient to accommodate the two and ten year return period storm runoff from all roads, lots and upstream drainage areas, whether inside or outside the development. Post-development runoff/drainage (volume & rate) shall not exceed Pre-development runoff/drainage (volume & rate). The Development Review Board shall not approve a drainage system that would overload downstream drainage facilities or cause flooding on other lands or results in increased public expenditure, until proper provision has been made for the improvement of such conditions. Adequate provision shall be made to minimize erosion during and after construction. All drainage system easements shall be shown on the plat.

The City also has what could be interpreted as an existing requirement for all projects subject to site plan review to provide some permanent stormwater controls, and 10-year storm detention for those projects creating “greater than 1 acre of pavement [sic].” The text of Section 603.4, General Criteria and Standards, is shown in the box on the following page. This language would not bind projects in the “regulatory gap” to a specific technical standard; moreover, for those properties creating a total area of equal to or greater than 1 acre of “pavement” (impervious surface), this standard is likely in conflict with the superseding requirements of the Vermont program.

**City of St. Albans Land Development Regulations
Site Plan Section 603.4, General Criteria & Standards**

G. Drainage. All projects shall be designed to include good stormwater management practices. Stormwater runoff shall be directed to existing storm drainage facilities where they exist. New swales, catch basins, and storm drains shall be incorporated into the site design, where necessary, to prevent any significant runoff from reaching adjacent properties or causing unsafe conditions on the project site. For new projects with impervious areas greater than 1 acre of pavement, onsite stormwater detention may be required by the Development Review Board. If required, the detention pond shall be designed to discharge runoff at a rate equal to or less than the pre-development rate for a 10 year storm frequency.

However, the City’s LDRs do have some provisions (which are not present in the Town regulations to the same extent) that can be interpreted to provide some authority to require design for stormwater management for subdivisions and site plans, and particularly for projects in the design review overlay districts. Table 6 below lists provisions in the City LDRs (in addition to Section 603.4 above) that relate directly to stormwater management. The team recommends discuss with City staff the potential to modify these regulations, Section 603.4 above, and the related requirements for landscaping, to provide more effective and integrated stormwater approaches. Some amendment language along these lines may be appropriate for the Town as well.

Table 6. Existing Provisions in the City LDRs Related to Post-Construction Stormwater Control

Reference	Text
Section 515.3 Parking Design Standard;	F. Off-street parking areas shall be drained so as to dispose of all surface water accumulated in the parking area in such a manner as to preclude drainage of water onto adjacent properties or toward buildings.
Section 515.4 Landscaping and Screening	Landscaping for accessory off-street parking lots shall serve as an aid in controlling pedestrian circulation, enhancing environmental and aesthetic conditions, reducing storm water runoff in paved areas, and the glare of automobile lights
	G. Drainage All projects shall be designed to include good stormwater management practices. Stormwater runoff shall be directed to existing storm drainage facilities where they exist. New swales, catch basins, and storm drains shall be incorporated into the site design, where necessary, to prevent any significant runoff from reaching adjacent properties or causing unsafe conditions on the project site. For new projects with impervious areas greater than 1 acre of pavement, onsite stormwater detention may be required by the Development Review Board. If required, the detention pond shall be designed to discharge runoff at a rate equal to or less than the pre-development rate for a 10 year storm frequency.
Section 809 (Subdivision) Development Requirements	A. Streets (b) Topography: Streets shall be related logically to the topography so as to produce usable lots, reasonable grades and safe intersections in appropriate relation to the proposed use of the land to be served by such streets. Adequate provisions shall be made to control the drainage of each lot by an adequate storm water system, subject to the approval of the Development Review Board
Article 7, Design Review Standards B. Landscape & Streetscape;	1. Street Tree/Streetscape Pattern; k) Bio-retention is one of several stormwater filtering systems that should be employed in parking lot and site designs. Other methods aside from bio-retention include: 1) sand filters (i.e. underground, organic or perimeter), and 2) vegetated channels (i.e. grass channels, dry/wet swales, filter strips). 2. Native landscaping/restoration (d) Bio-retention areas in parking lots and development sites are encouraged to treat stormwater runoff in a natural manner by detaining it and filtering it as it percolates through plantings and sand filter beds; (e) Underplanting of shrubs and groundcovers is encouraged as an alternative to mulch and lawns and to serve as a part of the stormwater management plan for a site by providing detention and filtration functions
E. Site Design & Development	5. Parking; (j) Bioretention areas or suitably landscaped storm water detention areas shall be incorporated to the fullest extent possible within parking lot designs so as to manage storm water in a safe and well designed manner. See Figure 10 below. (includes Figure 10)
Section 708 Definitions	Bioretention – a water quality practice that utilizes landscaping and soils to treat urban stormwater runoff by collecting it in shallow depressions, before filtering

