

**Appendix A: Indian Brook and Sunderland Brook TMDL
Reports**

**Total Maximum Daily Load
To Address Biological Impairment in**

Indian Brook (VT05-09)

Chittenden County, Vermont

September 2008

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Introduction

Section 303(d) of the Federal Clean Water Act requires each state to identify waters not attaining water quality standards, and to establish total maximum daily loads (TMDLs) for such waters for the pollutant of concern. The TMDL establishes the allowable pollutant loading from all contributing sources at a level necessary to attain the applicable water quality standards. TMDLs must account for seasonal variability and include a margin of safety that accounts for uncertainty of how pollutant loadings may impact the receiving water's quality. Once the public has had an opportunity to review and comment on the TMDL, it is submitted to the U.S. Environmental Protection Agency (USEPA) for approval. Upon approval, the TMDL is incorporated into the state's water quality management plan.

This TMDL establishes a scientifically based water quality target for Indian Brook that, when attained, will allow the stream to meet or exceed the established Vermont Water Quality Standards (VTWQS) for which it is impaired. This TMDL has been established in accordance with Section 303(d) of the Federal Clean Water Act, implementing regulations (40 CFR §130) regarding TMDL development, and other relevant USEPA guidance documents.

The basis for this TMDL was initially explained in the final report produced by the Vermont Water Resources Board Investigative Docket (Vermont Water Resources Board, 2004). More specifically, Appendix A of that document ("*A Scientifically Based Assessment and Adaptive Management Approach to Stormwater Management (Stormwater Cleanup Plan Framework)*") outlined the necessary steps to develop a scientifically sound approach in creating TMDLs for stormwater-impaired waters. Henceforth, this approach is referred to as the "Framework". The Vermont Department of Environmental Conservation (VTDEC) adhered to the Framework's approach for developing cleanup targets in this TMDL.

Several investigations have been conducted by multiple parties to derive the necessary information called for in the Framework. Significant results and findings of those investigations are summarized in this TMDL. Additionally, frequent interaction between VTDEC and the VTDEC-convened Stormwater Advisory Group (SWAG) yielded useful guidance for the development of this TMDL.

Description of Waterbody

The stormwater impaired portion of the Indian Brook watershed is located in Chittenden County in the Town of Essex and in the Village of Essex Junction. The headwaters in Essex originate in the undeveloped vicinity of the Indian Brook Reservoir from which the stream flows southward. The stream then flows beneath the major roads of Rts. 289 and 15 as it enters the more developed areas of Essex Junction. Turning to the west and then northwest, the brook then roughly parallels Rt. 2A as it ultimately flows to Lake Champlain via the large wetland complex associated with Mallets Creek and Mallets Bay. The stormwater impaired reach stretches from river mile 5.8 at Suzie Wilson Road up to river mile 9.8 near Rt. 15.

The entire stream portion and its tributaries within the impaired reach are Class B waters designated as cold water fish habitat pursuant to the Vermont Water Quality Standards. The total watershed area of the impaired section is approximately 4,580 acres. The land use breakdown of the watershed draining to the impaired reach is 39% developed lands, 18% agricultural or open lands and 43% forested or wetlands.

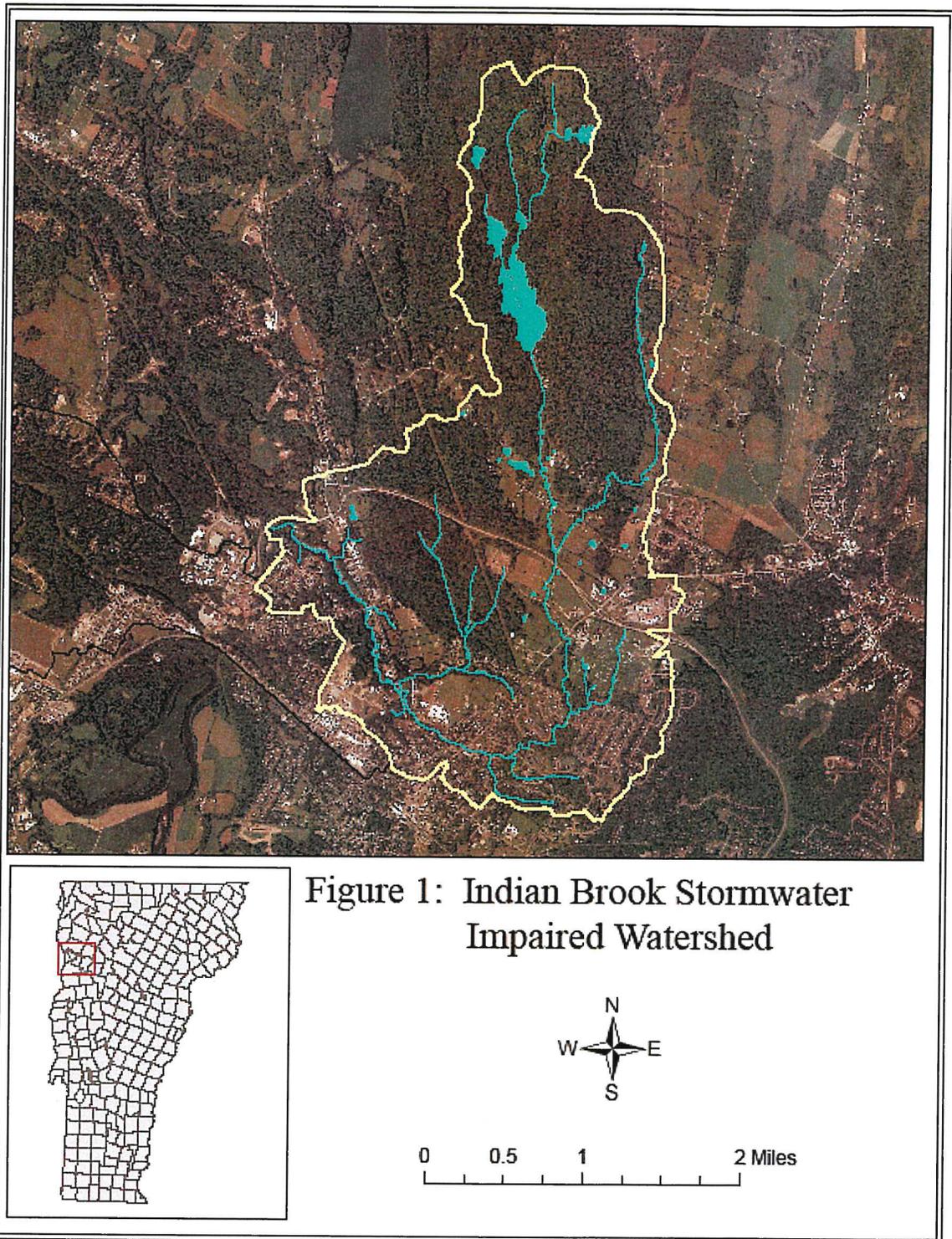


Figure 1: Indian Brook Stormwater Impaired Watershed

Priority Ranking/303d List of Impaired Waters

Indian Brook is designated as impaired on the 2006 Vermont 303(d) List from river mile 5.8 (Suzie Wilson Road) upstream to river mile 9.8 due to non-support of aquatic life designated uses. Since all tributaries and the upstream main stem drain to the impaired lower portion of the stream, the entire Indian Brook watershed upstream from river mile 5.8 is considered to contribute to its impairment. The source of the impairment is multiple impacts associated with excess stormwater runoff.

According to the 2006 Vermont 303(d) List, TMDL development priority for Indian Brook is high and scheduled for completion within 1-3 years from the 2006 listing cycle. In the 2006-2007 Legislative session, the Vermont Legislature amended the Vermont stormwater statute, 10 VSA §§ 1264 and 1264a, to require the issuance of a general or individual permit implementing a TMDL approved by EPA by January 15, 2010 for Vermont's stormwater impaired streams. VTDEC agrees with the Legislature that TMDL development and the issuance of general or individual permits to implement TMDLs for these streams is a high priority and is an integral component of the remediation process.

Description of Impairment

Biological Monitoring

In all the stormwater-impaired streams in Vermont, aquatic life use support (ALS) impairments are detected through the use of biological monitoring of fish and/or macroinvertebrate communities. The biological monitoring program relies on data from reference sites to define biological community goals for a given stream type. This approach is provided for in the VTWQS and specific numeric biological criteria have been established for several stream types to indicate compliance with the VTWQS.

The monitoring is extremely useful in that it directly measures the health of the aquatic life community and is reflective of environmental conditions that occur in the stream over an extended period of time (i.e. months) including the effects of intermittent discharges such as stormwater. However, biological monitoring is limited when trying to identify the specific pollutant stressor(s) and the extent to which they might contribute to the impairment.

The biological assessment information used to determine impairment has been collected throughout the watershed on the mainstem of the brook from river mile 3.1 up to river mile 9.5; however, data supports an assessment of impaired beginning at river mile 5.8 (Table 1).

Table 1. Biomonitoring site locations and Aquatic Life Use Support (ALS) assessment for the fish and/or macroinvertebrate community, by site and year, on Indian Brook.

Site (River Mile)	Date	Fish Assessment	Macroinvertebrates Assessment
5.8	1988	good	-
	1989	good	-
	1992	fair	fair-poor
	1993	good	fair-poor
	1994	fair	-
	1999	good	fair
	2003	fair	poor
	2004	-	poor
8.5	1992	fair	-
	1993		fair-poor
	1996	very good	-
	2002	good	fair-poor
	2004	good	-
9.0	2002	-	good-fair
	2003	-	fair
	2004	-	good-fair
9.5	1995	fair	excellent
	1996		good-fair
	2002	good	fair

Pollutants of Concern and Other Stressors

In streams draining developed watersheds, biological communities are subjected to many stressors associated with stormwater runoff. These stressors are related either directly or indirectly to stormwater runoff volumes and include increased watershed pollutant load (e.g. sediment), increased pollutant load from in-stream sources (e.g., bank erosion), habitat degradation (e.g. siltation, scour, over-widening of stream channel), washout of biota, and loss of habitat due to reductions in stream base flow. The stressors associated with stormwater runoff may act individually or cumulatively to degrade the overall biological community in a stream to a point, as in Indian Brook, where aquatic life uses are not fully supported and the stream does not attain the VTWQS.

Surrogate Measure for Multiple Stressors

This TMDL utilizes the surrogate of stormwater runoff volume in place of the traditional “pollutant of concern” approach. The combination of stressors is represented by the surrogate of stormwater runoff volume. First, the use of this surrogate has the primary benefit of addressing the physical impacts to the stream channel caused by stormwater runoff such as sediment release from channel erosion and scour from increased flows. These physical alterations to the stream are substantial contributors to the aquatic life impairment. Also, reductions in stormwater runoff volume will help restore diminished base flow (increased groundwater recharge), another aquatic life stressor. This surrogate is also appropriate because the amount of sediment and other pollutants discharged from

out of channel sources is a function of the amount of stormwater runoff generated from a watershed.

Fluvial Geomorphic Considerations

Where biological impairment of a stream is principally the result of physical stressors, such as in Indian Brook, the natural and anthropogenic factors controlling physical form and process may be quantified, and the strategies for restoring modified fluvial processes may be devised.

According to McCrae (1991), channel morphology and fluvial processes are primarily controlled by a) watershed inputs from the production zone of the watershed; b) the valley morphology of the stream reach; and c) the boundary material characteristics of the channel (Figure 2).

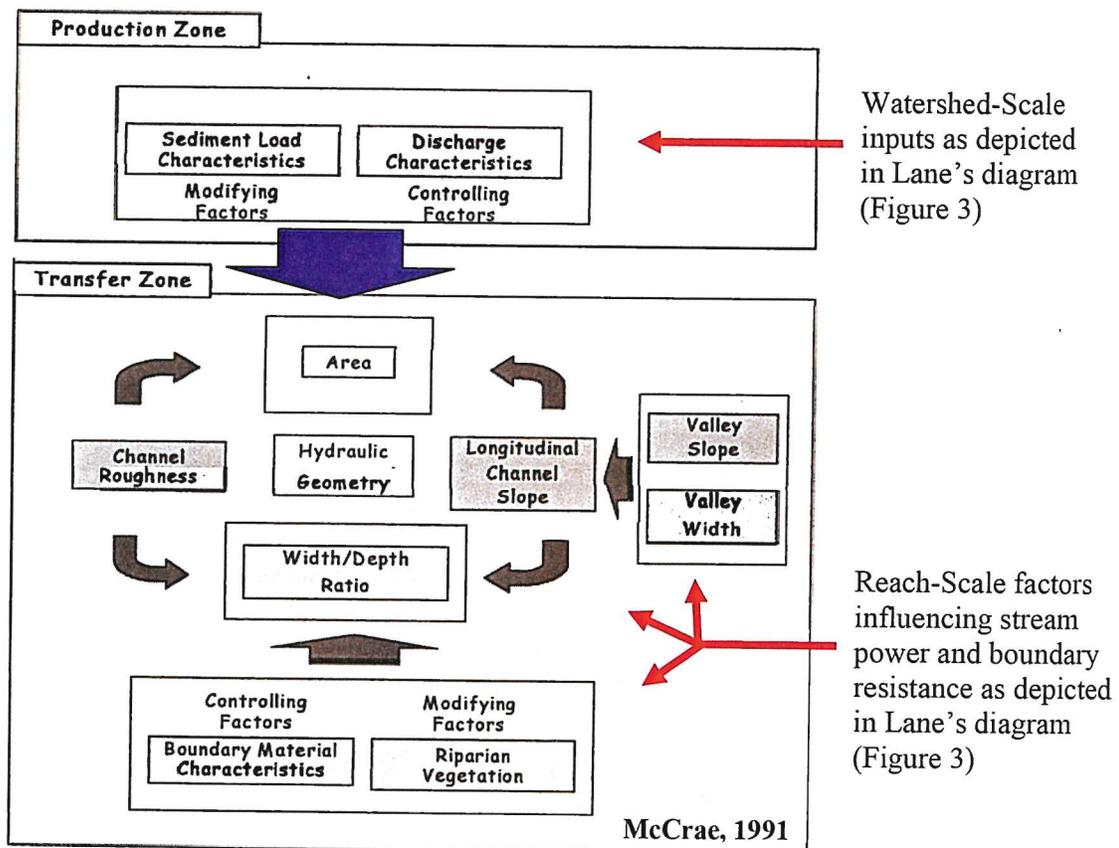


Figure 2. Diagram explaining the watershed and reach-scale controlling and modifying factors affecting the hydraulic geometry and fluvial processes of a stream.

In turn, channel and floodplain modifications and changes to the controlling factors of discharge and boundary materials, brought about by watershed and riparian land use modifications, place stress on biological communities by altering key physical habitat features of the stream network, including: hydrology; longitudinal and lateral connectivity; temperature; and the transport and retention of sediment, large wood, and organics.

Where the overall goal in the stormwater-impaired watersheds is to reduce physical stressors on key habitat features, the primary objective is to cost effectively manage toward the “reference” hydraulic geometry conditions of the stream channel where the energy grade or stream power, *as influenced by stream flow (discharge characteristics)*, is in balance with the resistance of the natural boundary materials (Figure 3).

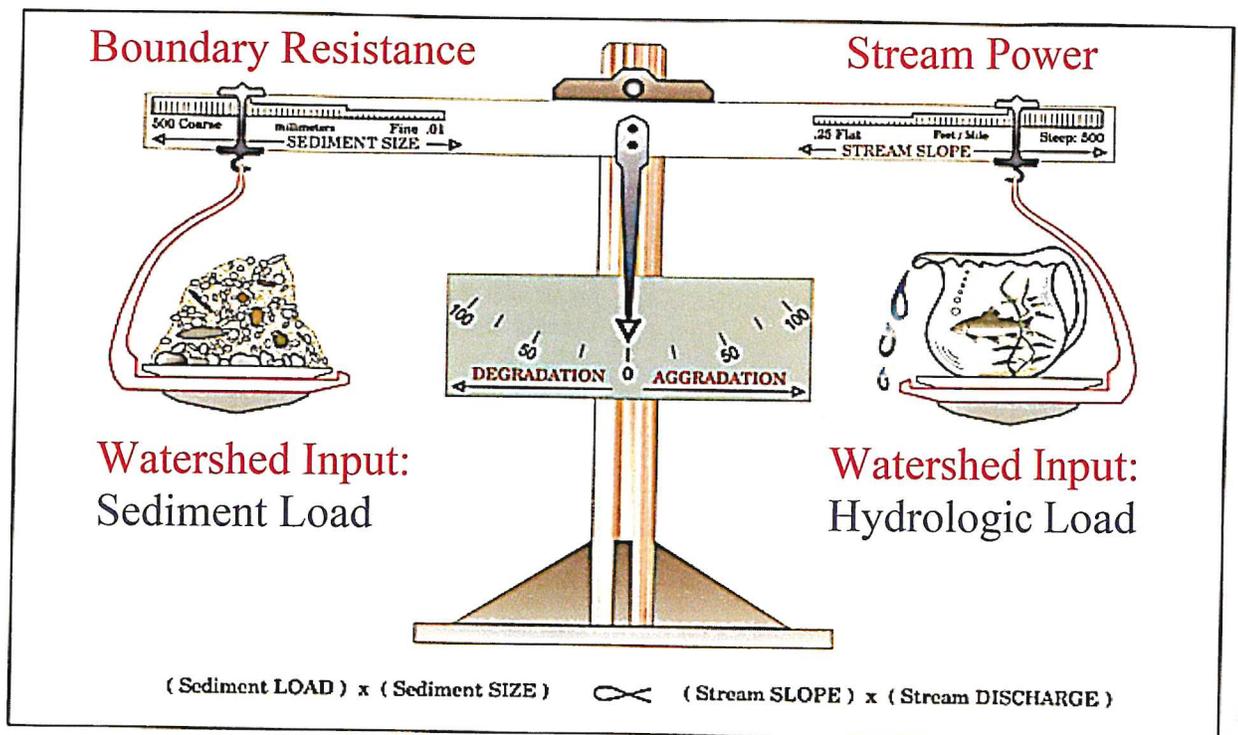


Figure 3: Lane’s Diagram (1955) from Rosgen 1996 explaining the balance of stream energy grade with boundary resistance as controlled by hydrologic and sediment load.

The first priority in managing energy grade is to look at stream flow characteristics (Figure 2. production zone input) as the primary controlling factor influencing hydraulic geometry and stream power. To meet the stated goal, alterations to watershed inputs (i.e., stormwater) must be addressed before attempts to remediate other reach-scale (transfer zone) factors affecting hydraulic geometry are undertaken (e.g., dealing with river corridor encroachments to change artificial valley constraints affecting channel plan form and slope and/or restoring floodplain connection to reduce flood depths).

Additionally, sediment load from the production zone may also be a controlling factor to channel hydraulic geometry (Figure 2). In the case of stormwater-impaired streams in Vermont, production zone contributions (colluvial and runoff generated) are far outweighed by the sediment contributions at the transfer zone or reach scale (channel bed and banks), due to channel degradation and widening initiated by stormwater increases.