Reference	Text
	through a fabricated planting soil media. Pea gravel filter strip – a trench filled with small, river-run gravel used as pretreatment and inflow regulation in stormwater filtering systems.
Section 516 Landscaping, Buffering, Setbacks and Grading	B. Performance Bond The applicant shall provide a suitable performance bond or other form of security to guarantee the performance and completion of all required landscaping, site restoration, screening, fencing, paving, striping and public improvements. In the case of landscaping, bonding shall be sufficient to guarantee all plantings for a period of two years.

3.4.3 RECOMMENDED ACTIONS

The team’s recommendation on post-construction control will require significant discussion on technical standards and administration. As the starting point for discussion, the team’s recommendation for requiring post-construction control would include three key features. These would most likely be implemented by requiring post construction control per (1) and (2) below in the stormwater ordinance, and then amending relevant provisions in the LDRs listed in Table 6 to coordinate with these stormwater ordinance requirements and maximize the use of landscaped areas, parking lots, and tree plantings to achieve post-construction control efficiently and cost-effectively. The requirements in the ordinance would be:

- (1) Projects that disturb more than one acre but are otherwise not subject to Vermont permitting (i.e. those in the so-called “regulatory gap” addressed by the MS4 permit) must submit a stormwater management plan equivalent to the State standards in place at the time of application, but with a number of additional waivers and options for BMPs allowed above and beyond those currently permitted in the Vermont Stormwater Management Manual (VSMM).
- (2) Projects subject to site plan or subdivision review (possibly with a minimum threshold number of lots in the Town) must demonstrate that provisions to provide for water quality protection (possibly 0.9” of rain in 24 hours) and large storm detention (possibly the 10-year storm) have been incorporated, using a combination of practices that include the additional options and waivers referenced above and emphasizing use of landscaped areas already on site, or planned, to provide stormwater management
- (3) Outside technical review of stormwater management plans will be provided and charged, in whole or part, to the applicant, under procedures adopted by the City Council or Select Board.

Meeting Technical Standards Efficiently on Site. The most important questions that the team will need to discuss are the technical standards that would be selected, and what practices would be allowed to demonstrate compliance. The team would recommend selecting a smaller volume for water quality that must be managed on site (typically 0.9” of rain in 24 hours, which is below the one-year storm volume and is not, in the team’s experience, an onerous standard), and then ensure that there is control for the peak discharge of a larger storm – possibly the same 10-year storm volume that the Town presently uses in its regulations. Controlling the 10-year volume is protective of both the MS4 and downstream sites, but does not require the larger (and more expensive) volume controls needed to manage a 25- or 100-year storm.

In small MS4 communities where costs and regulatory burden are a primary concern, it can be very productive to focus on implementing simple post-construction controls of this kind that integrate with required landscaping and trees, and with modifications to (or design of) parking lots and other paved surfaces. If a water quality plus peak volume approach were adopted, the purpose would be to maximize the use of simpler, on-site practices to direct stormwater flows to landscaped areas, small-scale stormwater BMPs, or other permeable surfaces that have been designed, and professionally reviewed, for their ability to provide some stormwater treatment and control. These measures can be coordinated within existing provisions in the City’s and Town’s LDRs that address stormwater control. It is important to note that in the City’s case, this will entail amendments to Section 603.4 and particularly the design standards in Article 7 so that technical standards are governed the stormwater ordinance and associated technical guidance, rather than having language and illustrations in the LDRs (Such as Figure 10 referenced in Table 6 above, which provides a general schematic for bioretention) that could conflict with the stormwater ordinance.

Providing Additional BMP Options and Waivers. While referring to the State’s standards and the Vermont Stormwater Management Manual as most recently amended (instead of developing a new set of guidelines) is the most efficient course of action for the City and Town and for applicants, the team also recommends providing a number of “outs” or allowable exceptions to the State’s existing manual. These include waivers to the Channel Protection Standard that would allow diffuse drainage through a landscape rather than creating storage, which can be expensive and counter-productive; another is to provide an updated standard for the soil mix in bioretention facilities to incorporate more sand, less clay and less compost, which would provide for greater infiltration. In addition some newer BMPs such as updated types of permeable surfacing are not accounted for, and could be productively used in St. Albans; and no credit is given for tree planting. If the new Vermont manual corrects these issues, the Town and City can modify the administrative guidance to refer directly to the new manual. In the meantime, however, the Team recommends adopting a set of Town- and City-specific waivers that would allow use of these practices.

3.4.4 ADMINISTRATIVE & REGULATORY CONSIDERATIONS

These recommendations raise many administrative questions for post-construction control. First and most important is the question of plan review. It is most likely that the City and Town will need to have some contracted assistance to review plans effectively, particularly for those projects in the “regulatory gap” that need to meet full Vermont stormwater permit standards. To the extent the Town amends the LDRs to provide greater stormwater management for smaller projects, review of these measures for appropriate siting and sizing, consistency with good design practices, and ease of maintenance also will require review capacity that staff does not have.

24 VSA §4440 Administration; finance

(d) The legislative body may establish procedures and standards for requiring an applicant to pay for reasonable costs of an independent technical review of the application. (Added 2003, No. 115 (Adj. Sess.), § 99.)

Besides a reluctance to impose additional requirements on applicants or landowners, the other significant issue is how to allocate the cost of additional review. Vermont’s Municipal Planning & Development Statutes (24 VSA §4440(d), at left) allow legislative bodies to establish standards and procedures for technical review, which may include charging applicants for these costs. Generally, Vermont municipalities will use technical review – which is in some cases invoked by staff pursuant to an adopted policy, and in others requires a motion of a DRB – to provide support for issues or plans that present technical issues beyond the capacity of planning and zoning staff, or the DRB, to review for consistency with municipal bylaws. Stormwater, along with wetlands and traffic, is a common reason for invoking technical review.

**Town of St Albans Subdivision Regulations
Section 212 - CONDITIONS OF FINAL PLAT
APPROVAL**

The Development Review Board may, where it deems necessary and with the consent of the Selectboard, retain proper legal or engineering professionals to review deeds, agreements or plans, design and construction of required improvements, the cost of which professional review shall be shared by the subdivider (75%) and the Town (25%).

At present, the City and Town have different approaches to technical review. The City’s DRB and Planning & Zoning staff do not at present use this approach to technical review. The Town has a provision allowing for technical review in its LDRs, with costs split between the Town (25%) and applicant (75%). This has been used for stormwater plan review in at least one case. However, invoking this provision requires approval both of the DRB, and the Select Board, meaning that this provision can only be used for those projects that have been through staff review and presented to the DRB. As the Town has worked to provide an efficient process with one DRB meeting only for most applications, this approach is not compatible with using technical review for stormwater requirements.

The Team’s initial recommendation is that each community consider a policy of requiring contracted, professional review of stormwater management (and erosion control) plans for projects in the “regulatory gap” where an acre or more of land would be disturbed. Below this threshold, each community should consider modifying its existing policy (in the case of the Town) or adopting a policy (in the City’s case) allowing staff to invoke, or recommend to the DRB to invoke, technical review for applications with stormwater management, stream buffer or wetland components that staff feels are beyond their capacity to review effectively. This could be accomplished through a contractor or through NRPC, if NRPC finds it has the capacity to provide contracted staff review services for stormwater and erosion control plans. These reviews may be very straightforward, and over time, increased staff expertise could eliminate some of the need for outside technical review.