Stream geomorphic assessment data specific to the impaired reaches of Indian Brook confirm the significance of the instream sediment generation, as opposed to production zone sediment inputs, and its resultant negative impact on aquatic biota habitat. Results from a 2005 geomorphic assessment in Indian Brook indicate that the stream channel is highly unstable and that the potential for more degradation is high (Fitzgerald 2006). Of 15 reaches assessed in the impaired portion of the Indian Brook watershed, 11 were rated as being in “fair” geomorphic condition with the remaining 4 in “good” condition. In the same 15 reaches, sensitivity to further channel instability was rated from “very low” to “extreme” but 13 of these reaches were rated as either “high”, “very high” or “extreme”. These conditions in turn reflect a generally degraded aquatic habitat whereby 10 of the 15 reaches were rated as having either “fair” or “poor” habitat conditions.

The goal of this TMDL is to address the controlling factor of instream sediment production by determining the departure of existing discharge characteristics in Indian Brook from attainment stream discharge characteristics and setting flow reduction targets to allow for the reestablishment of good habitat conditions throughout the stream in order to meet VTWQS.

Reduced Base Flow

Increased impervious cover and the resulting increase in surface runoff reduces the amount of rainfall that infiltrates pervious (e.g., vegetated) areas to recharge groundwater. For many streams, groundwater recharge is the predominant source of stream base flow. Diminished base flow can further stress aquatic life and cause or contribute to aquatic life impairments through loss of aquatic habitat (shrinking wetted perimeter) and increased susceptibility to pollutants.

The loss in base flow is directly proportional to the increase in stormwater runoff volume. It is possible to reasonably estimate stormwater runoff and the amount being recharged. It can be far more complicated to estimate the relationship between groundwater recharge and stream base flow. However, simpler methods involving hydrologic models have been used to successfully predict stream base flow as a function of groundwater recharge. More difficult, however, is understanding and quantifying the net effect of diminished base flow on aquatic life for a given stream.

Water Quality Standards

Indian Brook is listed as impaired based on narrative criteria relating to aquatic biota. The impact of excessive stormwater flows into Indian Brook has resulted in a violation of the VTWQS §3-04(B)(4) which states that there shall be:

“No change from the reference condition that would prevent the full support of aquatic biota, wildlife, or aquatic habitat uses. Biological integrity is maintained and all expected functional groups are present in a high quality habitat. All life-cycle functions, including overwintering and reproductive requirements are maintained and protected.”

In Vermont, numeric biological indices are used to determine the condition of fish and aquatic life uses. Vermont’s Water Quality Standards at 3-01(D)(1) and (2) provide the following regulatory basis for these numeric biological indices:

“(1) In addition to other applicable provisions of these rules and other appropriate methods of evaluation, the Secretary may establish and apply numeric biological indices to determine whether there is full support of aquatic biota and aquatic habitat uses. These numeric biological indices shall be derived from measures of the biological integrity of the reference condition for different water body types. In establishing numeric biological indices, the Secretary shall establish procedures that employ standard sampling and analytical methods to characterize the biological integrity of the appropriate reference condition. Characteristic measures of biological integrity include but are not limited to community level measurements such as: species richness, diversity, relative abundance of tolerant and intolerant species, density, and functional composition.

(2) In addition, the Secretary may determine whether there is full support of aquatic biota and aquatic habitat uses through other appropriate methods of evaluation, including habitat assessments.”

Designated Uses

Indian Brook is a Class B waterbody. Section 3-04(A) of the VTWQS states:

Class B waters shall be managed to achieve and maintain a high level of quality that is compatible with the following beneficial values and uses: . . .

§3-04(A)(1):

aquatic biota and wildlife sustained by a high quality aquatic habitat with additional protection in those waters where these uses are sustainable at a higher level based on Water Management Type designation.

Since biomonitoring data does not meet the criteria for Class B standards, Indian Brook does not support the designated uses for Class B waters.

Antidegradation Policy

In addition to the above standards, the VTWQS contain the following General Antidegradation Policy in §1-03(B):

All waters shall be managed in accordance with these rules to protect, maintain, and improve water quality.

Numeric Water Quality Target

In a pollutant-specific TMDL, a stream's water quality target, or loading capacity, is the greatest amount of pollutant loading the water can receive without violating water quality standards. In this TMDL, because the "pollutant of concern" is represented by the surrogate measure of stormwater runoff volume, the loading capacity is the greatest volume of stormwater runoff Indian Brook can receive without violating the stream's aquatic life criteria. The challenge is to determine the maximum stormwater runoff target volume for the stormwater-impaired streams.

Target Setting Approach

The Framework identifies a reference watershed approach whereby hydrologic targets are developed by using similar "attainment" watersheds as a guide. The term "attainment" is used here rather than "reference" because reference tends to imply that the ultimate goal for the impaired stream approaches pristine. Instead, the attainment watershed(s), while meeting or exceeding the Vermont water quality standards criteria for aquatic life, should contain some level of development in order to better approximate the true ecological potential of the impaired stream. This TMDL uses the attainment watershed approach for target setting and identifies hydrologic targets for Indian Brook based on the hydrologic characteristics of similar watersheds where the VTWQS aquatic life criteria are currently met.

The first step in using the attainment watershed approach is to select appropriate attainment streams, which, ideally, are as similar to the impaired watershed as possible in physical makeup, such as slope, soils, climatic patterns, channel type, and land use/cover, etc. Since all of the lowland stormwater-impaired streams are located in the Lake Champlain Valley, a collection of similarly located streams was identified from which the most representative attainment watersheds could be selected for each stormwater-impaired watershed.

The Framework identifies flow duration curves (FDCs) as the best surrogate for defining hydrologic targets. FDCs are very useful at describing the hydrologic condition of a stream/watershed because the curves incorporate the full spectrum of flow conditions (very low to very high) that occur in the stream system over a long period of time. The FDCs also incorporate any flow variability due to seasonal variations. A comparison of FDC between an impaired and appropriate attainment stream/watershed can reveal obvious patterns. For example, a FDC for a stormwater-impaired stream/watershed will typically show significantly higher flow rates per unit area for high flow events and significantly lower flow rates per unit area for low-base flow conditions than the FDC for the attainment watersheds. The increased predominance of high flow events in the impaired watershed creates the potential for increased watershed stormwater pollutant loadings, increased scouring and stream bank erosion events, and the possible displacement of biota from within the system. Also the reduction in stream base flow revealed by the FDC can create a potential loss of habitat for low flow conditions.

A high flow value (0.3%) and a low flow value (95%) were selected as points along the continuum of the FDCs useful for setting specific hydrologic targets. The 0.3% exceedance flow closely matches the one year return flow and the 95% exceedance flow represents a low flow condition comparable to the 7Q10.

Since there is limited hydrologic data for either impaired or attainment streams, the Framework recommends developing synthetic FDCs by employing a calibrated rainfall-runoff model based on land use and cover. FDCs can then be developed for both impaired and attainment streams and the relative difference between the two is used to establish the flows needed to restore the stream's hydrology. In this TMDL, the hydrologic targets are expressed as percentage reductions or increases relative to the attainment watersheds' FDCs at the representative high and low flow values.

Flow Duration Curve Development

Based on available data and the model outputs necessary to develop the FDCs, the P8-Urban Catchment Model (P8-UCM) was selected (Walker, 1990) to develop the synthetic FDC for both the stormwater impaired and attainment streams. Inputs to P8-UCM for hydrologic simulation include climatological data, percent watershed imperviousness, pervious curve number, and times of concentration for ground water base flow and surface runoff.

After initial calibration and review, additional changes were made to improve the low flow prediction capability of the model and refine the estimated surface runoff time of concentration. Upon final review and model verification, the calibrated model was used to develop FDCs for all impaired and attainment streams in the lowland areas. A complete discussion of the model setup, calibration, adjustments and results can be found in the report entitled "*Stormwater Modeling for Flow Duration Curve Development in Vermont*" (Tetra Tech, 2005). The complete FDC for Indian Brook along with expanded views of the high and low flow portions of the curve are given below in Figures 4 through 6.

Target Setting

With the FDCs for all attainment and impaired streams in hand, a process was developed to determine which attainment streams to use for setting appropriate hydrologic targets. A statistical approach was developed cooperatively by researchers at the University of Vermont and the VTDEC that allowed for the selection of the most appropriate attainment streams for each stormwater-impaired stream. A summary of this methodology is given below; however, the complete methodology and results can be found in a report under separate cover (Foley, 2005).

The first step in this target setting approach was a statistical analysis of the P8 input variables for each watershed to establish what are the most influential factors determining impairment/attainment in the sample of Lake Champlain Valley streams. The second step grouped impaired streams with the most similar attainment streams based on watershed features that were least likely to determine impairment based on step one. By

doing this, watersheds were grouped based on intrinsic similarities that effect flow, resulting in attainment streams being grouped with the most similar stormwater-impaired streams. Within each group, the attainment stream FDCs represent a hydrologic regime that will most likely support healthy aquatic life and thus the attainment of the VTWQS for each stormwater-impaired stream.

Due to the relatively small sample size of attainment streams (15) relative to the number of lowland stormwater-impaired streams (12), the concept of a range of appropriate FDC values is useful to alleviate some uncertainty associated with selecting the single best matching watershed. While the entire range of flows within each attainment group represents flow regimes associated with attainment conditions (i.e. supporting VTWQS criteria for aquatic life), the selection of the mean value provides an intrinsic margin of safety that the selected target represents an attainment condition. The group of attainment streams best matched with Indian Brook is given in Table 2 with FDC flows at the high and low flow intervals. Figures 4 through 6 graphically represent the FDCs for Indian Brook and associated attainment streams (complete FDC, high flow and low flow respectively).

Table 2. Attainment streams matched with Indian Brook and corresponding flows.

	Status	Q 0.3% (cfs/mi ²)	Q 95% (cfs/mi ²)
Indian Brook	Impaired	11.6373	0.2108
Bump School Brook	Attainment	12.5317	0.2100
Hubbardton River	Attainment	11.9623	0.2116
Mallets Bay Creek	Attainment	10.9241	0.2177
Milton Pond Brook	Attainment	12.0885	0.2027
Rock River	Attainment	11.9923	0.2036
Sheldon Springs Bk.	Attainment	9.2432	0.2239
Willow Brook	Attainment	11.9511	0.2121
Mean flow of attainment streams		11.5276	0.2116
Difference between Indian Bk. and mean attainment flows		0.1097	0.0008

Figure 4. Flow duration curves for Indian Brook and attainment streams.

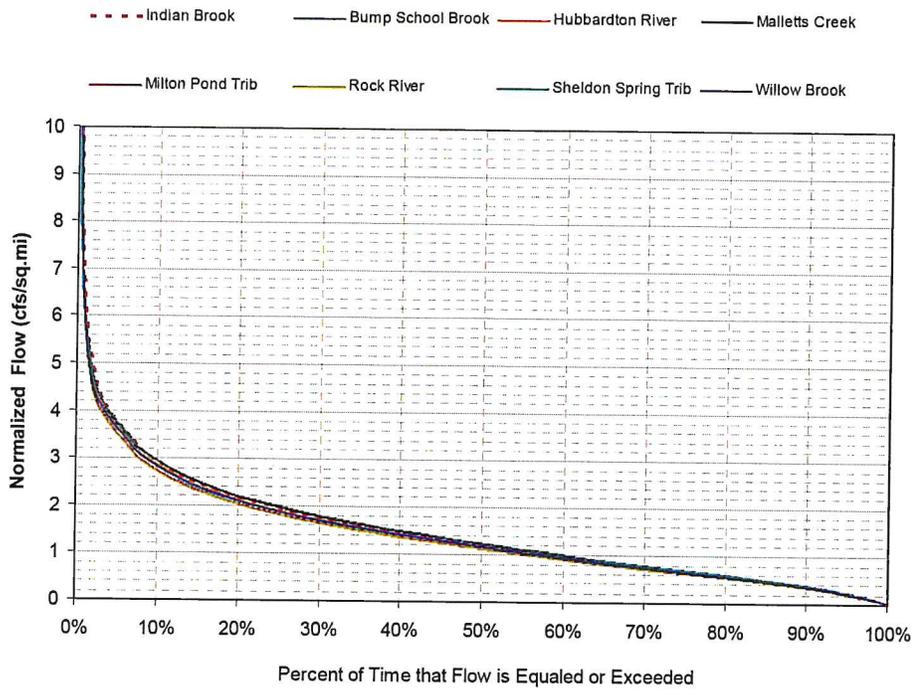


Figure 5. High flow portion of the flow duration curves for Indian Brook and attainment streams

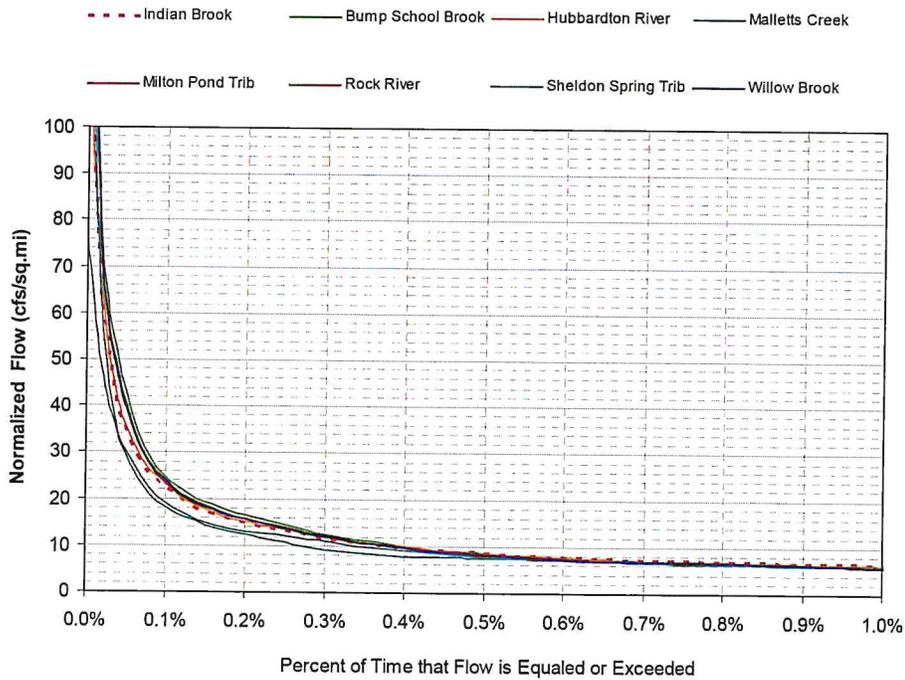
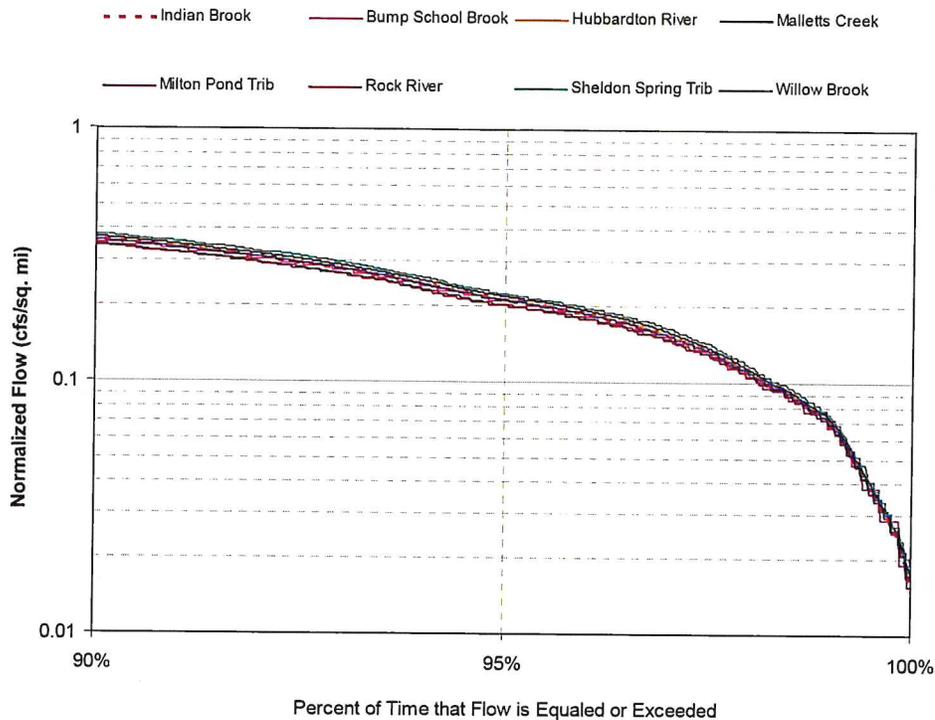


Figure 6. Low flow portion of the flow duration curves for Indian Brook and attainment streams.



The actual TMDL target flows for Indian Brook are the percentage differences between the Indian Brook flows and the mean of the attainment streams at both Q0.3% and Q95% (Table 3). This accounts for any lack of accuracy in the FDCs developed with the P8-UCM. Considering the relative simplicity of the model, there may be some inaccuracy with the final modeled flow values compared to actual flows. However, since similar data sources and calibrated model were used across all watersheds, both impaired and attained, inaccuracies are expected to be relative across all watersheds. Therefore, the relative difference between impaired and target flows are best described as a percentage rather than actual flow rates.

Table 3. Watershed flow targets for Indian Brook given as percentage increase/decrease from current conditions.

Target decrease in flow at Q 0.3%	Target increase in flow at Q 95%
0.9 %	0.4 %

Margin of Safety

The Clean Water Act and implementing regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between the TMDL allocations and water quality. EPA guidance explains that the MOS may be either implicit (i.e. incorporated into the TMDL through conservative

assumptions in the analysis) or explicit (i.e. expressed as a separate allocation). The MOS in this TMDL is implicit and is incorporated through conservative assumptions in the target setting approach.

As described above, the mean flow of the attainment streams was selected as the target flow condition in the Indian Brook TMDL to provide an intrinsic margin of safety that the selected targets would provide for the attainment of the VTWQS. Due to the rigorous application of the attainment stream selection approach in the Indian Brook TMDL, the targets are believed to be particularly accurate thus reducing the need for an overly conservative or arbitrary margin of safety.

The use of the attainment stream approach is a particularly good approach to identify flow targets because it relates appropriate flow conditions in streams that comply with the VTWQS (attainment streams) back to Indian Brook. However, haphazard matching of attainment streams, and thus flow targets, to Indian Brook could lead to targets with a high degree of uncertainty as to whether standards would be met. To provide a more rigorous target setting approach, attainment streams for Indian Brook were selected using an analysis described in “Statistical Analysis of Watershed Variables” (Foley, J. and Bowden, 2005). VTDEC believes that by utilizing this approach, Indian Brook was paired with the “most similar” attainment streams available in the Lake Champlain Basin. By identifying the “most similar” attainment streams through standard statistical approaches, a significant amount of uncertainty is eliminated regarding what are the best target values.