3.4.5 ENSURING & TRACKING POST-CONSTRUCTION MAINTENANCE

Finally, ensuring post-construction maintenance must be a component of any stormwater program not only for the sake of meeting MS4 permit requirements, but to ensure that the Town and City do not, in the future, face ongoing issues with failing infrastructure (public or private) due to insufficient maintenance. Two issues are involved: One, establishing maintenance agreements for BMPs; and two, providing some financial surety to ensure that BMPs are established per the issued permits.

Maintenance Agreements. The team encourages the City and Town to have some sort of stormwater maintenance agreement for any property receiving site plan or subdivision approval (other than perhaps subdivisions creating fewer than five or similar single-family lots). Per the MS4 requirements in Table 6, public projects must also show that there is some authority to bind the municipality to these standards and maintenance requirements as well. The Town, again, has a start on both fronts: A stormwater maintenance agreement has been developed for properties outside the impaired MS4, and the Road Standards Ordinance, while limited, requires permits to be up-to-date, requires an inspection, and requires an engineer's certification that the system was constructed per the design and is operating as designed.

From experience with the City and Town, and other Vermont municipalities, the team recommends at a minimum a provision in the stormwater ordinance that will require both a maintenance agreement with financial surety, and annual inspection and maintenance of BMPs. Ideally, the Town or City would log receipt of annual inspection and maintenance reports, and contact the property owner or responsible party if the report is not received. This may have to be phased in once an individual or contractor is identified for technical review and erosion control. In addition, it is strongly recommended that some process be developed on the application form to log and track locations and types of permitted stormwater BMPs, including landscaped areas providing stormwater function. This should be reviewed with NRPC, and would be information such as a shapefile or GPS coordinates. Ideally, this would be funneled into a database kept by the City, Town or NRPC as a record of the BMPs and would be linked to annual inspection reports.

Financial surety (Bonds or letters of credit). Another important key to effectiveness is the use of some financial surety – whether a bond or a letter of credit – to ensure that stormwater infrastructure is built as approved. This is particularly important if landscape features (such as bioretention in parking lot landscaping) are used to provide stormwater control. The use of bonds or letters of credit for landscaping, stormwater and other improvements is common practice in Vermont municipalities though sometimes waived by DRBs if there does not appear to be sufficient risk to the municipality to require one. As noted in Table 6 above, the City's LDRs do allow the DRB to hold a surety, with landscape bonds to have a two-year duration. However, staff reports that the DRB has waived this provision frequently. Because of the importance of both landscaping and stormwater BMPs to achieving not only MS4 compliance but the goals of the FRPs and TMDL as well, the team encourages consideration of including the bond requirement in the stormwater ordinance, and adding more stringent language in the LDRs as well. A three-year duration for landscaping letters of credit also is recommended rather than the City's current two year duration, where landscape-based BMPs are used.

4.0 STREAM CORRIDOR PROTECTION

4.1 OVERVIEW

Among the most important actions the City and Town can take with respect both to permit compliance and water quality protection is to adopt and enhance regulations that will minimize, and mitigate the impacts of, impervious surfaces and land clearing within the immediate riparian corridor of Stevens Brook, Rugg Brook, and their tributaries. Stream buffer regulations are uniquely important in protecting small urban watersheds from both flow and pollutant inputs, but represent an often controversial encumbrance on landowners' use of this portion of their properties. Since the most of the City is already developed, and the Town has seen significant development in recent years, there is a challenging balance to be struck between stream protection, and managing existing land uses.

An effective stream buffer must do two things: One, keep structures and potentially polluting uses physically separated from riparian corridors; and two, provide sufficient vegetative growth, and functional soil structure, to maintain the natural functions of infiltration, pollutant and soil attenuation, and shading within the corridor. Presently, the Town of St. Albans requires a physical separation for structures – 75 feet from named streams – in the provisions in the text box on the following page. The City's regulations, by contrast, consist primarily of the setbacks required for rear and side yards in each zoning district, which will be related to stream locations only on

properties where a stream forms a property boundary. In neither case do the regulations require a vegetated buffer, or an active delineation of areas to be preserved for natural functions. Both components will be important to adopt – recognizing the very challenging issues within the City in particular, where developed historically occurred along streams.

A core task in this project is the assessment of stream corridor conditions and conditions with the 50 and 100 foot buffer areas along Stevens Brook, Rugg Brook and the tributaries to each of these streams. Based on the information from this assessment, staff and the project team will be able to review the distribution of impervious cover and areas of

concern with staff, discuss options (some of which are listed under recommended actions in the table below), and begin drafting options for regulation. Table 7 below lists the MS4 permit requirements pertaining to stream corridors. The sections that follow identify areas where impervious cover exists within the stream corridor, and areas of particular concern. Designing a buffer regulation – which may be structured as an overlay district on all stream corridors, an overlay unique to a stream or watershed, a general provision applicable to all sites, or as a dimensional requirement within individual zoning districts - will be the main task facing the project team and staff as this project moves along.

St. Albans Town LDRs				
Section 403 - SPECIFIC LOT AND USE DIMENSIONAL REQUIREMENTS				
1. The following minimum setbacks shall apply in locating structures, roadways and parking in relation to stream banks, classified wetlands and the shore of Lake Champlain				
	Named Stream	Watercourse	Class 1 Wetland	Class 2 Wetland
Structure	75 feet	25 feet	50 feet	50 feet
Impervious Roadways/Parking*	60 feet	20 feet	50 feet	50 feet
Permeable Roadways/Parking*	50 feet	15 feet	50 feet	50 feet

Table 7. MS4 Permit Requirements for Stream Corridor Regulation

MS4 Permit Provision	City/ Town SWMP Response	Existing Regulations	Recommended Action
<i>(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 the legal authorities or strategies that the permittee has adopted to protect and regulate development in the stream corridors of stormwater impaired waters.</i>	Two years after the issuance of an authorization as a regulated small MS4, the City will submit to the Agency a report on the legal authorities or strategies that the City has adopted for enhanced protection and regulation of development in the Stevens Brook stream corridors	City: Rear & side setbacks in LDRs, which are not specific to stream corridor protection; general standards on erosion control & environmental quality Town: Section 403, Required minimum setback from Named Streams	Submittal of this report & assessment, along with adopted amendments to City LDRs and Town LDRs Section 403.
<i>(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. In preparing this plan, the permittee should review riparian buffer and stream fluvial geo-morphological information provided to the permittee by the Agency as a result of the Agency's preparation of stormwater TMDLs</i>	Based on the riparian buffer and geomorphological information that will be developed for the Stevens Brook stream corridor, the City will evaluate the establishment of minimum widths of stream channel buffers and setback requirements to enhance protection of the stream corridor. For those areas where the stream corridor has been developed with impervious surfaces, options for corridor restoration will be considered		Minimum setbacks: Discuss with team & municipal staff at summer work session Requirements: Consider requiring additional vegetation to be planted with zoning permit applications; clearing restrictions immediately adjacent to streams; limitations on establishing lawn within buffer Incentives for restoration: Consider providing additional allowable coverage in front/side yard if lots are affected by stream corridor buffer provisions;

4.2 LOCATION AND DISTRIBUTION OF IMPERVIOUS SURFACE IN THE STREAM BUFFER

This section and Figures 1 (Impervious Area in Buffer, Stevens Brook) and 2 (Impervious Area in Buffer, Rugg Brook) attached with this report present the assessment of impervious cover within the buffer of each watershed. Tables 8, 9 and 10 below break down the location and extent of impervious cover by watershed, and by City and Town.