According to the attainment stream approach, by definition, the flows for the attainment streams represent flows under which the biologic criteria are currently being met. This can be thought of as a range of flows in streams most similar to Indian Brook that are capable of sustaining appropriate aquatic life standards as defined by the VTWQS. It is reasonable to assume that attainment of flows at the high end of this range would allow Indian Brook to comply with the VTWQS, however, by lowering the target to the attainment stream mean, an added margin of safety is incorporated.

Additionally, it is likely that the flows represented by the attainment stream are not at the “threshold” of attainment. That is, the modeled flows in the streams currently meeting standards likely represent flows somewhat below that which impairment would occur, thus adding an additional level of safety.

VTDEC affirms the attainment stream approach outlined in the Docket report and has taken steps to reduce a significant level of target setting uncertainty by incorporating a solid statistical approach. The fact that the stormwater runoff volume target approach has not routinely been utilized in the development of TMDLs should not detract from its firm basis in sound science and logical experimental design.

Further, the Docket strongly urges the concept of adaptive management when implementing controls in the stormwater-impaired streams and VTDEC is firmly committed to this idea. Various types of watershed monitoring, many of which have

already been initiated, will provide the necessary data to either adjust the targets or implementation measures to ensure ultimate compliance with VTWQS in Indian Brook. While VTDEC believes there is an adequately conservative margin of safety associated with these targets, post-implementation adaptive management provides yet another layer of “safety” that the VTWQS will be met.

Seasonal Variation

The Clean Water Act and implementing regulations require that a TMDL be established with consideration of seasonable variations. The FDCs, and subsequent hydrologic targets, developed for this TMDL are very useful for incorporating any seasonal variation in the stream system because they describe the full spectrum of flow conditions (very low to very high) that occur. By using a 10 year simulation period utilizing actual precipitation data to develop the FDCs, any flow variability due to seasonal variations has been incorporated into the hydrologic targets and the required flow decreases/increases in Indian Brook to meet those targets.

Allocations

In addition to the overall watershed target, TMDLs must also provide for an allocation of that target between point sources and nonpoint sources, or, the Wasteload Allocation (WLA) and the Load Allocation (LA) respectively. USEPA guidance allows for a gross allocation between these two stormwater source types rather than accounting for every discrete stormwater conveyance and the areas draining to them (USEPA 2002). The USEPA guidance also allows for dividing the allocation by using a land use analysis to simplify the process. By making the assumption that more developed areas typically convey stormwater via discrete means such as pipes or swales and lesser developed areas mostly convey stormwater via surface sheetflow, the allocation process can be developed with land use analysis whereby developed areas fall into the WLA and the lesser developed areas into the LA.

This TMDL uses the land use based allocation approach to distribute the overall percentage targets for the watershed. To do this, the Indian Brook watershed was divided into three broad categories including Urban/Developed, Agriculture/Open, and Forest/Wetland. Table 4 below illustrates how the land use categories were divided into these three broader categories and the associated land areas within the Indian Brook watershed.

Table 4. Categorization of Land Uses into broader classes.

Major Land Use Categories	Land Use Name
Urban/Developed	Residential
	Commercial
	Industrial
	Transportation
	Other Urban
Agriculture/Open	Agriculture/Mixed Open
	Row Crops
	Hay/Pasture
	Barren Land
Forest/Wetland	Deciduous Forest
	Coniferous Forest
	Mixed Forest
	Brush/Transitional
	Wetland
	Water

The overall percent reduction/increase in flows was then distributed among these three categories to meet watershed targets. It was determined that there would be a zero allocation, or no expected change in flow levels emanating from the Forest/Wetland category since the runoff characteristics from these areas are likely optimal with regard to overall watershed hydrology. This left the allocation to be distributed between the Urban/Developed (WLA) and Agriculture/Open (LA) categories. The next step was to determine the relative amount of influence each category had on runoff characteristics, and thus the FDC, and divide the allocation accordingly. To accomplish this, the concept of a runoff coefficient was utilized.

A runoff coefficient (R_v) is an expression of the percentage of precipitation that appears as runoff. The value of the coefficient is determined on the basis of climatic conditions and physiographic characteristics of the drainage area and is expressed as a constant between zero and one. By determining the relative contribution to stormwater runoff from each land use category using the R_v , the allocation between WLA and LA can be made accordingly.

The primary influence on R_v is the degree of watershed imperviousness. This is shown through data collected from numerous watersheds during the National Urban Runoff Program Study from which an equation was developed to define the R_v as shown below (Schueler 1987):

$$R_v = 0.05 + 0.9(I_a)$$

Where: I_a = Impervious fraction

Percent imperviousness was estimated using a previously developed relationship (CWP et al., 1999) for the Vermont Center for Geographic Information (VCGI) land use data layer. Table 5 presents the estimated values for various land use categories.

Table 5. Relationship between VCGI Land Use and percent imperviousness.

VCGI Land Use Code	Land Use Name	Percent Impervious Cover
3	Brush/Transitional	0%
5	Water	0%
7	Barren Land	0%
11	Residential	14%
12	Commercial	80%
13	Industrial	60%
14	Transportation	41%
17	Other Urban	60%
24	Agriculture/Mixed Open	2%
41	Deciduous Forest	0%
42	Coniferous Forest	0%
43	Mixed Forest	0%
61,62	Wetland	0%
211	Row Crops	2%
212	Hay/Pasture	2%

By calculating the R_v for each broad land use group, and then weighting that coefficient's influence on runoff based on the amount of land area within each group, the relative influence of each group on runoff (and conversely groundwater recharge) can be used to allocate the watershed targets across the entire watershed. The results for Indian Brook are given below in Table 6.

Table 6. The relative influence of each land use category on stormwater runoff in Indian Brook based on the calculation of the R_v .

	R_v	Area (acres)	Weighted influence on runoff
Urban/Developed	0.40	1,787	93%
Agriculture/Open	0.07	824	7%

USEPA interprets 40 CFR 130.2 to require that allocations for NPDES-regulated discharges of stormwater runoff be included within the wasteload allocation component of the TMDL (USEPA, 2002). USEPA also states that in instances where there is insufficient data to calculate loads on an outfall by outfall basis, the stormwater wasteload may be expressed as an aggregate or categorical allocation. USEPA acknowledges that in cases where it is difficult to separate NPDES-regulated from non NPDES-regulated stormwater discharges, it is acceptable to include both NPDES-regulated stormwater discharges and non NPDES-regulated discharges (which would typically be included in the load allocation portion of the TMDL) in this aggregated wasteload category.

Because of data limitations and the wide variability of stormwater discharges, it is not possible to separate the stormwater discharges subject to the NPDES program (e.g. stormwater discharges from construction activity, MS4 discharges and multi-sector industries) from stormwater discharges that are not subject to NPDES permitting (e.g. stormwater discharges from impervious surfaces regulated under Vermont's stormwater program). Therefore, all stormwater discharges from the urban/developed land category are included in the wasteload allocation portion of this TMDL. This category includes

the NPDES-regulated stormwater discharges as well as other sources of stormwater runoff not regulated as NPDES discharges.

In other words, the weighted proportion of runoff from the more developed areas, where the vast majority of the NPDES regulated and non-NPDES regulated stormwater was generated, established the limit of the WLA. Therefore, the “regulated” areas, including all the NPDES regulated and non-NPDES regulated sources in the WLA, are responsible for reducing and maintaining a 93% decrease in the high flow target. The same is true for the LA whereby the “nonregulated” areas are responsible for reducing and maintaining a 7% decrease in the high flow target.

By aggregating NPDES-regulated and non NPDES-regulated stormwater discharges in the wasteload allocation, the public is provided with a clearer understanding of how Vermont proposes to achieve water quality standards and meet the cleanup target established in the TMDL. However, the inclusion of stormwater discharges outside the scope of the NPDES permit program in the wasteload allocation does not mean that these discharges are legally required to obtain a NPDES stormwater permit currently or that they will be legally required to obtain a NPDES permit to implement the TMDL.

Future Growth

The Agency has applied a two step analysis in allocating for future growth in this TMDL. First, as to “jurisdictional” new growth that is subject to the VTDEC’s permit program for impervious surfaces under 10 V.S.A. Section 1264 (i.e. new impervious surfaces greater than one acre), the Agency assumes that the channel protection requirements in the Vermont Stormwater Management Manual requiring 12-hour detention of the 1-year storm, or 24-hour detention if discharging to a warm-water fishery, are sufficient to protect against future stream degradation. The manual requires sites to meet channel protection (CPv) as well as groundwater recharge treatment standards. The premise of the channel protection standard is that runoff would be stored and released in such a gradual manner that critical erosive velocities would seldom be exceeded in downstream channels. MacRae (1991) found that the traditionally used 2-year control approach failed to protect channels worn into more sensitive boundary materials and actually aggravated erosion hazard in very sensitive channels. Therefore, MacRae (1991) developed the distributed runoff control (DRC) as a method to vary the degree of control from the 2-year control to the 80% over control based on the strength of boundary material. A study done in Maryland (Cappuccitti, 2000) showed that “the CPv and DRC methods provide a comparable level of management.” Additionally, the Center for Watershed Protection (CWP) recommends the use of the channel protection criteria stating that “the criterion balances the need to use a scientifically valid approach with a methodology that is relatively easy to implement in the context of a statewide program.” (CWP, 2000) VTDEC believes that if future growth complies with the channel protection standard as well as the groundwater recharge treatment standard, Indian Brook will be able to meet both the high and low flow targets of the TMDL.

For “jurisdictional” new growth relative to the low flow targets, the Vermont Stormwater Management Manual groundwater recharge treatment standard requires that predevelopment recharge volumes be maintained, thus providing adequate protection.

As to “non-jurisdiction” new growth (i.e. new impervious surfaces less than one acre), runoff from which could contribute to stream degradation, the Agency has allocated additional stream flow reductions from current conditions to account for these potential impacts. This allocation is based on future growth estimates of “non-jurisdiction” impervious surfaces within the Indian Brook watershed. Based on current development patterns and potential for future growth, 18 acres was estimated to be an appropriate future growth target. By requiring reductions from currently developed areas that are equal to the future impacts of the additional 18 acres, this type of future development should have no effect on the overall watershed stream flow targets. The same approach has been applied to the low flow targets.

Based on a subsequent P8-UCM model run, the projected 18 acres of impervious surfaces increased the flow at the 0.3% high flow point on the FDC from 11.6373 to 11.6820 cfs/mi². The flow at the 95% low flow point on the FDC decreased from 0.2108 to 0.2094 cfs/mi².

Overall Allocation

In the broadest sense, the primary function of a TMDL is to determine and allocate among sources the maximum pollutant loading a waterbody can receive to maintain compliance with the appropriate water quality standard. For the Indian Brook TMDL, it’s the stormwater runoff volume that is being limited overall and allocated among sources. This approach works well within the TMDL framework for the high flow target whereby an overall reduction of stormwater runoff is required. However, this approach does not fit particularly well for the low flow target where an increase in non-stormwater instream flow is necessary and loading of stormwater runoff volume is not directly being allocated. The restoration of low flows in Indian Brook is actually a secondary result of controlling stormwater runoff (high flows) to increase groundwater recharge. As stormwater runoff volumes are controlled (high flow reductions), the water that eventually reaches the stream (low flow increases) is no longer considered stormwater runoff because it is generally routed through the groundwater and does not reach the stream for a significant amount of time following the precipitation event.

Also, the benefit of decreased pollutant loading (sediment, nutrients, etc.) due to reduced stormwater runoff at high flows provides a good fit, although indirectly, within the TMDL framework. The same cannot be said of the low flow targets. The low flow targets represent conditions where pollutants are already substantially removed from water the stream receives from groundwater and thus there are no problematic “pollutants” to allocate.

For these reasons, EPA does not consider the low flow targets applicable to an allocation scenario and thus they will not be presented as such in this TMDL. Therefore, Table 7

gives the overall Indian Brook TMDL allocation for the high flows and Table 8 presents the overall Indian Brook targets for the low flow condition.

It should be emphasized here that even though the low flow targets are not part of the formal TMDL allocation, VTDEC remains committed to including these low flow targets within the remediation plan for the watershed.

Table 7. Indian Brook TMDL high flow allocation at Q0.3%.

Wasteload Allocation	Stormwater reduction from current Urban/Developed areas	0.9%	1.3%
	Additional stormwater flow reduction from Urban/Developed areas to account for future growth	0.4%	
Load Allocation	Stormwater reduction from Agriculture/Open areas		0.1%
Total Indian Brook watershed stormwater flow reduction allocation at Q0.3%			1.4%

Table 8. Indian Brook low flow targets at Q95%.

Wasteload Allocation	Base flow increase from current Urban/Developed areas	0.4%	1.1%
	Additional base flow increase from Urban/Developed areas to account for future growth	0.7%	
Load Allocation	Base flow increase from Agriculture/Open areas		0.0%
Total Indian Brook watershed base flow increase target at Q95%			1.1%

Reasonable Assurances

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the wasteload allocation is based on an assumption that nonpoint source load reductions will occur, EPA's TMDL guidance provides that a TMDL must provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. In order to allocate loads among both nonpoint and point sources, there must be reasonable assurances that nonpoint source reduction will in fact be achieved. Where there are not reasonable assurances, under the Clean Water Act, the entire load reduction must be assigned to point sources.

As discussed earlier, this TMDL has been structured with an aggregate wasteload allocation category that includes both NPDES-regulated stormwater discharges and non NPDES-regulated stormwater discharges. Under the Clean Water Act, the only federally enforceable controls are those for point sources through the NPDES permitting process. However, VTDEC implements both a federally-authorized NPDES permit program for stormwater discharges from construction activities, industrial activities and municipal discharges under the MS4 program and a state-authorized permitting program for stormwater discharges from impervious surfaces equal to or greater than one acre.

VTDEC is, therefore, well positioned to require implementation of stormwater treatment and control measures through NPDES permit conditions and state stormwater permit conditions for discharges in the urban/developed land category. This wasteload allocation category constitutes a 93% weighted influence on stormwater runoff.

The load allocation is comprised of the agriculture/open land use category that constitutes a 7% weighted influence on stormwater runoff. VTDEC believes that nonpoint source control measures that will be implemented through Vermont's Clean and Clear Action Plan will achieve the minimal load reductions set forth in this TMDL. Although the Clean and Clear Action Plan is primarily a phosphorus reduction plan, action items in that Plan will also benefit the stormwater-impaired streams in the Champlain Basin. These action items include:

- Expand the Conservation Reserve Enhancement Program statewide to create conservation easements on farms along streams for buffer implementation.
- Provide technical assistance by Agricultural Resource Specialists to help farmers statewide with best management practices, riparian buffer conservation, nutrient management, compliance with Accepted Agricultural Practices, basin planning, and other technical needs.
- Support agricultural participation in the basin planning process.
- Hire Watershed Coordinators for Lake Champlain Basin watersheds to help develop and implement river basin plans.
- Expand the Department's River Management Program to promote stream stability and reduce phosphorus loading from stream bank and stream channel erosion in the Lake Champlain Basin through a comprehensive program of assessment, protection, management, restoration, and education, with additional federal funding being sought from the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and other agencies.
- Enhance the Vermont Better Backroads Program throughout the Lake Champlain Basin with staffing for technical assistance and increased funding for erosion control grants to towns.
- Offer technical assistance to towns in the Lake Champlain Basin seeking to provide better water quality protection through local ordinances and other municipal actions.
- Protect and/or restore riparian wetlands.

The nonpoint source phosphorus reduction activities listed in the Lake Champlain Phosphorus TMDL implementation plan will be actively pursued, contingent on the availability of state and federal funding and the provision of other necessary authority to the Department to carry out these implementation activities. Vermont Governor Douglas announced his "Clean and Clear Action Plan" on September 30, 2003. A major focus of this plan is implementation of the Lake Champlain Phosphorus TMDL.

A total of \$5.2 million in state funds was approved by the Vermont General Assembly for state fiscal year 2008 for the Clean and Clear Action Plan. This follows the \$8.1 million and \$9.5 million state appropriation in FY2006 and FY2007 respectively. These funds are being used to support the above mentioned activities, and others, by the Agency of Natural Resources, the Agency of Agriculture Food and Markets, and many partners.

Implementation Plan

EPA is not required to and does not approve TMDL implementation plans. Moreover, TMDLs are not legally required to include implementation plans. Despite this, the Agency has provided below a brief description of the general framework that it anticipates using to implement this TMDL. The Agency is providing this general description to aid the public in understanding the myriad of tools that the Agency possesses to effectively implement this TMDL. This framework may change over time based on new information gathered by VTDEC and as necessary to meet the requirements of this TMDL.

As a starting point, the Agency has been undertaking various projects to collect information to aid in the development of the implementation plan and in monitoring to assess the success of the plan as it is implemented and make necessary adjustments to the implementation plan. These projects include stream geomorphic assessment, subwatershed mapping, flow gaging and precipitation monitoring, impervious surface mapping and engineering feasibility assessment

Stream Geomorphic Assessment

In order to support the monitoring phase of stream remediation efforts, ANR has contracted with UVM and various consultants to develop a consistent baseline of stream geomorphic assessments (SGAs) for the stormwater-impaired streams, including Indian Brook. These SGAs can be used as a point of comparison for future assessments to document improvements or degradation of these streams on a set of reaches from stormwater-impaired streams.

Subwatershed Mapping

The objective of this project is to identify discharge points within the stormwater-impaired watersheds and delineate the associated watersheds for those discharge points. The previously available subwatershed data is of varying quality. In some cases, there was data on stormwater collection systems and discharge points. However, all of the watersheds took a substantial amount of work to get an accurate subwatershed delineation. The delineation of these sub-watersheds will help to focus stormwater treatment and control measures on higher risk areas within each stormwater-impaired watershed.

Flow Gaging and Precipitation Monitoring

Altered hydrology within the stormwater-impaired watersheds is the dominant factor in causing the impairments. To support the monitoring phase of stream remediation, ANR,

through a contract, established and operates stream flow and precipitation recording stations within each of the stormwater-impaired waters. This data will form an essential part of the adaptive management approach (discussed below) as stream flow is anticipated to reflect the initial response of Indian Brook to stormwater treatment and control measures that are implemented in accordance with this TMDL.

Impervious Surface Mapping

ANR is mapping the impervious surface area of each stormwater-impaired watershed using QuickBird satellite data. The QuickBird satellite acquires high-quality satellite imagery for map creation, detection of change over time, and image analysis. This project is being undertaken in conjunction with the School of Natural Resources at the University of Vermont.

ANR has performed the digital analysis of the data for the Indian Brook watershed. UVM will apply advanced object oriented eCognition classification techniques to potentially improve the mapping accuracy for the previously analyzed data using the QuickBird satellite data. This data will be used in developing the implementation plan for this TMDL.

Engineering Feasibility Assessment

To help develop the implementation plan for this TMDL, ANR is currently collecting technical data for all significant stormwater treatment practices (including ponds, infiltration basins, constructed wetlands, etc.) in the Indian Brook watershed. Technical information including pond volume, drainage area and detention time is being collected through permit review and site modeling using HydroCAD software. Once information is collected, site visits are conducted to ensure the accuracy of data. In addition to data collection, ANR is also conducting a limited engineering feasibility analysis at each site to determine what can reasonably be achieved at each site with regard to stormwater detention and infiltration.

Vermont BMP Decision Support System

In order to implement appropriate restoration efforts, it is important to identify and size the appropriate best management practices (BMP) to achieve the watershed target. Because there are a plethora of BMP type, size, and location combinations, this type of analysis is typically extremely time-consuming. It may require numerous computer model iterations and a significant data pre- and post-processing effort. The urban nature of the stormwater impaired Vermont watersheds and their inherent spatial limitations make them particularly difficult and time-consuming to evaluate. Restoration may require implementing a large number of small-scale BMPs. To increase the efficiency in evaluating these watersheds, a BMP modeling tool that considers type, sizing, and placement and produces results that can be compared to the TMDL targets is being developed. This modeling tool is the Vermont BMP Decision Support System (VT BMP DSS). The VT BMP DSS will help to evaluate where the implementation of stormwater treatment and control will result in the greatest improvements on the flow regime, and ultimately the water quality in the watershed.

Watershed-Wide General Permits and NPDES Permits

As discussed above, Vermont is authorized to implement both a federally-authorized NPDES permit program for stormwater discharges from construction activities, industrial activities and municipal discharges under the MS4 program and a state-authorized permitting program for stormwater discharges from impervious surfaces equal to or greater than one acre. This dual permitting authority provides Vermont with powerful tools for requiring stormwater treatment and control practices and monitoring necessary to implement this TMDL.

The Agency currently anticipates that TMDL implementation will be phased and that the Agency will utilize an iterative, adaptive management approach to implementation. The first phase of implementation may involve the issuance of a watershed-wide general permit pursuant to state law and may involve requiring controls through Vermont's federally-authorized NPDES stormwater permit program for municipal discharges, discharges associated with industrial activities and construction discharges. Stormwater treatment and control measures required in the first-round watershed-wide general permit may include the construction and/or upgrade of stormwater treatment and control systems by specifically identified dischargers of stormwater runoff.

The first-phase permit(s) will include a coordinated and cost-effective monitoring program to gather necessary information on progress toward the TMDL target and water quality standards and to determine the appropriate conditions or limitations for subsequent permits. Such a monitoring program may include BMP evaluation, ambient monitoring, receiving water assessment, or a combination of monitoring procedures designed to gather the necessary information. Based on this information, the permit(s) would be amended, as appropriate, to require implementation of more widespread and/or more stringent treatment and controls or other best management practices as necessary to meet the TMDL targets. This adaptive management approach is a cyclical process in which a permit(s) is periodically assessed and adjustments to the permit(s) are made as necessary.

Monitoring Plan

USEPA recommends a monitoring plan to track the effectiveness of a TMDL. The Framework supports the concept of adaptive management which necessitates a substantial monitoring plan at several levels. The Framework identifies three levels of monitoring that are necessary for an adaptive management process to proceed most effectively. These include monitoring: 1) BMP implementation, 2) the primary stressors in the watershed, and 3) the instream habitat and biological condition. VTDEC intends to institute a comprehensive monitoring plan that addresses all the aspects identified in the Framework. At this point, certain parts of the monitoring plan have already been initiated while it is premature for others to begin. Several of the initiated monitoring programs have been summarized in the previous "Implementation Plan" section.

Since the watershed general permit that will require the implementation of stormwater treatment and control measures necessary to meet the TMDL target for Indian Brook has yet to be developed, there is currently no specific monitoring plan for Indian Brook.

However, VTDEC will include requirements for the monitoring components listed in the Framework which might include tracking BMPs implemented, percentage of stormwater treated, percent of land area treated, etc. in the general permit. This should be accomplished relatively easily through database tracking of permits.

Monitoring of the primary stressors in Indian Brook is necessary to reveal if the implementation measures are having the desired impact. To date, some background monitoring has occurred to provide baseline information against which to measure future change. Continuous streamflow monitoring has been initiated in Indian Brook. Also, VTDEC has developed the in-house capability to accurately measure imperviousness within the watershed based on satellite imagery.

Monitoring of habitat condition and biological condition in Indian Brook has also been initiated. A stream geomorphic assessment has been completed which includes an assessment of aquatic life habitat. This data will provide a baseline against which to compare future assessments. Recent biological monitoring has also been conducted to verify the stormwater impairment listing of Indian Brook. Similarly, this will be used as background data to track future improvements and ultimate meeting of the VTWQS.

Public Participation

A public comment period was established upon the release of the draft Indian Brook TMDL from April 16, 2008 through May 16, 2008. In conjunction with the release of the draft TMDL, two informational public meetings were conducted, one in Shelburne and another in Williston on May 6, 2008 to present the TMDL and to answer any questions. Additionally, notification of the public informational meeting was posted to the Vermont Department of Libraries website.

At the close of the public comment period, VTDEC had received comments from one party. Responses to those comments is given in the below section.

Responses to Public Comments on the Draft Allen, Indian, Sunderland, and Munroe Brook TMDLs

Comments received

Submitted by:	Signed by:
Village of Essex Junction	James L. Jutras Water Quality Superintendent

1. Page; 25 Watershed-wide General Permits and NPDES Permits

As stated within the TMDL, there are multiple permitting tools available. At the implementation phase, any general watershed permit considered should not delegate all work to a municipality via these noted permitting processes.

Not all sites in a municipality or within an MS4 are under direct municipal control or municipal jurisdiction. Included in this type of parcel are state permitted facilities and facilities with expired stormwater permits. Expired permits remain an outstanding matter that requires resolution. Address of this permit group has the potential for substantial positive effect on the TMDL implementation.

Response:

DEC recently reconvened the Stormwater Advisory Group (SWAG) to discuss the full range of implementation issues associated with its stormwater TMDLs. One topic of discussion will be the role of municipalities in the implementation phase. DEC is cognizant of the legal limits on jurisdiction over municipal discharges both under the MS4 permit program and under state stormwater law. DEC hopes to cooperatively work with affected municipalities to best implement these TMDLs and currently anticipates that a combination of municipal and private efforts will be needed to fully implement the TMDLs. Expired permits will also be a focus of SWAG discussions. DEC anticipates that positive effects to these impaired streams will occur if stormwater systems with expired permits are maintained and/or upgraded.

2. The TMDL was not clear what occurs when attainment of water quality standards are achieved. It is assumed that the jurisdictional and non jurisdictional controls are to be continued for maintenance of water quality. The TMDL does not specifically address how those controls may be integrated through ongoing watershed wide or other permit mechanisms.

Response:

The role of the stormwater TMDLs is to set the hydrologic target for each watershed upon which the implementation plan will be based. A TMDL is not required to include an implementation plan or the specific control actions required to meet water quality standards and the long-term maintenance requirements for these control actions. Each watershed-specific implementation plan and related permit(s) will spell out the required stormwater control requirements and the long-term maintenance of those controls.

3. Indian Brook. Page 5: Biomonitoring: It was my understanding that there would be additional bioassessment prior to TMDL development. In streams near attainment where offset work has been completed after the most current assessment described, there might be improvement to bioassessment data. With work completed, this assessment will unfortunately occur during TMDL implementation.

Response:

VTDEC agrees that follow-up biomonitoring is an important aspect to tracking BMP effectiveness, especially in watersheds with relatively attainable TMDL targets and where significant BMPs have been installed. However, no monitoring schedule has been devised for the stormwater impaired watersheds beyond the statewide five year rotating watershed assessment schedule. This important aspect of stormwater implementation planning will be part of the Stormwater Advisory Group (SWAG) discussions. Key to

this discussion will be consideration of appropriate biomonitoring schedules and resources available to fund this labor intensive and expensive monitoring.

4. Page 1. Waterbody: Sunderland Brook also lies within the Village of Essex Junction, upstream from Susie Wilson Road.

Response

This change will be made to the Sunderland Brook TMDL.

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**Total Maximum Daily Load
To Address Biological Impairment in
Sunderland Brook (VT08-02)**

Chittenden County, Vermont

September 2008

Approved by USEPA: August 21, 2008

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Introduction

Section 303(d) of the Federal Clean Water Act requires each state to identify waters not attaining water quality standards, and to establish total maximum daily loads (TMDLs) for such waters for the pollutant of concern. The TMDL establishes the allowable pollutant loading from all contributing sources at a level necessary to attain the applicable water quality standards. TMDLs must account for seasonal variability and include a margin of safety that accounts for uncertainty of how pollutant loadings may impact the receiving water's quality. Once the public has had an opportunity to review and comment on the TMDL, it is submitted to the U.S. Environmental Protection Agency (USEPA) for approval. Upon approval, the TMDL is incorporated into the state's water quality management plan.

This TMDL establishes a scientifically based water quality target for Sunderland Brook that, when attained, will allow the stream to meet or exceed the established Vermont Water Quality Standards (VTWQS) for which it is impaired. This TMDL has been established in accordance with Section 303(d) of the Federal Clean Water Act, implementing regulations (40 CFR §130) regarding TMDL development, and other relevant USEPA guidance documents.

The basis for this TMDL was initially explained in the final report produced by the Vermont Water Resources Board Investigative Docket (Vermont Water Resources Board, 2004). More specifically, Appendix A of that document ("*A Scientifically Based Assessment and Adaptive Management Approach to Stormwater Management (Stormwater Cleanup Plan Framework)*") outlined the necessary steps to develop a scientifically sound approach in creating TMDLs for stormwater-impaired waters. Henceforth, this approach is referred to as the "Framework". The Vermont Department of Environmental Conservation (VTDEC) adhered to the Framework's approach for developing cleanup targets in this TMDL.

Several investigations have been conducted by multiple parties to derive the necessary information called for in the Framework. Significant results and findings of those investigations are summarized in this TMDL. Additionally, frequent interaction between VTDEC and the VTDEC-convened Stormwater Advisory Group (SWAG) yielded useful guidance for the development of this TMDL.

Description of Waterbody

The stormwater impaired portion of the Sunderland Brook watershed is an elongated watershed flowing northwesterly located in Chittenden County in the Towns of Colchester and Essex and the Village of Essex Junction. The headwaters in Essex originate in the highly developed areas adjacent to Route 15. The mainstem and minor tributaries flow to the north of Camp Johnson through more forested and less developed areas until the downstream end of the impaired segment is reached at river mile (RM) 3.5 at Route 7.

The entire stream portion and its tributaries within the impaired reach are Class B waters designated as cold water fish habitat pursuant to the Vermont Water Quality Standards. The total watershed area of the impaired section is approximately 1,320 acres. The land use breakdown of the watershed draining to the impaired reach is 76% developed lands, 4% agricultural or open lands and 20% forested or wetlands.

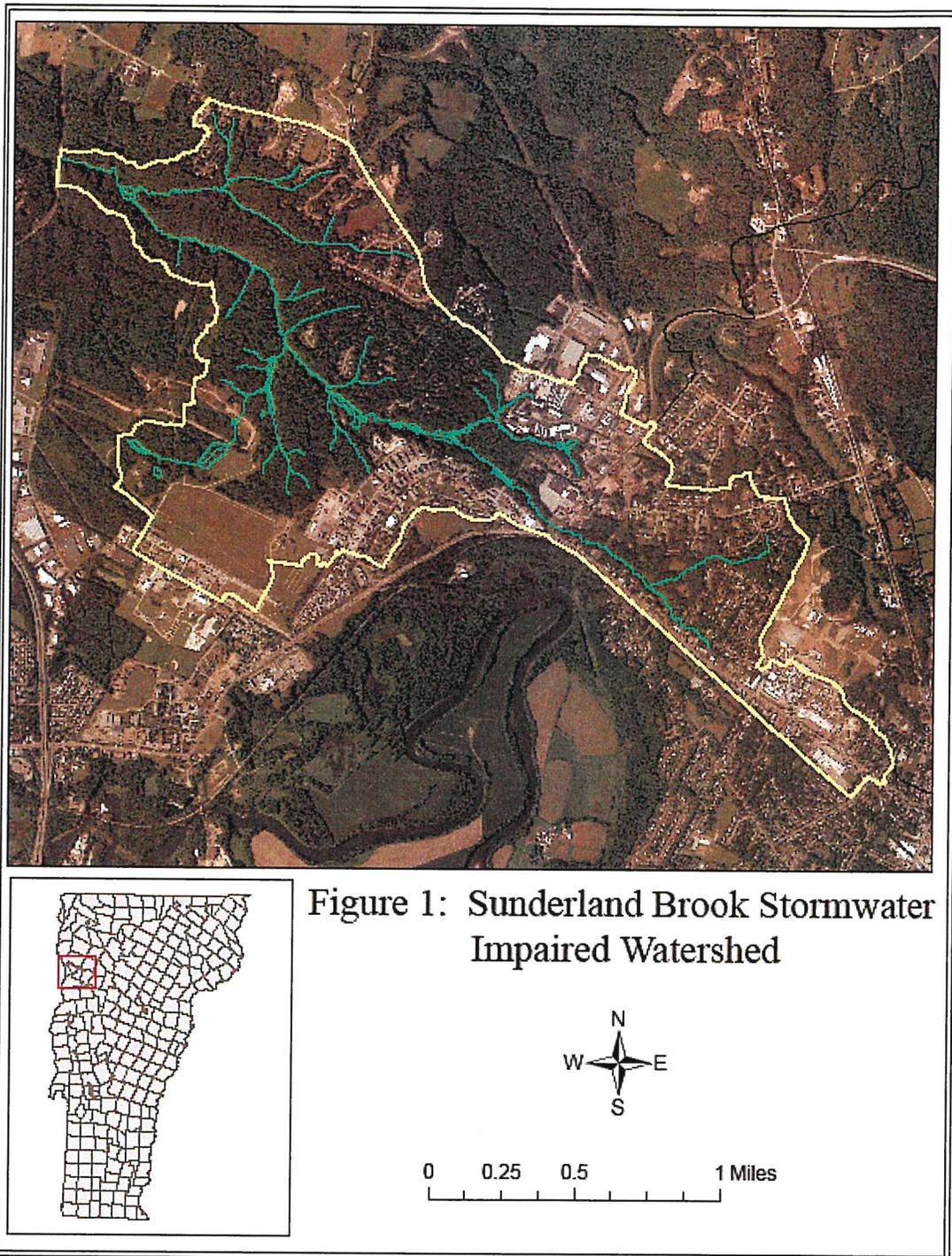


Figure 1: Sunderland Brook Stormwater Impaired Watershed

Priority Ranking/303d List of Impaired Waters

Sunderland Brook is designated as impaired on the 2006 Vermont 303(d) List from river mile 3.5 (Route 7) upstream to river mile 5.3 due to non-support of aquatic life designated uses. Since all tributaries and the upstream main stem drain to the impaired lower portion of the stream, the entire Sunderland Brook watershed upstream from river mile 3.5 is considered to contribute to its impairment. The source of the impairment is multiple impacts associated with excess stormwater runoff.

According to the 2006 Vermont 303(d) List, TMDL development priority for Sunderland Brook is high and scheduled for completion within 1-3 years from the 2006 listing cycle. In the 2006-2007 Legislative session, the Vermont Legislature amended the Vermont stormwater statute, 10 VSA §§1264 and 1264a, to require the issuance of a general or individual permit implementing a TMDL approved by EPA by January 15, 2010 for Vermont's stormwater impaired streams. VTDEC agrees with the Legislature that TMDL development and the issuance of general or individual permits to implement TMDLs for these streams is a high priority and is an integral component of the remediation process.

Description of Impairment

Biological Monitoring

In all the stormwater-impaired streams in Vermont, aquatic life use support (ALS) impairments are detected through the use of biological monitoring of fish and/or macroinvertebrate communities. The biological monitoring program relies on data from reference sites to define biological community goals for a given stream type. This approach is provided for in the VTWQS and specific numeric biological criteria have been established for several stream types to indicate compliance with the VTWQS.

The monitoring is extremely useful in that it directly measures the health of the aquatic life community and is reflective of environmental conditions that occur in the stream over an extended period of time (i.e. months) including the effects of intermittent discharges such as stormwater. However, biological monitoring is limited when trying to identify the specific pollutant stressor(s) and the extent to which they might contribute to the impairment.

The biological assessment information used to determine the stormwater impaired reach has been collected on the mainstem of the brook at river mile 3.5 (Table 1).

Table 1. Biomonitoring site locations and overall Aquatic Life Use Support (ALS) assessment using the fish and/or macroinvertebrate community, by site and year, on Sunderland Brook.

Site (River Mile)	Date	Overall ALS determination	Fish Assessment	Macroinvertebrates Assessment
3.5	1995	Fair/Poor	-	Fair/Poor
	2002	Fair	Fair	Fair

Pollutants of Concern and Other Stressors

In streams draining developed watersheds, biological communities are subjected to many stressors associated with stormwater runoff. These stressors are related either directly or indirectly to stormwater runoff volumes and include increased watershed pollutant load (e.g. sediment), increased pollutant load from in-stream sources (e.g., bank erosion), habitat degradation (e.g. siltation, scour, over-widening of stream channel), washout of biota, and loss of habitat due to reductions in stream base flow. The stressors associated with stormwater runoff may act individually or cumulatively to degrade the overall biological community in a stream to a point, as in Sunderland Brook, where aquatic life uses are not fully supported and the stream does not attain the VTWQS.

Surrogate Measure for Multiple Stressors

This TMDL utilizes the surrogate of stormwater runoff volume in place of the traditional “pollutant of concern” approach. The combination of stressors is represented by the surrogate of stormwater runoff volume. First, the use of this surrogate has the primary benefit of addressing the physical impacts to the stream channel caused by stormwater runoff such as sediment release from channel erosion and scour from increased flows. These physical alterations to the stream are substantial contributors to the aquatic life impairment. Also, reductions in stormwater runoff volume will help restore diminished base flow (increased groundwater recharge), another aquatic life stressor. This surrogate is also appropriate because the amount of sediment and other pollutants discharged from out of channel sources is a function of the amount of stormwater runoff generated from a watershed.

Fluvial Geomorphic Considerations

Where biological impairment of a stream is principally the result of physical stressors, such as in Sunderland Brook, the natural and anthropogenic factors controlling physical form and process may be quantified, and the strategies for restoring modified fluvial processes may be devised.

According to McCrae (1991), channel morphology and fluvial processes are primarily controlled by a) watershed inputs from the production zone of the watershed; b) the valley morphology of the stream reach; and c) the boundary material characteristics of the channel (Figure 2).