Table 8. Total Impervious Area within Buffer, Stevens Brook & Rugg Brook Watersheds

		Watershed Area (Acres)	Total Buffer Area (Acres)	Buffer within Watershed Area (%)	Impervious Area within Buffer (Acres)	Buffer Classified as Impervious (%)
Stevens Brook Watershed	50 ft Buffer from Top of Bank	1,858.9	134.9	7.3%	4.4	3.3%
	100 ft Buffer from Top of Bank		243.8	13.1%	12.7	5.2%
Rugg Brook Watershed	50 ft Buffer from Top of Bank	1,740.3	148.3	8.5%	12.8	8.6%
	100 ft Buffer from Top of Bank		266.8	15.3%	28.3	10.6%
Both Watersheds Combined	50 ft Buffer from Top of Bank	3,599.2	283.8	7.9%	17.2	6.1%
	100 ft Buffer from Top of Bank		513.2	14.3%	41.0	8.0%

Table 9 below presents the amount of buffer area, and imperviousness within it, for areas within the City. The primary issue is the Rugg Brook watershed; approximately one-quarter of the buffer area of the watershed is within the City, and there are significant amounts of imperviousness within 50 and 100 feet of the bank. In an urban setting like this, the policy goal for a stream buffer usually focuses on providing some greater degree of protection and vegetation as sites are redeveloped or modified. It is feasible under Vermont law – though not popular in individual site plan reviews – to limit or require some removal of imperviousness within a setback as a site is redeveloped. It will be an important area of policy discussion first with Staff to see how much could be accomplished with measures such as a deeper rear setback, perhaps coupled with a shorter front setback, and also to explore whether there are realistic landscaping or planting requirements that could “disconnect” the impervious surface more effectively along the stream. The team anticipates that a number of options will need to be drafted and evaluated. Moreover, there will need to be a working session with staff with these figures to assess options by zoning district.

Table 9. Total Impervious Area within Buffers, City of St Albans

		Watershed Area within St. Albans City (Acres)	Buffer within St. Albans City (Acres)	Proportion of Buffer within St. Albans City (% of Total Buffer)	Impervious Area within Buffer in St. Albans City (Acres)	Buffer Classified as Impervious in St. Albans City (%)
Stevens Brook Watershed	50 ft Buffer from Top of Bank	72.7	2.0	1.5%	0.3	15.6%
	100 ft Buffer from Top of Bank		3.7	1.5%	0.9	24.1%
Rugg Brook Watershed	50 ft Buffer from Top of Bank	597.7	34.4	23.2%	5.4	15.8%

		Watershed Area within St. Albans City (Acres)	Buffer within St. Albans City (Acres)	Proportion of Buffer within St. Albans City (% of Total Buffer)	Impervious Area within Buffer in St. Albans City (Acres)	Buffer Classified as Impervious in St. Albans City (%)
Both Watersheds Combined	100 ft Buffer from Top of Bank	670.4	62.0	23.2%	13.4	21.7%
	50 ft Buffer from Top of Bank		36.5	12.9%	5.8	15.8%
	100 ft Buffer from Top of Bank		66.0	12.9%	14.3	21.7%

The management issues within St Albans Town are somewhat different. A much larger percentage of the buffer is within the Town than the City, but less imperviousness overall, and a lower percent of the buffer classified as impervious. Here, the issue principally will be ensuring that well-vegetated setbacks are maintained. A substantial enhancement to water quality would be requiring tree canopy plantings along segments of each brook if and when subdivisions or commercial uses are approved on larger, undeveloped parcels. This could perhaps be done in lieu of other required landscaping. Another essential issue for the Land Development Regulations is whether subdivision designs include stream buffer area within individual residential lots, or if this area is maintained as common land. There are pros and cons to both approaches, largely depending upon whether a functional Homeowners Association is created that can either provide some enforcement, or can be enforced against effectively by the Town in the event of a violation.

Table 10. Total Impervious Area within Buffers, Town of St Albans

		Watershed Area within St. Albans Town (Acres)	Buffer within St. Albans Town (Acres)	Proportion of Buffer within St. Albans Town (% of Total Buffer)	Impervious Area within Buffer in St. Albans Town (Acres)	Buffer Classified as Impervious in St. Albans Town (%)
Stevens Brook Watershed	50 ft Buffer from Top of Bank	1,680.6	132.9	98.5%	4.1	3.1%
	100 ft Buffer from Top of Bank		240.1	98.5%	11.9	4.9%
Rugg Brook Watershed	50 ft Buffer from Top of Bank	1,142.6	113.9	76.8%	7.3	6.4%
	100 ft Buffer from Top of Bank		204.9	76.8%	14.8	7.2%
Both Watersheds Combined	50 ft Buffer from Top of Bank	2,928.8	247.3	87.1%	11.4	4.6%
	100 ft Buffer from Top of Bank		447.2	87.1%	26.7	6.0%