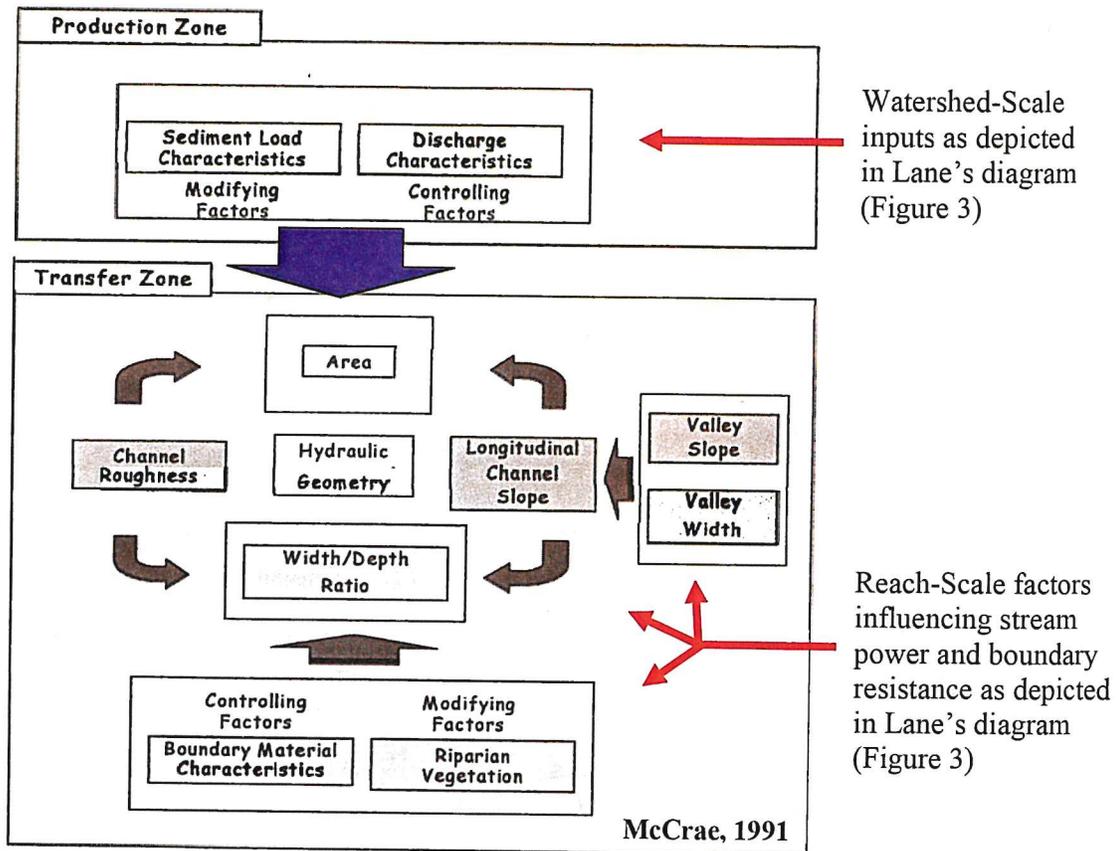


Figure 2. Diagram explaining the watershed and reach-scale controlling and modifying factors affecting the hydraulic geometry and fluvial processes of a stream.

In turn, channel and floodplain modifications and changes to the controlling factors of discharge and boundary materials, brought about by watershed and riparian land use modifications, place stress on biological communities by altering key physical habitat features of the stream network, including: hydrology; longitudinal and lateral connectivity; temperature; and the transport and retention of sediment, large wood, and organics.

Where the overall goal in the stormwater-impaired watersheds is to reduce physical stressors on key habitat features, the primary objective is to cost effectively manage toward the "reference" hydraulic geometry conditions of the stream channel where the energy grade or stream power, *as influenced by stream flow (discharge characteristics)*, is in balance with the resistance of the natural boundary materials (Figure 3).

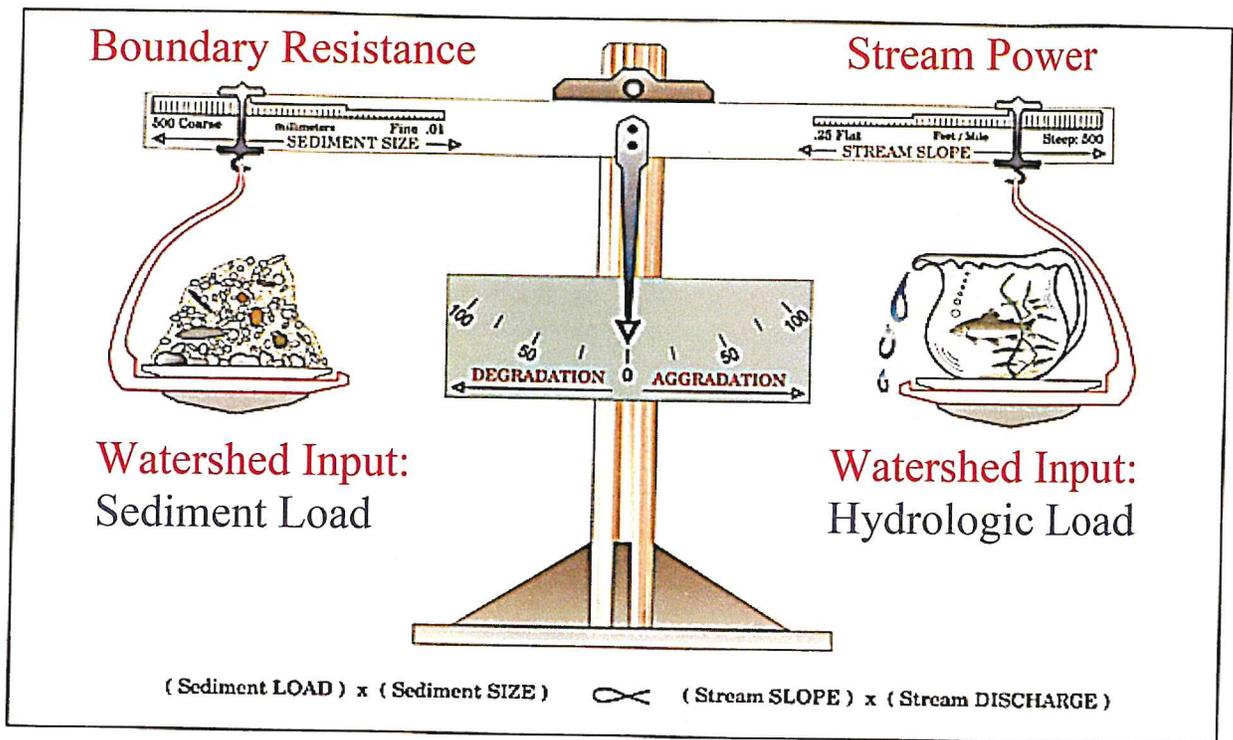


Figure 3: Lane's Diagram (1955) from Rosgen 1996 explaining the balance of stream energy grade with boundary resistance as controlled by hydrologic and sediment load.

The first priority in managing energy grade is to look at stream flow characteristics (Figure 2. production zone input) as the primary controlling factor influencing hydraulic geometry and stream power. To meet the stated goal, alterations to watershed inputs (i.e., stormwater) must be addressed before attempts to remediate other reach-scale (transfer zone) factors affecting hydraulic geometry are undertaken (e.g., dealing with river corridor encroachments to change artificial valley constraints affecting channel plan form and slope and/or restoring floodplain connection to reduce flood depths).

Additionally, sediment load from the production zone may also be a controlling factor to channel hydraulic geometry (Figure 2). In the case of stormwater-impaired streams in Vermont, production zone contributions (colluvial and runoff generated) are far outweighed by the sediment contributions at the transfer zone or reach scale (channel bed and banks), due to channel degradation and widening initiated by stormwater increases.

Stream geomorphic assessment data specific to Sunderland Brook confirms the significance of the instream sediment generation, as opposed to production zone sediment inputs, and its resultant negative impact on aquatic biota habitat. Results from a 2005 geomorphic assessment in Sunderland Brook indicate that the stream channel is highly unstable and that the potential for more degradation is high (Fitzgerald 2006). Of 5 reaches assessed in the stormwater impaired portion of the Sunderland Brook watershed, 4 were rated as being in "fair" geomorphic condition and 1 rated as "good". In the same

5 reaches, sensitivity to further channel instability was rated as “very high” in 4 reaches and “high” in 1 reach. These conditions in turn reflect a generally degraded aquatic habitat whereby 1 reach was rated as having “poor” habitat conditions, 3 were rated “fair” and 1 rated as “good”.

The goal of this TMDL is to address the controlling factor of instream sediment production by determining the departure of existing discharge characteristics in Sunderland Brook from attainment stream discharge characteristics and setting flow reduction targets to allow for the reestablishment of good habitat conditions throughout the stream in order to meet VTWQS.

Reduced Base Flow

Increased impervious cover and the resulting increase in surface runoff reduces the amount of rainfall that infiltrates pervious (e.g., vegetated) areas to recharge groundwater. For many streams, groundwater recharge is the predominant source of stream base flow. Diminished base flow can further stress aquatic life and cause or contribute to aquatic life impairments through loss of aquatic habitat (shrinking wetted perimeter) and increased susceptibility to pollutants.

The loss in base flow is directly proportional to the increase in stormwater runoff volume. It is possible to reasonably estimate stormwater runoff and the amount being recharged. It can be far more complicated to estimate the relationship between groundwater recharge and stream base flow. However, simpler methods involving hydrologic models have been used to successfully predict stream base flow as a function of groundwater recharge. More difficult, however, is understanding and quantifying the net effect of diminished base flow on aquatic life for a given stream.

Water Quality Standards

Sunderland Brook is listed as impaired based on narrative criteria relating to aquatic biota. The impact of excessive stormwater flows into Sunderland Brook has resulted in a violation of the VTWQS §3-04(B)(4) which states that there shall be:

“No change from the reference condition that would prevent the full support of aquatic biota, wildlife, or aquatic habitat uses. Biological integrity is maintained and all expected functional groups are present in a high quality habitat. All life-cycle functions, including overwintering and reproductive requirements are maintained and protected.”

In Vermont, numeric biological indices are used to determine the condition of fish and aquatic life uses. Vermont’s Water Quality Standards at 3-01(D)(1) and (2) provide the following regulatory basis for these numeric biological indices:

“(1) In addition to other applicable provisions of these rules and other appropriate methods of evaluation, the Secretary may establish and apply numeric biological indices to determine whether there is full support of aquatic biota and aquatic habitat uses. These numeric biological indices shall be derived

from measures of the biological integrity of the reference condition for different water body types. In establishing numeric biological indices, the Secretary shall establish procedures that employ standard sampling and analytical methods to characterize the biological integrity of the appropriate reference condition. Characteristic measures of biological integrity include but are not limited to community level measurements such as: species richness, diversity, relative abundance of tolerant and intolerant species, density, and functional composition.

(2) In addition, the Secretary may determine whether there is full support of aquatic biota and aquatic habitat uses through other appropriate methods of evaluation, including habitat assessments.”

Designated Uses

Sunderland Brook is a Class B waterbody. Section 3-04(A) of the VTWQS states:

Class B waters shall be managed to achieve and maintain a high level of quality that is compatible with the following beneficial values and uses: . . .

§3-04(A)(1):

aquatic biota and wildlife sustained by a high quality aquatic habitat with additional protection in those waters where these uses are sustainable at a higher level based on Water Management Type designation.

Since biomonitoring data does not meet the criteria for Class B standards, Sunderland Brook does not support the designated uses for Class B waters.

Antidegradation Policy

In addition to the above standards, the VTWQS contain the following General Antidegradation Policy in §1-03(B):

All waters shall be managed in accordance with these rules to protect, maintain, and improve water quality.

Numeric Water Quality Target

In a pollutant-specific TMDL, a stream’s water quality target, or loading capacity, is the greatest amount of pollutant loading the water can receive without violating water quality standards. In this TMDL, because the “pollutant of concern” is represented by the surrogate measure of stormwater runoff volume, the loading capacity is the greatest volume of stormwater runoff Sunderland Brook can receive without violating the stream’s aquatic life criteria. The challenge is to determine the maximum stormwater runoff target volume for the stormwater-impaired streams.

Target Setting Approach

The Framework identifies a reference watershed approach whereby hydrologic targets are developed by using similar “attainment” watersheds as a guide. The term “attainment” is used here rather than “reference” because reference tends to imply that the ultimate goal for the impaired stream approaches pristine. Instead, the attainment watershed(s), while meeting or exceeding the Vermont water quality standards criteria for aquatic life, should contain some level of development in order to better approximate the true ecological potential of the impaired stream. This TMDL uses the attainment watershed approach for target setting and identifies hydrologic targets for Sunderland Brook based on the hydrologic characteristics of similar watersheds where the VTWQS aquatic life criteria are currently met.

The first step in using the attainment watershed approach is to select appropriate attainment streams, which, ideally, are as similar to the impaired watershed as possible in physical makeup, such as slope, soils, climatic patterns, channel type, and land use/cover, etc. Since all of the lowland stormwater-impaired streams are located in the Lake Champlain Valley, a collection of similarly located streams was identified from which the most representative attainment watersheds could be selected for each stormwater-impaired watershed.

The Framework identifies flow duration curves (FDCs) as the best surrogate for defining hydrologic targets. FDCs are very useful at describing the hydrologic condition of a stream/watershed because the curves incorporate the full spectrum of flow conditions (very low to very high) that occur in the stream system over a long period of time. The FDCs also incorporate any flow variability due to seasonal variations. A comparison of FDC between an impaired and appropriate attainment stream/watershed can reveal obvious patterns. For example, a FDC for a stormwater-impaired stream/watershed will typically show significantly higher flow rates per unit area for high flow events and significantly lower flow rates per unit area for low-base flow conditions than the FDC for the attainment watersheds. The increased predominance of high flow events in the impaired watershed creates the potential for increased watershed stormwater pollutant loadings, increased scouring and stream bank erosion events, and the possible displacement of biota from within the system. Also the reduction in stream base flow revealed by the FDC can create a potential loss of habitat for low flow conditions.

A high flow value (0.3%) and a low flow value (95%) were selected as points along the continuum of the FDCs useful for setting specific hydrologic targets. The 0.3% exceedance flow closely matches the one year return flow and the 95% exceedance flow represents a low flow condition comparable to the 7Q10.

Since there is limited hydrologic data for either impaired or attainment streams, the Framework recommends developing synthetic FDCs by employing a calibrated rainfall-runoff model based on land use and cover. FDCs can then be developed for both impaired and attainment streams and the relative difference between the two is used to establish the flows needed to restore the stream’s hydrology. In this TMDL, the

hydrologic targets are expressed as percentage reductions or increases relative to the attainment watersheds' FDCs at the representative high and low flow values.

Flow Duration Curve Development

Based on available data and the model outputs necessary to develop the FDCs, the P8-Urban Catchment Model (P8-UCM) was selected (Walker, 1990) to develop the synthetic FDC for both the stormwater impaired and attainment streams. Inputs to P8-UCM for hydrologic simulation include climatological data, percent watershed imperviousness, pervious curve number, and times of concentration for ground water base flow and surface runoff.

After initial calibration and review, additional changes were made to improve the low flow prediction capability of the model and refine the estimated surface runoff time of concentration. Upon final review and model verification, the calibrated model was used to develop FDCs for all impaired and attainment streams in the lowland areas. A complete discussion of the model setup, calibration, adjustments and results can be found in the report entitled "*Stormwater Modeling for Flow Duration Curve Development in Vermont*" (Tetra Tech, 2005). The complete FDC for Sunderland Brook along with expanded views of the high and low flow portions of the curve are given below in Figures 4 through 6.

Target Setting

With the FDCs for all attainment and impaired streams in hand, a process was developed to determine which attainment streams to use for setting appropriate hydrologic targets. A statistical approach was developed cooperatively by researchers at the University of Vermont and the VTDEC that allowed for the selection of the most appropriate attainment streams for each stormwater-impaired stream. A summary of this methodology is given below; however, the complete methodology and results can be found in a report under separate cover (Foley, 2005).

The first step in this target setting approach was a statistical analysis of the P8 input variables for each watershed to establish what are the most influential factors determining impairment/attainment in the sample of Lake Champlain Valley streams. The second step grouped impaired streams with the most similar attainment streams based on watershed features that were least likely to determine impairment based on step one. By doing this, watersheds were grouped based on intrinsic similarities that effect flow, resulting in attainment streams being grouped with the most similar stormwater-impaired streams. Within each group, the attainment stream FDCs represent a hydrologic regime that will most likely support healthy aquatic life and thus the attainment of the VTWQS for each stormwater-impaired stream.

Due to the relatively small sample size of attainment streams (15) relative to the number of lowland stormwater-impaired streams (12), the concept of a range of appropriate FDC values is useful to alleviate some uncertainty associated with selecting the single best matching watershed. While the entire range of flows within each attainment group represents flow regimes associated with attainment conditions (i.e. supporting VTWQS

criteria for aquatic life), the selection of the mean value provides an intrinsic margin of safety that the selected target represents an attainment condition. The group of attainment streams best matched with Sunderland Brook is given in Table 2 with FDC flows at the high and low flow intervals. Figures 4 through 6 graphically represent the FDCs for Sunderland Brook and associated attainment streams (complete FDC, high flow and low flow respectively).

Table 2. Attainment streams matched with Sunderland Brook and corresponding flows.

	Status	Q 0.3% (cfs/mi ²)	Q 95% (cfs/mi ²)
Sunderland Brook	Impaired	8.2525	0.2229
Sand Hill Brook	Attainment	8.0236	0.2335
Youngman Brook	Attainment	7.9035	0.2285
Mean flow of attainment streams		7.9636	0.2310
Difference between Sunderland Bk. and mean attainment flows		0.2889	0.0081

Figure 4. Flow duration curves for Sunderland Brook and attainment streams.

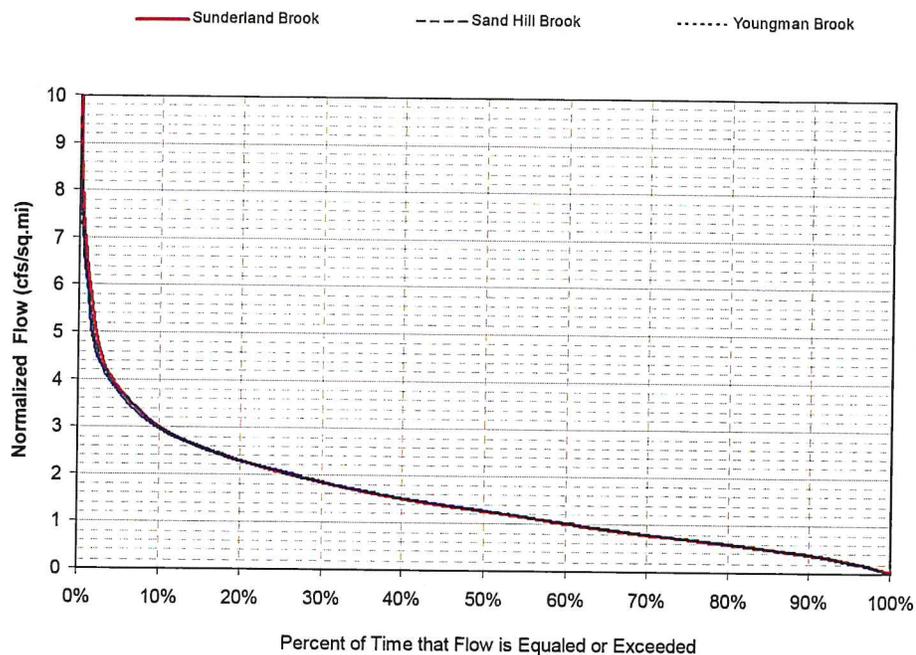


Figure 5. High flow portion of the flow duration curves for Sunderland Brook and attainment streams

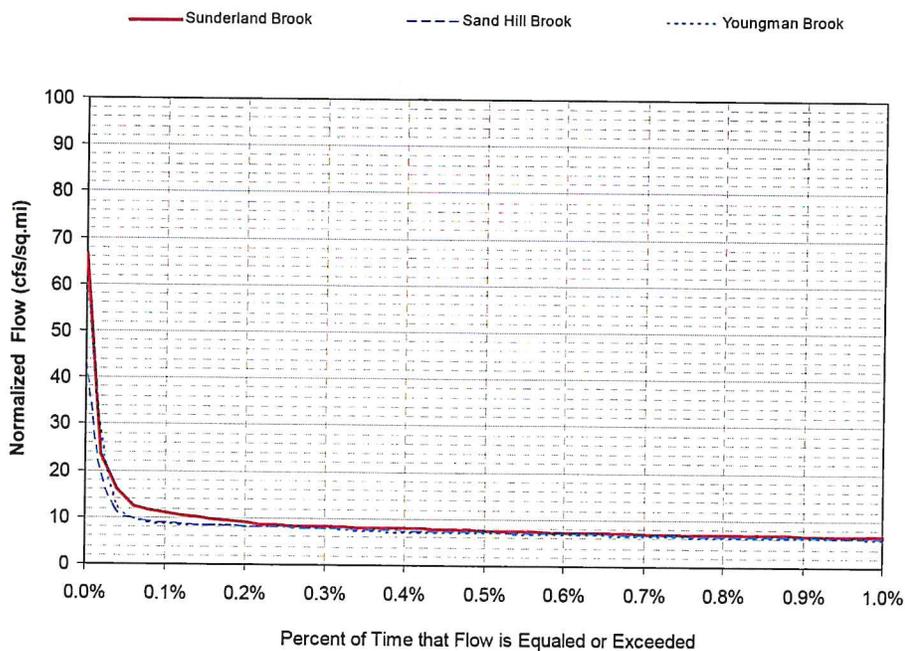
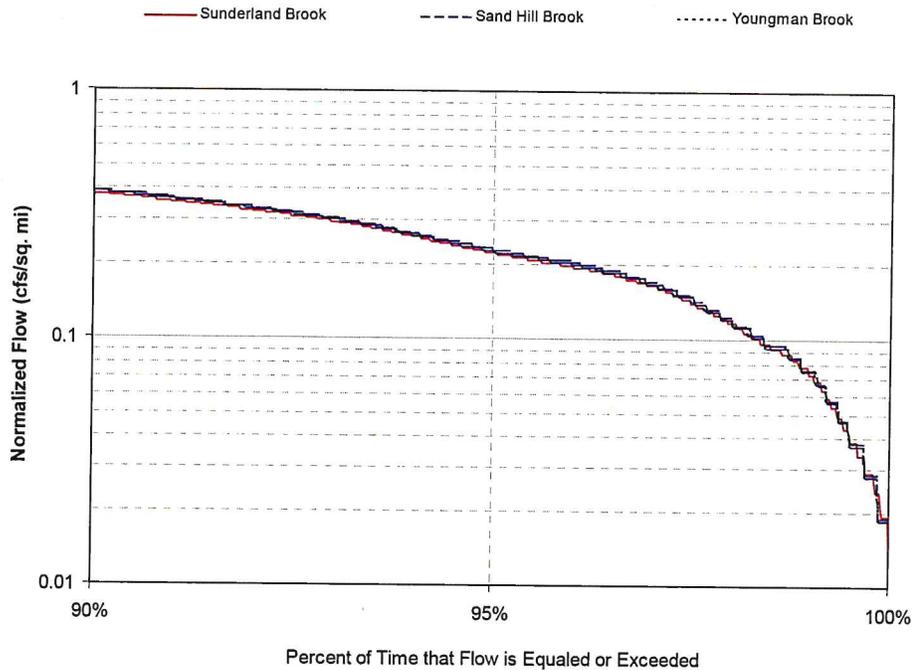


Figure 6. Low flow portion of the flow duration curves for Sunderland Brook and attainment streams.



The actual TMDL target flows for Sunderland Brook are the percentage differences between the Sunderland Brook flows and the mean of the attainment streams at both Q0.3% and Q95% (Table 3). This accounts for any lack of accuracy in the FDCs developed with the P8-UCM. Considering the relative simplicity of the model, there may be some inaccuracy with the final modeled flow values compared to actual flows. However, since similar data sources and calibrated model were used across all watersheds, both impaired and attained, inaccuracies are expected to be relative across all watersheds. Therefore, the relative difference between impaired and target flows are best described as a percentage rather than actual flow rates.

Table 3. Watershed flow targets for Sunderland Brook given as percentage increase/decrease from current conditions.

Target decrease in flow at Q 0.3%	Target increase in flow at Q 95%
4 %	4 %

Margin of Safety

The Clean Water Act and implementing regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between the TMDL allocations and water quality. EPA guidance explains that the MOS

may be either implicit (i.e. incorporated into the TMDL through conservative assumptions in the analysis) or explicit (i.e. expressed as a separate allocation). The MOS in this TMDL is implicit and is incorporated through conservative assumptions in the target setting approach.

As described above, the mean flow of the attainment streams was selected as the target flow condition in the Sunderland Brook TMDL to provide an intrinsic margin of safety that the selected targets would provide for the attainment of the VTWQS. Due to the rigorous application of the attainment stream selection approach in the Sunderland Brook TMDL, the targets are believed to be particularly accurate thus reducing the need for an overly conservative or arbitrary margin of safety.

The use of the attainment stream approach is a particularly good approach to identify flow targets because it relates appropriate flow conditions in streams that comply with the VTWQS (attainment streams) back to Sunderland Brook. However, haphazard matching of attainment streams, and thus flow targets, to Sunderland Brook could lead to targets with a high degree of uncertainty as to whether standards would be met. To provide a more rigorous target setting approach, attainment streams for Sunderland Brook were selected using an analysis described in “Statistical Analysis of Watershed Variables” (Foley, J. and Bowden, 2005). VTDEC believes that by utilizing this approach, Sunderland Brook was paired with the “most similar” attainment streams available in the Lake Champlain Basin. By identifying the “most similar” attainment streams through standard statistical approaches, a significant amount of uncertainty is eliminated regarding what are the best target values.

According to the attainment stream approach, by definition, the flows for the attainment streams represent flows under which the biologic criteria are currently being met. This can be thought of as a range of flows in streams most similar to Sunderland Brook that are capable of sustaining appropriate aquatic life standards as defined by the VTWQS. It is reasonable to assume that attainment of flows at the high end of this range would allow Sunderland Brook to comply with the VTWQS, however, by lowering the target to the attainment stream mean, an added margin of safety is incorporated.

Additionally, it is likely that the flows represented by the attainment stream are not at the “threshold” of attainment. That is, the modeled flows in the streams currently meeting standards likely represent flows somewhat below that which impairment would occur, thus adding an additional level of safety.

VTDEC affirms the attainment stream approach outlined in the Docket report and has taken steps to reduce a significant level of target setting uncertainty by incorporating a solid statistical approach. The fact that the stormwater runoff volume target approach has not routinely been utilized in the development of TMDLs should not detract from its firm basis in sound science and logical experimental design.

Further, the Docket strongly urges the concept of adaptive management when implementing controls in the stormwater-impaired streams and VTDEC is firmly

committed to this idea. Various types of watershed monitoring, many of which have already been initiated, will provide the necessary data to either adjust the targets or implementation measures to ensure ultimate compliance with VTWQS in Sunderland Brook. While VTDEC believes there is an adequately conservative margin of safety associated with these targets, post-implementation adaptive management provides yet another layer of “safety” that the VTWQS will be met.

Seasonal Variation

The Clean Water Act and implementing regulations require that a TMDL be established with consideration of seasonable variations. The FDCs, and subsequent hydrologic targets, developed for this TMDL are very useful for incorporating any seasonal variation in the stream system because they describe the full spectrum of flow conditions (very low to very high) that occur. By using a 10 year simulation period utilizing actual precipitation data to develop the FDCs, any flow variability due to seasonal variations has been incorporated into the hydrologic targets and the required flow decreases/increases in Sunderland Brook to meet those targets.

Allocations

In addition to the overall watershed target, TMDLs must also provide for an allocation of that target between point sources and nonpoint sources, or, the Wasteload Allocation (WLA) and the Load Allocation (LA) respectively. USEPA guidance allows for a gross allocation between these two stormwater source types rather than accounting for every discrete stormwater conveyance and the areas draining to them (USEPA 2002). The USEPA guidance also allows for dividing the allocation by using a land use analysis to simplify the process. By making the assumption that more developed areas typically convey stormwater via discrete means such as pipes or swales and lesser developed areas mostly convey stormwater via surface sheetflow, the allocation process can be developed with land use analysis whereby developed areas fall into the WLA and the lesser developed areas into the LA.

This TMDL uses the land use based allocation approach to distribute the overall percentage targets for the watershed. To do this, the Sunderland Brook watershed was divided into three broad categories including Urban/Developed, Agriculture/Open, and Forest/Wetland. Table 4 below illustrates how the land use categories were divided into these three broader categories and the associated land areas within the Sunderland Brook watershed.

Table 4. Categorization of Land Uses into broader classes.

Major Land Use Categories	Land Use Name
Urban/Developed	Residential
	Commercial
	Industrial
	Transportation
	Other Urban
Agriculture/Open	Agriculture/Mixed Open
	Row Crops
	Hay/Pasture
	Barren Land
Forest/Wetland	Deciduous Forest
	Coniferous Forest
	Mixed Forest
	Brush/Transitional
	Wetland
	Water

The overall percent reduction/increase in flows was then distributed among these three categories to meet watershed targets. It was determined that there would be a zero allocation, or no expected change in flow levels emanating from the Forest/Wetland category since the runoff characteristics from these areas are likely optimal with regard to overall watershed hydrology. This left the allocation to be distributed between the Urban/Developed (WLA) and Agriculture/Open (LA) categories. The next step was to determine the relative amount of influence each category had on runoff characteristics, and thus the FDC, and divide the allocation accordingly. To accomplish this, the concept of a runoff coefficient was utilized.

A runoff coefficient (R_v) is an expression of the percentage of precipitation that appears as runoff. The value of the coefficient is determined on the basis of climatic conditions and physiographic characteristics of the drainage area and is expressed as a constant between zero and one. By determining the relative contribution to stormwater runoff from each land use category using the R_v , the allocation between WLA and LA can be made accordingly.

The primary influence on R_v is the degree of watershed imperviousness. This is shown through data collected from numerous watersheds during the National Urban Runoff Program Study from which an equation was developed to define the R_v as shown below (Schueler 1987):

$$R_v = 0.05 + 0.9(I_a)$$

Where: I_a = Impervious fraction

Percent imperviousness was estimated using a previously developed relationship (CWP et al., 1999) for the Vermont Center for Geographic Information (VCGI) land use data layer. Table 5 presents the estimated values for various land use categories.

Table 5. Relationship between VCGI Land Use and percent imperviousness.

VCGI Land Use Code	Land Use Name	Percent Impervious Cover
3	Brush/Transitional	0%
5	Water	0%
7	Barren Land	0%
11	Residential	14%
12	Commercial	80%
13	Industrial	60%
14	Transportation	41%
17	Other Urban	60%
24	Agriculture/Mixed Open	2%
41	Deciduous Forest	0%
42	Coniferous Forest	0%
43	Mixed Forest	0%
61,62	Wetland	0%
211	Row Crops	2%
212	Hay/Pasture	2%

By calculating the R_v for each broad land use group, and then weighting that coefficient's influence on runoff based on the amount of land area within each group, the relative influence of each group on runoff (and conversely groundwater recharge) can be used to allocate the watershed targets across the entire watershed. The results for Sunderland Brook are given below in Table 6.

Table 6. The relative influence of each land use category on stormwater runoff in Sunderland Brook based on the calculation of the R_v .

	R_v	Area (acres)	Weighted influence on runoff
Urban/Developed	0.52	1003	100%
Agriculture/Open	0.07	53	0%

USEPA interprets 40 CFR 130.2 to require that allocations for NPDES-regulated discharges of stormwater runoff be included within the wasteload allocation component of the TMDL (USEPA, 2002). USEPA also states that in instances where there is insufficient data to calculate loads on an outfall by outfall basis, the stormwater wasteload may be expressed as an aggregate or categorical allocation. USEPA acknowledges that in cases where it is difficult to separate NPDES-regulated from non NPDES-regulated stormwater discharges, it is acceptable to include both NPDES-regulated stormwater discharges and non NPDES-regulated discharges (which would typically be included in the load allocation portion of the TMDL) in this aggregated wasteload category.

Because of data limitations and the wide variability of stormwater discharges, it is not possible to separate the stormwater discharges subject to the NPDES program (e.g. stormwater discharges from construction activity, MS4 discharges and multi-sector industries) from stormwater discharges that are not subject to NPDES permitting (e.g. stormwater discharges from impervious surfaces regulated under Vermont's stormwater program). Therefore, all stormwater discharges from the urban/developed land category are included in the wasteload allocation portion of this TMDL. This category includes

the NPDES-regulated stormwater discharges as well as other sources of stormwater runoff not regulated as NPDES discharges.

In other words, the weighted proportion of runoff from the more developed areas, where the vast majority of the NPDES regulated and non-NPDES regulated stormwater was generated, established the limit of the WLA. Therefore, the “regulated” areas, including all the NPDES regulated and non-NPDES regulated sources in the WLA, are responsible for reducing and maintaining a 100% decrease in the high flow target. This total allocation of the target flow to the WLA results from the minimal influence of the relatively small portion of agricultural or undeveloped open areas in the watershed.

By aggregating NPDES-regulated and non NPDES-regulated stormwater discharges in the wasteload allocation, the public is provided with a clearer understanding of how Vermont proposes to achieve water quality standards and meet the cleanup target established in the TMDL. However, the inclusion of stormwater discharges outside the scope of the NPDES permit program in the wasteload allocation does not mean that these discharges are legally required to obtain a NPDES stormwater permit currently or that they will be legally required to obtain a NPDES permit to implement the TMDL.

Future Growth

The Agency has applied a two step analysis in allocating for future growth in this TMDL. First, as to “jurisdictional” new growth that is subject to the VTDEC’s permit program for impervious surfaces under 10 V.S.A. Section 1264 (i.e. new impervious surfaces greater than one acre), the Agency assumes that the channel protection requirements in the Vermont Stormwater Management Manual requiring 12-hour detention of the 1-year storm, or 24-hour detention if discharging to a warm-water fishery, are sufficient to protect against future stream degradation. The manual requires sites to meet channel protection (CPv) as well as groundwater recharge treatment standards. The premise of the channel protection standard is that runoff would be stored and released in such a gradual manner that critical erosive velocities would seldom be exceeded in downstream channels. MacRae (1991) found that the traditionally used 2-year control approach failed to protect channels worn into more sensitive boundary materials and actually aggravated erosion hazard in very sensitive channels. Therefore, MacRae (1991) developed the distributed runoff control (DRC) as a method to vary the degree of control from the 2-year control to the 80% over control based on the strength of boundary material. A study done in Maryland (Cappuccitti, 2000) showed that “the CPv and DRC methods provide a comparable level of management.” Additionally, the Center for Watershed Protection (CWP) recommends the use of the channel protection criteria stating that “the criterion balances the need to use a scientifically valid approach with a methodology that is relatively easy to implement in the context of a statewide program.” (CWP, 2000) VTDEC believes that if future growth complies with the channel protection standard as well as the groundwater recharge treatment standard, Sunderland Brook will be able to meet both the high and low flow targets of the TMDL.

For “jurisdictional” new growth relative to the low flow targets, the Vermont Stormwater Management Manual groundwater recharge treatment standard requires that predevelopment recharge volumes be maintained, thus providing adequate protection.

As to “non-jurisdiction” new growth (i.e. new impervious surfaces less than one acre), runoff from which could contribute to stream degradation, the Agency has allocated additional stream flow reductions from current conditions to account for these potential impacts. This allocation is based on future growth estimates of “non-jurisdiction” impervious surfaces within the Sunderland Brook watershed. Based on current development patterns and potential for future growth, 8 acres was estimated to be an appropriate future growth target. By requiring reductions from currently developed areas that are equal to the future impacts of the additional 8 acres, this type of future development should have no effect on the overall watershed stream flow targets. The same approach has been applied to the low flow targets.

Based on a subsequent P8-UCM model run, the projected 8 acres of impervious surfaces increased the flow at the 0.3% high flow point on the FDC from 8.2525 to 8.2670 cfs/mi². The flow at the 95% low flow point on the FDC remained unchanged at 0.2229 cfs/mi².

This unchanged low flow response appears to be coupled to the capabilities of the P8 model groundwater component and the relatively low discernible change the additional future growth has on the overall percent imperviousness of the Sunderland Brook watershed. The 8 acres of additional non-jurisdictional impervious acreage attributed to future growth contributes a relatively minor overall increase to impervious cover – approximately 0.6%. As a result, the groundwater component of the P8 model does not discern a significant change in the groundwater recharge component of the overall flow.

Overall Allocation

In the broadest sense, the primary function of a TMDL is to determine and allocate among sources the maximum pollutant loading a waterbody can receive to maintain compliance with the appropriate water quality standard. For the Sunderland Brook TMDL, it's the stormwater runoff volume that is being limited overall and allocated among sources. This approach works well within the TMDL framework for the high flow target whereby an overall reduction of stormwater runoff is required. However, this approach does not fit particularly well for the low flow target where an increase in non-stormwater instream flow is necessary and loading of stormwater runoff volume is not directly being allocated. The restoration of low flows in Sunderland Brook is actually a secondary result of controlling stormwater runoff (high flows) to increase groundwater recharge. As stormwater runoff volumes are controlled (high flow reductions), the water that eventually reaches the stream (low flow increases) is no longer considered stormwater runoff because it is generally routed through the groundwater and does not reach the stream for a significant amount of time following the precipitation event.

Also, the benefit of decreased pollutant loading (sediment, nutrients, etc.) due to reduced stormwater runoff at high flows provides a good fit, although indirectly, within the TMDL framework. The same cannot be said of the low flow targets. The low flow

targets represent conditions where pollutants are already substantially removed from water the stream receives from groundwater and thus there are no problematic “pollutants” to allocate.