4.3 AREAS WITH LAND USES OF CONCERN

Based on a desktop assessment of the impervious area within a 100 ft buffer of the stream, no specific land uses were identified, however several key areas of concern were flagged. Figures 3 (Stevens Brook) and 4 (Rugg Brook) depict five areas of concern (AOCs) that were identified along Stevens Brook and 3 along Rugg Brook. These areas fall within the 50 and 100 foot top of bank buffers. These areas were selected primarily due to their proximity to the stream top of bank, total area of impervious features within the buffers, and the composition of impervious areas (i.e., roads, driveways, or structures). These are areas that may require special provisions within the LDRs or possibly the stormwater ordinance, and also may be important sites to evaluate for cooperative retrofit efforts outside the regulatory process.

In the Stevens Brook watershed, five areas were identified (Figure 3).

- AOC1 and AOC2 are located on the north and south side of Lake Street, respectively. On both sides of the street, Stevens Brook is highly channelized and lacks any vegetated buffer. Impervious areas are within 0 to 10 feet of the stream bank on both sides of the stream in AOC1 and the east side of the stream in AOC2. Although there is a 50 foot pervious area directly bordering the stream bank on the west side of AOC2, this area is mowed to the stream bank.
- AOC3 is located approximately 900 feet upstream of AOC1 and 2 on the north side of Lower Welden Street. There is an approximately 15 to 20 foot strip of pervious area between the stream top of bank and the impervious parking lot, but this area is mowed to within less than 5 feet of the water line. A park with recreational fields is located on the west side of the stream. There is a narrow vegetated strip (<5 feet) along the stream; the remainder of the pervious area bordering the stream is mowed. A row of large trees are present within the mowed area.
- AOC4, located further upstream, involves a large section of impervious area made up of a parking lot and a building on the east side of Lemnah Drive. The parking lot is 10 to 20 feet from the top of bank along the bordering area. The parcel contains approximately 0.6 acres of impervious surfaces within the 100 foot buffer and 0.2 acres of impervious within the 50 foot buffer. Most of this pervious area long the stream bank is mowed with only an approximate 1 meter vegetated buffer. The north side of Stevens Brook abuts additional mowed and impervious areas following a narrow (<5 feet) vegetated stream buffer.
- The final area of concern for Stevens Brook, AOC5, is a building and parking lot closely abutting the stream. Of the impervious area in this parcel, 0.4 acres is within the 50 foot top of bank buffer and 0.8 acres is within the 100 foot buffer. There is a small primarily vegetated buffer, but evidence of recent bank erosion along the back of the parking lot is evident.

In the Rugg Brook watershed, three AOCs were identified (Figure 4).

- The first of these areas, AOC1, is a residential development between Crosby Drive and Cameron Drive. Portions of at least 9 of these houses and driveways fall within the defined buffers. The pervious buffer around Rugg Brook is primarily mowed with a thin vegetated area directly bordering the stream. This vegetated area narrows as the impervious surfaces are located closer to the stream top of bank.
- AOC2 is located to the west of South Main Street and includes an impervious driveway and parking area. These impervious areas are located within 35 feet of the stream top of bank, and much of this pervious area is regularly mowed. The impervious area is sloped towards the stream, which facilitates stormwater and associated pollutant transport to Rugg Brook.
- The third area, AOC3, is an athletic complex and its associated parking areas. Much of the stream is closely (<15 feet) abutted by impervious surfaces as it passes through this area, and the nearby pervious areas are primarily mowed. Approximately 0.8 impervious acres fall within the 50 foot top of bank buffer and 1.7 acres fall within the 100 foot buffer.

5.0 ADDITIONAL REQUIREMENTS & OPPORTUNITIES

5.1 LANDOWNER ASSISTANCE IN BMP INSTALLATION AND MAINTENANCE

Another requirement of the MS4 Permit is for each municipality to provide some program of outreach and assistance for property owners to implement and maintain “low impact development” BMPs. With respect to a regulatory or administrative program, the most important measures that can be implemented are (1) to ensure that there are no barriers in any municipal regulation to the widespread, and easy, implementation of site-scale BMPs; (2) to identify and draft zoning or changes that encourage BMP implementation where appropriate; and (3) to outline administrative procedures (including staff education) that will facilitate providing property owners with prompt, accurate information. The options listed in the table below are based

on the Team’s review and discussions with St. Albans staff, as well as experience with other communities, and provide both “the basics” and some options for future program enhancement.

One typical landowner-assistance BMP that is frequently cited is disconnecting downspouts from the storm drain system, or at least directing downspout drainage to permeable areas. This is probably a feasible and fairly easily implemented program in much of the City and Town. However, along Main Street and in other older areas of the City, many of the flat roof commercial building roofs remain connected to the sanitary sewer system. In most cases, these roof drains are internal to building. The roof drains extend into the basements and are interconnected with the sanitary sewer services. A common pipeline typically exits the building basements and is connected to the sanitary sewerline in the street. It would be preferable if this stormwater collected from the roofs was discharged to the storm systems, but this is very difficult and costly to change this internal plumbing in the older buildings. Provisions have been provided with the recent Main Street project to provide a separate outlet from the basement to the storm sewers, but changes in the internal plumbing would be necessary to make this separation. Thus, based on the team’s assessment and particularly the findings under Section 4.0 on stream corridor protection, stream corridor assistance programs may be the best use of municipal resources for landowner assistance.

Table 11. Landowner Assistance Requirements

MS4 Provision	SWMP Response	Options for Action
<i>(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.</i>	<p>Recommendations from this LID assessment are: The City should consider incentives for LID as part of the policy development process related to stormwater management. Some examples of credits for consideration are; model LID bylaws, environmentally sensitive development, disconnection of rooftop runoff, disconnection of non-rooftop runoff, stream buffers, and grass channels.</p> <p>Next steps for the LID assessment are: These recommendations should be evaluated and implemented through the MS4 permitting process after planning staff has reviewed the recommendations with the planning commission, prioritized the items to address, and determined how they will be funded.</p>	<ul style="list-style-type: none"> - Consider seeking Section 319 and other funds for stream buffer protection as a top priority for landowner assistance - Add standards and language within each municipality’s Land Development Regulations encouraging the use of LID measures (notably permeable surfacing and landscape-based practices) for treatment of parking lot runoff, as discussed under 3.0 above - Develop clear administrative procedures for rainwater harvesting installation (where not contra-indicated), rain garden installation & train staff to answer calls, emails or questions

5.2 FLOW AND PRECIPITATION MONITORING

While beyond the scope of regulation *per se*, development and implementation of a flow and precipitation monitoring program will provide the City and Town with valuable information on local conditions, and progress towards meeting the Flow Restoration Plan targets. From the standpoint of program adoption, the Town and City may wish to consider providing rain gauging information and supplies in the same manner as rain barrels or other low impact development BMPs. At a minimum, including rain gauging as part of the BMP outreach information, website information and staff training will be a valuable step towards this requirement.

Table 12. Flow and Precipitation Monitoring Requirements

MS4 Provision	SWMP Response	Options for Action
<i>(7a) The permittee shall implement, or otherwise fund, a flow and precipitation monitoring program, subject to approval by the Secretary, in its respective stormwater impaired watersheds.</i>	The City of St. Albans will collaborate with the Town of St. Albans to implement the flow and precipitation monitoring program of the Stevens Brook and Rugg watershed in proportion with the area of impaired watershed within the City boundary. The SWMP will be amended to include this information once the State has determined how the monitoring program will be managed and implemented	<ul style="list-style-type: none"> - Include information on rain gauge purchase in staff training on LID BMPs such as rain barrels - Include links to USGS stream gauging and Vermont precipitation monitoring directly from City/Town website information

APPENDIX A

STORMWATER ORDINANCES, TOWN OF ESSEX & TOWN OF COLCHESTER

BIRCHLINE PLANNING LLC

*City & Town of St Albans
Stormwater Program Review
Initial Report*