For these reasons, EPA does not consider the low flow targets applicable to an allocation scenario and thus they will not be presented as such in this TMDL. Therefore, Table 7 gives the overall Sunderland Brook TMDL allocation for the high flows and Table 8 presents the overall Sunderland Brook targets for the low flow condition.

It should be emphasized here that even though the low flow targets are not part of the formal TMDL allocation, VTDEC remains committed to including these low flow targets within the remediation plan for the watershed.

Table 7. Sunderland Brook TMDL high flow allocation at Q0.3%.

Wasteload Allocation	Stormwater reduction from current Urban/Developed areas	3.5%	3.7%
	Additional stormwater flow reduction from Urban/Developed areas to account for future growth	0.2%	
Load Allocation	Stormwater reduction from Agriculture/Open areas		0.0%
Total Sunderland Brook watershed stormwater flow reduction allocation at Q0.3%			3.7%

Table 8. Sunderland Brook low flow targets at Q95%.

Wasteload Allocation	Base flow increase from current Urban/Developed areas	3.6%	3.6%
	Additional base flow increase from Urban/Developed areas to account for future growth	0.0%	
Load Allocation	Base flow increase from Agriculture/Open areas		0.0%
Total Sunderland Brook watershed base flow increase target at Q95%			3.6%

Reasonable Assurances

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the wasteload allocation is based on an assumption that nonpoint source load reductions will occur, EPA’s TMDL guidance provides that a TMDL must provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. In order to allocate loads among both nonpoint and point sources, there must be reasonable assurances that nonpoint source reduction will in fact be achieved. Where there are not reasonable assurances, under the Clean Water Act, the entire load reduction must be assigned to point sources.

As discussed earlier, this TMDL has been structured with an aggregate wasteload allocation category that includes both NPDES-regulated stormwater discharges and non NPDES-regulated stormwater discharges. Under the Clean Water Act, the only federally enforceable controls are those for point sources through the NPDES permitting process. However, VTDEC implements both a federally-authorized NPDES permit program for stormwater discharges from construction activities, industrial activities and municipal discharges under the MS4 program and a state-authorized permitting program for stormwater discharges from impervious surfaces equal to or greater than one acre. VTDEC is, therefore, well positioned to require implementation of stormwater treatment and control measures through NPDES permit conditions and state stormwater permit conditions for discharges in the urban/developed land category. However, the entire flow reductions required under this TMDL have been allocated to the wasteload allocation due to the highly developed nature of the Sunderland Brook watershed. Therefore, no reasonable assurances that the load allocation portion of the TMDL will be implemented are required or necessary.

Implementation Plan

EPA is not required to and does not approve TMDL implementation plans. Moreover, TMDLs are not legally required to include implementation plans. Despite this, the Agency has provided below a brief description of the general framework that it anticipates using to implement this TMDL. The Agency is providing this general description to aid the public in understanding the myriad of tools that the Agency possesses to effectively implement this TMDL. This framework may change over time based on new information gathered by VTDEC and as necessary to meet the requirements of this TMDL.

As a starting point, the Agency has been undertaking various projects to collect information to aid in the development of the implementation plan and in monitoring to assess the success of the plan as it is implemented and make necessary adjustments to the implementation plan. These projects include stream geomorphic assessment, subwatershed mapping, flow gaging and precipitation monitoring, impervious surface mapping and engineering feasibility assessment

Stream Geomorphic Assessment

In order to support the monitoring phase of stream remediation efforts, ANR has contracted with UVM and various consultants to develop a consistent baseline of stream geomorphic assessments (SGAs) for the stormwater-impaired streams, including Sunderland Brook. These SGAs can be used as a point of comparison for future assessments to document improvements or degradation of these streams on a set of reaches from stormwater-impaired streams.

Subwatershed Mapping

The objective of this project is to identify discharge points within the stormwater-impaired watersheds and delineate the associated watersheds for those discharge points. The previously available subwatershed data is of varying quality. In some cases, there was data on stormwater collection systems and discharge points. However, all of the

watersheds took a substantial amount of work to get an accurate subwatershed delineation. The delineation of these sub-watersheds will help to focus stormwater treatment and control measures on higher risk areas within each stormwater-impaired watershed.

Flow Gaging and Precipitation Monitoring

Altered hydrology within the stormwater-impaired watersheds is the dominant factor in causing the impairments. To support the monitoring phase of stream remediation, ANR, through a contract, established and operates stream flow and precipitation recording stations within each of the stormwater-impaired waters. This data will form an essential part of the adaptive management approach (discussed below) as stream flow is anticipated to reflect the initial response of Sunderland Brook to stormwater treatment and control measures that are implemented in accordance with this TMDL.

Impervious Surface Mapping

ANR is mapping the impervious surface area of each stormwater-impaired watershed using QuickBird satellite data. The QuickBird satellite acquires high-quality satellite imagery for map creation, detection of change over time, and image analysis. This project is being undertaken in conjunction with the School of Natural Resources at the University of Vermont.

ANR has performed the digital analysis of the data for the Sunderland Brook watershed. UVM will apply advanced object oriented eCognition classification techniques to potentially improve the mapping accuracy for the previously analyzed data using the QuickBird satellite data. This data will be used in developing the implementation plan for this TMDL.

Engineering Feasibility Assessment

To help develop the implementation plan for this TMDL, ANR is currently collecting technical data for all significant stormwater treatment practices (including ponds, infiltration basins, constructed wetlands, etc.) in the Sunderland Brook watershed. Technical information including pond volume, drainage area and detention time is being collected through permit review and site modeling using HydroCAD software. Once information is collected, site visits are conducted to ensure the accuracy of data. In addition to data collection, ANR is also conducting a limited engineering feasibility analysis at each site to determine what can reasonably be achieved at each site with regard to stormwater detention and infiltration.

Vermont BMP Decision Support System

In order to implement appropriate restoration efforts, it is important to identify and size the appropriate best management practices (BMP) to achieve the watershed target. Because there are a plethora of BMP type, size, and location combinations, this type of analysis is typically extremely time-consuming. It may require numerous computer model iterations and a significant data pre- and post-processing effort. The urban nature of the stormwater impaired Vermont watersheds and their inherent spatial limitations

make them particularly difficult and time-consuming to evaluate. Restoration may require implementing a large number of small-scale BMPs. To increase the efficiency in evaluating these watersheds, a BMP modeling tool that considers type, sizing, and placement and produces results that can be compared to the TMDL targets is being developed. This modeling tool is the Vermont BMP Decision Support System (VT BMP DSS). The VT BMP DSS will help to evaluate where the implementation of stormwater treatment and control will result in the greatest improvements on the flow regime, and ultimately the water quality in the watershed.

Watershed-Wide General Permits and NPDES Permits

As discussed above, Vermont is authorized to implement both a federally-authorized NPDES permit program for stormwater discharges from construction activities, industrial activities and municipal discharges under the MS4 program and a state-authorized permitting program for stormwater discharges from impervious surfaces equal to or greater than one acre. This dual permitting authority provides Vermont with powerful tools for requiring stormwater treatment and control practices and monitoring necessary to implement this TMDL.

The Agency currently anticipates that TMDL implementation will be phased and that the Agency will utilize an iterative, adaptive management approach to implementation. The first phase of implementation may involve the issuance of a watershed-wide general permit pursuant to state law and may involve requiring controls through Vermont's federally-authorized NPDES stormwater permit program for municipal discharges, discharges associated with industrial activities and construction discharges. Stormwater treatment and control measures required in the first-round watershed-wide general permit may include the construction and/or upgrade of stormwater treatment and control systems by specifically identified dischargers of stormwater runoff.

The first-phase permit(s) will include a coordinated and cost-effective monitoring program to gather necessary information on progress toward the TMDL target and water quality standards and to determine the appropriate conditions or limitations for subsequent permits. Such a monitoring program may include BMP evaluation, ambient monitoring, receiving water assessment, or a combination of monitoring procedures designed to gather the necessary information. Based on this information, the permit(s) would be amended, as appropriate, to require implementation of more widespread and/or more stringent treatment and controls or other best management practices as necessary to meet the TMDL targets. This adaptive management approach is a cyclical process in which a permit(s) is periodically assessed and adjustments to the permit(s) are made as necessary.

Monitoring Plan

USEPA recommends a monitoring plan to track the effectiveness of a TMDL. The Framework supports the concept of adaptive management which necessitates a substantial monitoring plan at several levels. The Framework identifies three levels of monitoring that are necessary for an adaptive management process to proceed most effectively. These include monitoring: 1) BMP implementation, 2) the primary stressors

in the watershed, and 3) the instream habitat and biological condition. VTDEC intends to institute a comprehensive monitoring plan that addresses all the aspects identified in the Framework. At this point, certain parts of the monitoring plan have already been initiated while it is premature for others to begin. Several of the initiated monitoring programs have been summarized in the previous “Implementation Plan” section.

Since the watershed general permit that will require the implementation of stormwater treatment and control measures necessary to meet the TMDL target for Sunderland Brook has yet to be developed, there is currently no specific monitoring plan for Sunderland Brook. However, VTDEC will include requirements for the monitoring components listed in the Framework which might include tracking BMPs implemented, percentage of stormwater treated, percent of land area treated, etc. in the general permit. This should be accomplished relatively easily through database tracking of permits.

Monitoring of the primary stressors in Sunderland Brook is necessary to reveal if the implementation measures are having the desired impact. To date, some background monitoring has occurred to provide baseline information against which to measure future change. Continuous streamflow monitoring has been initiated in Sunderland Brook. Also, VTDEC has developed the in-house capability to accurately measure imperviousness within the watershed based on satellite imagery.

Monitoring of habitat condition and biological condition in Sunderland Brook has also been initiated. A stream geomorphic assessment has been completed which includes an assessment of aquatic life habitat. This data will provide a baseline against which to compare future assessments. Recent biological monitoring has also been conducted to verify the stormwater impairment listing of Sunderland Brook. Similarly, this will be used as background data to track future improvements and ultimate meeting of the VTWQS.

Public Participation

A public comment period was established upon the release of the draft Sunderland Brook TMDL from April 16, 2008 through May 16, 2008. In conjunction with the release of the draft TMDL, two informational public meetings were conducted, one in Shelburne and another in Williston on May 6, 2008 to present the TMDL and to answer any questions. Additionally, notification of the public informational meeting was posted to the Vermont Department of Libraries website.

At the close of the public comment period, VTDEC had received comments from one party. Responses to those comments is given in the below section.

Responses to Public Comments on the Draft Allen, Indian, Sunderland, and Munroe Brook TMDLs

Comments received

Submitted by:	Signed by:
Village of Essex Junction	James L. Jutras Water Quality Superintendent

1. Page; 25 Watershed-wide General Permits and NPDES Permits

As stated within the TMDL, there are multiple permitting tools available. At the implementation phase, any general watershed permit considered should not delegate all work to a municipality via these noted permitting processes.

Not all sites in a municipality or within an MS4 are under direct municipal control or municipal jurisdiction. Included in this type of parcel are state permitted facilities and facilities with expired stormwater permits. Expired permits remain an outstanding matter that requires resolution. Address of this permit group has the potential for substantial positive effect on the TMDL implementation.

Response:

DEC recently reconvened the Stormwater Advisory Group (SWAG) to discuss the full range of implementation issues associated with its stormwater TMDLs. One topic of discussion will be the role of municipalities in the implementation phase. DEC is cognizant of the legal limits on jurisdiction over municipal discharges both under the MS4 permit program and under state stormwater law. DEC hopes to cooperatively work with affected municipalities to best implement these TMDLs and currently anticipates that a combination of municipal and private efforts will be needed to fully implement the TMDLs. Expired permits will also be a focus of SWAG discussions. DEC anticipates that positive effects to these impaired streams will occur if stormwater systems with expired permits are maintained and/or upgraded.

2. The TMDL was not clear what occurs when attainment of water quality standards are achieved. It is assumed that the jurisdictional and non jurisdictional controls are to be continued for maintenance of water quality. The TMDL does not specifically address how those controls may be integrated through ongoing watershed wide or other permit mechanisms.

Response:

The role of the stormwater TMDLs is to set the hydrologic target for each watershed upon which the implementation plan will be based. A TMDL is not required to include an implementation plan or the specific control actions required to meet water quality standards and the long-term maintenance requirements for these control actions. Each watershed-specific implementation plan and related permit(s) will spell out the required stormwater control requirements and the long-term maintenance of those controls.

3. Indian Brook. Page 5: Biomonitoring: It was my understanding that there would be additional bioassessment prior to TMDL development. In streams near attainment where offset work has been completed after the most current assessment described, there might be improvement to bioassessment data. With work completed, this assessment will unfortunately occur during TMDL implementation.

Response:

VTDEC agrees that follow-up biomonitoring is an important aspect to tracking BMP effectiveness, especially in watersheds with relatively attainable TMDL targets and where significant BMPs have been installed. However, no monitoring schedule has been devised for the stormwater impaired watersheds beyond the statewide five year rotating watershed assessment schedule. This important aspect of stormwater implementation planning will be part of the Stormwater Advisory Group (SWAG) discussions. Key to this discussion will be consideration of appropriate biomonitoring schedules and resources available to fund this labor intensive and expensive monitoring.

4. Page 1. Waterbody: Sunderland Brook also lies within the Village of Essex Junction, upstream from Susie Wilson Road.

Response

This change will be made to the Sunderland Brook TMDL.

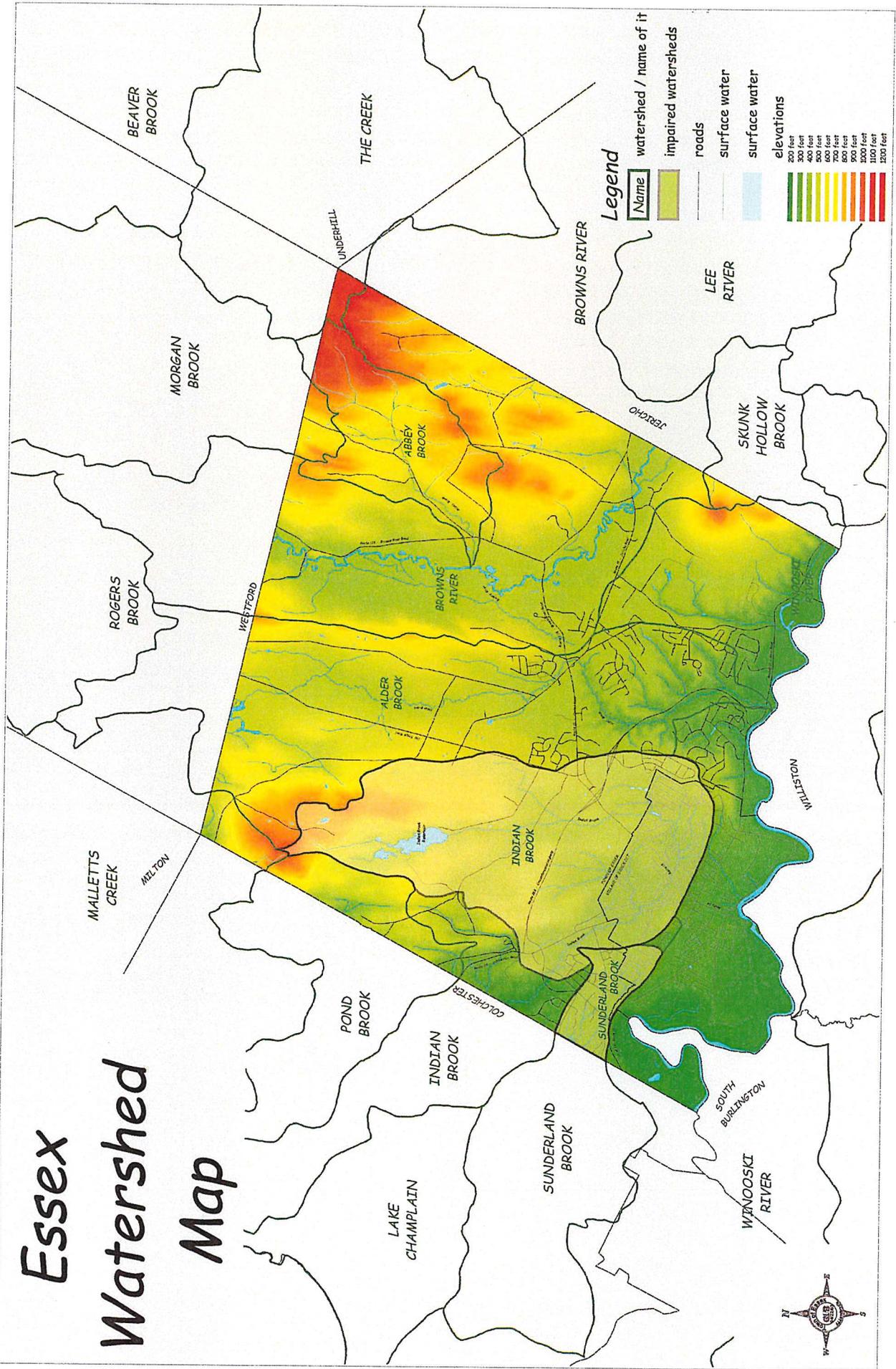
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Appendix B: Map of the Watersheds in the Town

Essex Watershed Map



**Appendix C: Stormwater Program Agreement between
the MS4 Communities and the Chittenden County
Regional Planning Commission for Rethink Runoff**

**CHITTENDEN COUNTY MS4
STORMWATER PROGRAM SERVICES AGREEMENT
EFFECTIVE JULY 28, 2023, THROUGH JULY 27, 2028**

Preamble

This Stormwater Program Services Agreement (“Agreement”) is entered into by and between a group of Municipal Separate Storm Sewer System (“MS4”) permittees (“MS4 Permittees”) and the Chittenden County Regional Planning Commission (“CCRPC”) to operate an MS4 Stormwater Program (“Program”) that conforms with and satisfies the relevant requirements of both Minimum Control Measure One (Public Outreach and Education) and Minimum Control Measure Two (Public Involvement and Participation) of the Phase II NPDES Permit issued by the Vermont Department of Environmental Conservation (“DEC”) on July 17, 2018 through General Permit 3-9014 (“MS4 Permit”) and then re-issued by DEC as General Permit 3-9014 (2023), as these requirements may be amended, or otherwise modified during the term of this Agreement.

1. **Service Agreement** – This Agreement constitutes a service agreement pursuant to 24 V.S.A. § 4345b (Intermunicipal Service Agreements).
2. **Definitions**—For purposes of this Agreement, the term “MS4 Permittees” includes the Vermont Agency of Transportation, which on December 28, 2016 became eligible for coverage under General Permit 3-9007 for Stormwater Discharges from the State Transportation Separate Storm Sewer System (TS4).
3. **Parties** – The following are the parties to this Agreement:
 - a. **MS4 Permittees** – the undersigned MS4 Permittees, and
 - b. **CCRPC** – the undersigned regional planning commission.
5. **MS4 Steering Committee**
 - a. **Composition** – The Members of the Steering Committee shall consist of one representative from each of the signatory MS4 Permittees to this Agreement. Another MS4 permittee may request to join this Agreement if approved by a two-thirds vote of the Members. The Members shall be appointed either by the governing bodies or their designee of their municipalities at publicly warned meetings or, if a Member representing an MS4 Permittee is a non-municipal agency, via a process consistent with that agency’s practices and policies. At its first meeting, the Steering Committee shall elect a Chair or Co-Chairs by a majority vote. The Chair or co-Chairs shall serve until such time as the Chair or Co-Chairs resigns or the Steering Committee elects a new Chair or Co-Chairs.
 - b. **Duties** – The Steering Committee shall direct the CCRPC on the development and performance of Program Services in particular and on all other matters bearing on the administration of this Agreement. All actions of the Steering Committee shall be by majority vote unless otherwise specified in this Agreement.

- c. **Organization of Meetings** – The CCRPC shall provide Steering Committee Members with reasonable notice of meetings via email. Notice shall include a meeting agenda and draft meeting minutes. In addition, the CCRPC shall post notice of Steering Committee meetings on its website and on the Program website. Regular meetings shall be held on a monthly basis at a date and time as agreed upon by members from year to year. Meeting notices shall be issued consistent with the Vermont Open Meetings law.

6. **CCRPC**

a. **Duties** – The CCRPC shall:

- 1) Administer this Agreement and agreements with contractors (including executing contracts approved by the Steering Committee, receiving and disbursing funds, and monitoring the provision of services) for the benefit of the MS4 Permittees.
- 2) Provide other services contributing to the operation of the Program (including, but not limited to, social media management, public relations, grant writing, creating and managing a Program website, organizing meetings as set forth in Section 4.c, above, etc.) as directed by the Steering Committee; and at a level consistent with each year's Program Budget as described in Section 8.b, below.
- 3) Provide a quarterly budget report to the Steering Committee detailing expenses the CCRPC incurred and the payments it has received.
- 4) Pay contractors and vendors for charges consistent with the relevant contract, using funds from the Program Budget, as defined in Section 8, below.
- 5) Upon approval of the Steering Committee or its designee, reimburse itself for reasonable personnel expenses and other reasonable expenses for approved charges consistent with its duties, using funds from the Program Budget.
- 6) Consult with the Steering Committee prior to authorizing any contractor activities or charges outside the scope of work of a contract.
- 7) Notify the Steering Committee when 75% of the annual budget (as defined in Section 8, below) for an individual category of expenses (e.g., contractors, CCRPC fees, advertising, etc.) is reached.
- 8) At the request of the Steering Committee, assign any or all contracts that the CCRPC has entered into pursuant to this Agreement to the MS4 Permittees who are signatories to this Agreement at the time or to another contractor of the Steering Committee's choosing.
- 9) Comply with all applicable federal, state, and local laws, including Burlington's Livable Wage Ordinance as applicable.

- b. **Compensation** – Through the Program Budget, the MS4 Permittees shall compensate the CCRPC for the actual costs of performing its duties defined in Section 5.a, above; provided, however, that the CCRPC shall not be entitled to compensation that would exceed ten percent (10%) of

the Program Budget as specified in Section 8.b, below, without the prior written approval of a majority of the Steering Committee.

- c. **Invoices** – The CCRPC shall invoice the Program to cover personnel charges, mileage reimbursement, and other direct expenses necessary to perform its duties. Personnel charges for CCRPC staff shall be calculated at a rate of salary plus fringe plus CCRPC’s applicable indirect rate as required by 24 V.S.A. § 4345b. As set forth in Section 5.b, above, upon approval of the Steering Committee or its designee, the CCRPC may reimburse itself for charges consistent with its duties, using funds from the Program Budget, subject to the approval of the Chair or Co-Chairs. Invoices from vendors to CCRPC may be paid by CCRPC subject to contract limits consistent with the budget without the approval of the Chair or Co-Chairs.

7. Selection of Contractors

- a. The CCRPC, in consultation with the Steering Committee, shall competitively bid for contract(s) for Program services that collectively satisfy the requirements for Minimum Control Measure One (Public Outreach and Education) and Minimum Control Measure Two (Public Involvement and Participation) of the Phase II NPDES Permit then in effect. The parties to the contracts shall be the contractors and the CCRPC. All contracts shall require the contractor to indemnify and hold harmless the MS4 Permittees from any claims related to the contract and to procure and maintain commercially reasonable liability insurance for all services performed under the contract.
- b. In addition to meeting the insurance and indemnity requirements described in subsection (a) above, all contracts shall be awarded based on qualifications, price, and the ability of the entity to provide services that meet the relevant MS4 Permit requirements. The selection of contractors shall comply with the procurement policy of the CCRPC and with applicable state and federal procurement laws and procedures.
- c. Contracts shall generally be 1 to 5 years in length (not exceeding five years) and shall include, but not be limited to, a Maximum Limiting Amount and the right of the CCRPC to 1) cancel a contract if services are not being adequately provided, 2) specify that payments to contractors shall be made only for services rendered, 3) specify the annual scope of work and budget as approved by the Steering Committee, 4) allow a contract extension if desired, and 5) assign the contract to the MS4 Permittees that are signatories to this Agreement at the time of the assignment or to a contractor of the Steering Committee’s choosing.
- d. Contracting for services under this Agreement shall comply with the Fair Employment Act and Americans with Disabilities Act: the CCRPC shall comply with the requirement of Title 21 V.S.A Chapter 5, Subchapter 6, relating to fair employment practices, to the full extent applicable. The CCRPC shall also ensure, to the full extent required by the Americans with Disabilities Act of 1990, that qualified individuals with disabilities receive equitable access to the services, programs, and activities provided by the Steering Committee under this Agreement. This provision shall also be included in all contracts and subcontracts executed under this Agreement.
- e. The CCRPC and the Steering Committee recognize the important contribution and vital impact which small businesses have on the State’s economy. In this regard, the CCRPC shall ensure a

free and open bidding process that affords all businesses equal access and opportunity to compete, except under circumstances where competitive bidding may not be practicable and is not required by applicable procurement policies. The CCRPC and the Steering Committee also recognize the existence of businesses owned by minorities and women, and the CCRPC shall make a good faith effort to encourage these firms to compete for contracts involving state or federal funds and comply with applicable law relating to civil rights and disadvantaged business enterprises.

8. **Program Services** – The Steering Committee, assisted by the CCRPC and its contractors, shall implement a unified Program that satisfies the relevant requirements of Minimum Control Measure One (Public Education and Outreach) and Minimum Control Measure Two (Public Involvement and Participation) of the MS4 Permit.

The Program Content for each Program Year shall be as defined in writing by a majority of the Steering Committee. The Program Year shall be the State of Vermont’s fiscal year. The Program Content shall implement the following deliverables:

- a. **Public Education and Outreach** – Elements shall include, at a minimum:
 - 1) operating the Program’s website, www.smartwaterways.org, or its equivalent; and
 - 2) advertising in various media.
- b. **Public Involvement and Participation** – Elements shall include, at a minimum:
 - 1) operating the Program’s website, www.ccstreamteam.org, or its equivalent;
 - 2) hosting and/or organizing workshops, projects, and other events to engage the public; and
 - 3) recruiting volunteers to support projects, promote events, and/or engage the public.
- c. **End of MS4 permit year annual reporting** – Elements shall include preparation of a narrative report 25 business days prior to the MS4 Permittees’ reporting deadline to DEC.

9. **Program Dues, Budget, Costs, and Payments**

- a. **Dues**
 - 1) For State Fiscal Year, FY24, July 2023-June 2024, the annual dues for each of the undersigned MS4 Permittees shall be \$7,000.
 - 2) For FY25 and following fiscal years, the annual dues shall be set by a two-thirds majority by December 15th of the preceding calendar year. In the absence of agreement, the dues shall be \$6,000.
 - 3) The CCRPC shall invoice each MS4 Permittee on or about July 1st of each year with payment to the CCRPC due 30 days later.

4) All Members shall pay equal dues.

b. Program Budget

- 1) The annual Program Budget shall consist of the sum of the annual payments for each Program Year made by MS4 Permittees, plus any funds from other sources made available to the Program by majority vote of the Steering Committee.
- 2) Prior to the start of each Program Year, the Steering Committee shall adopt a Program Budget governing expenditures for the subsequent Program Year. Budget categories shall include, but not be limited to: CCRPC Duties, Minimum Measure #1 Services, Minimum Measure #2 Services, Advertising Costs and Expenses.
- 3) Once the Program Year starts, after written notice and meeting or by written consent, a majority of the Steering Committee may amend the Program Budget as needed, for example to reflect any surplus or deficits from the prior Program Year, receipt of new sources of funds, or a desired change in the Program Budget, subject to Section 8.a, above.
- 4) In the event that costs are less than anticipated or if grants or other funding sources become available, a majority of the voting Members of the Steering Committee may decide to reduce each Member's payment by an equal amount or to credit all or part of the following Program Year assessment to each MS4 Permittee.

- c. **Maximum Annual Costs and Payments** – Except as otherwise provided by this section, each MS4 Permittee shall within 30 days of receipt of an invoice make a single annual dues payment, as provided by Section 8.a, above.
- d. **Other Funds** – Any funds made available to the Program shall be dedicated to reducing the annual costs of each MS4 Permittee participating in the Program, except as a majority of the voting Members of the Steering Committee may decide.
- e. **Excess Funds** – Any funds remaining at the end of a Program Year shall be carried over to the next Program Year, unless a majority of the voting Members of the Steering Committee decides otherwise.
- f. **Non-appropriation** – The obligations of each MS4 Permittee to make payments under this Agreement shall constitute a current expense of the MS4 Permittee and shall not in any way be construed to be a debt of the MS4 Permittee in contravention of any applicable constitutional or statutory limitation or requirement, or the MS4 Permittee's charter or articles of incorporation; nor shall anything contained in this Agreement constitute a pledge of the credit or tax revenues, funds, or monies of the MS4 Permittee. The decision whether or not to budget and appropriate funds during each fiscal year of the MS4 Permittee is within the discretion of the governing body of the MS4 Permittee. The obligations of a MS4 Permittee under the Agreement are subject to annual appropriations by the governing body of the MS4 Permittee, except as provided by Section 12 of this Agreement. An MS4 Permittee cannot choose to not appropriate funds and then withdraw in a manner that shifts prior contractual obligations on to the others. Non-appropriation will be considered withdrawal and must be prospective in fairness to all signatories as per Section 13.

10. **Contract Approval** – All CCRPC contracts related to this agreement shall be conditioned upon approval by a majority of the voting Members of the Steering Committee and shall be consistent with Section 6, above.
11. **Termination of CCRPC** – The CCRPC on its own or the Steering Committee by a majority vote of its full Membership may elect to terminate the CCRPC’s future participation in this Agreement by providing 90 days’ written notice to the other party. In the event of termination under this section, the CCRPC shall continue to administer and comply with each existing contract, and the MS4 Permittees shall continue to reimburse the CCRPC from the Program Budget for the actual costs of administering and complying with each contract, as provided by this Agreement, unless and until the CCRPC assigns the contract pursuant to Sections 5.a.8 and 6.c of this Agreement.
12. **Termination of Agreement**
 - a. This Agreement shall become null and void with no further obligation of the parties if:
 - 1) After written notice and meeting, two-thirds of the Members of the Steering Committee vote to end participation, or
 - 2) DEC determines that the Program outlined in this Agreement does not meet the relevant requirements for Minimum Control Measure One (Public Education and Outreach) or Minimum Control Measure Two (Public Involvement and Participation), and the parties to this Agreement are unable to craft a Program to satisfy DEC.
 - b. In the event of termination, any funds remaining in the Program Budget (after payment of obligations to vendors or to satisfy debts) shall be reimbursed to the MS4 Permittees with each MS4 Permittee receiving a share proportional to the number of MS4 Permittees at the time of termination. For example, if there are twelve MS4 Permittees at the time of termination, each MS4 Permittee shall receive a 1/12th share.
13. **Withdrawal of Member** – If an MS4 Permittee wishes to withdrawal from participation, it may do so with or without cause and it shall provide at least 90 days’ notice to the other MS4 Permittees and the CCRPC. After withdrawal, a MS4 Permittee shall remain responsible for its share of the costs of contracts that the Steering Committee approved prior to the effective date of the withdrawal.
14. **Effective Date and Duration of Agreement** – The effective date of this Agreement shall be July 28, 2023, 2023_, and this Agreement shall terminate on July 27, 2028
15. **Amendment** – This Agreement may be amended only in writing and upon unanimous action of all the Members.
16. **Counterparts** – This Agreement may be executed in multiple counterparts, each of which is deemed an original and all of which constitute one and the same document. Each such counterpart may be a facsimile or PDF copy, and such facsimile or PDF copy shall be deemed an original.

17. **Public Records** – This Agreement and any and all records submitted to the CCRPC or MS4 Permittees - including Bids, Proposals, Qualifications, Contracts, etc.-- whether electronic, paper, or otherwise recorded, are subject to the Vermont Public Records Act.

Signature of CCRPC

DocuSigned by:

Christopher Shaw

Christopher A. Shaw, Board Chair, CCRPC

9/28/2023

Date

Signatures of Members

Name Title The Burlington International Airport Date

Name Title The City of Burlington Date

Name Title The Town of Colchester Date

Name Title The Town of Essex Date

Name Title The City of Essex Junction Date

Name Title The Town of Milton Date

Name Title The Town of Shelburne Date

Name Title The City of South Burlington Date

Name Title Vermont Agency of Transportation Date

Name Title The University of Vermont Date

Name Title The Town of Williston Date

Name Title The City of Winooski Date

17. **Public Records** – This Agreement and any and all records submitted to the CCRPC or MS4 Permittees - including Bids, Proposals, Qualifications, Contracts, etc.-- whether electronic, paper, or otherwise recorded, are subject to the Vermont Public Records Act.

Signature of CCRPC

 Christopher A. Shaw, Board Chair, CCRPC _____ Date

Signatures of Members

NICOLAS LONGO  DIRECTOR OF AVIATION 9/19/2023
 Name Title The Burlington International Airport Date

 Name Title The City of Burlington _____ Date

 Name Title The Town of Colchester _____ Date

 Name Title The Town of Essex _____ Date

 Name Title The City of Essex Junction _____ Date

 Name Title The Town of Milton _____ Date

 Name Title The Town of Shelburne _____ Date

 Name Title The City of South Burlington _____ Date

 Name Title Vermont Agency of Transportation _____ Date

 Name Title The University of Vermont _____ Date

 Name Title The Town of Williston _____ Date

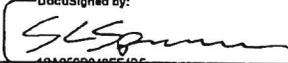
 Name Title The City of Winooski _____ Date

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Signature of CCRPC

Christopher A. Shaw, Board Chair, CCRPC _____
Date

Signatures of Members

Name	Title	The Burlington International Airport	Date
<small>DocuSigned by:</small>  <small>10A95E0042EF4B5...</small>	DPW Director		8/21/2023

Name	Title	The City of Burlington	Date
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Name	Title	The Town of Colchester	Date
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Name	Title	The Town of Essex	Date
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Name	Title	The City of Essex Junction	Date
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Name	Title	The Town of Milton	Date
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Name	Title	The Town of Shelburne	Date
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Name	Title	The City of South Burlington	Date
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Name	Title	Vermont Agency of Transportation	Date
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Name	Title	The University of Vermont	Date
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Name	Title	The Town of Williston	Date
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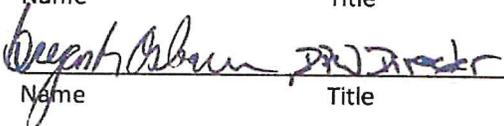
Name	Title	The City of Winooski	Date
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Signature of CCRPC

Christopher A. Shaw, Board Chair, CCRPC _____ Date

Signatures of Members

Name	Title	The Burlington International Airport	Date
Name	Title	The City of Burlington	Date
		The Town of Colchester	7.25.23
Name	Title	The Town of Essex	Date
Name	Title	The City of Essex Junction	Date
Name	Title	The Town of Milton	Date
Name	Title	The Town of Shelburne	Date
Name	Title	The City of South Burlington	Date
Name	Title	Vermont Agency of Transportation	Date
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Signatures of Members

 Name Title The Burlington International Airport _____ Date

 Name Title The City of Burlington _____ Date

 Name Title The Town of Colchester _____ Date
ANNE MARSH, PE PUBLIC WORKS DIRECTOR *[Signature]* 7/27/23
 Name Title The Town of Essex _____ Date

 Name Title The City of Essex Junction _____ Date

 Name Title The Town of Milton _____ Date

 Name Title The Town of Shelburne _____ Date

 Name Title The City of South Burlington _____ Date

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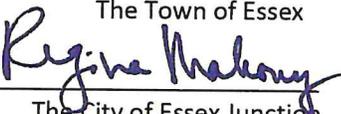
Signatures of Members

 Name Title The Burlington International Airport _____ Date

 Name Title The City of Burlington _____ Date

 Name Title The Town of Colchester _____ Date

 Name Title The Town of Essex _____ Date

Regina Mahony, City Manager  7/27/2023

 Name Title The City of Essex Junction _____ Date

 Name Title The Town of Milton _____ Date

 Name Title The Town of Shelburne _____ Date

 Name Title The City of South Burlington _____ Date

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 Name Title The City of Burlington _____
 Date

 Name Title The Town of Colchester _____
 Date

 Name Title The Town of Essex _____
 Date

 Name Title The City of Essex Junction _____
 Date

[Handwritten Signature] *[Handwritten Title: Town Manager]* _____
 Name Title The Town of Milton 7/31/23
 Date

 Name Title The Town of Shelburne _____
 Date

 Name Title The City of South Burlington _____
 Date

 Name Title Vermont Agency of Transportation _____
 Date

 Name Title The University of Vermont _____
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Name Title The City of Burlington _____ Date

Name Title The Town of Colchester _____ Date

Name Title The Town of Essex _____ Date

Name Title The City of Essex Junction _____ Date

Name Title The Town of Milton _____ Date

Matthew B. Swales *Town Manager*

Name Title The Town of Shelburne 7/27/23
_____ Date

Name Title The City of South Burlington _____ Date

Name Title Vermont Agency of Transportation _____ Date

Name Title The University of Vermont _____ Date

Name Title The Town of Williston _____ Date

Name Title The City of Winooski _____ Date

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Name Title The City of Burlington _____ Date

Name Title The Town of Colchester _____ Date

Name Title The Town of Essex _____ Date

Name Title The City of Essex Junction _____ Date

Name Title The Town of Milton _____ Date

Name Title The Town of Shelburne _____ Date

Jessie Baker City Manager *Jessie Baker* 8/1/23
Name Title The City of South Burlington _____ Date

Name Title Vermont Agency of Transportation _____ Date

Name Title The University of Vermont _____ Date

Name Title The Town of Williston _____ Date

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Name Title The City of Burlington _____ Date

Name Title The Town of Colchester _____ Date

Name Title The Town of Essex _____ Date

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Name Title The Town of Milton _____ Date

Name Title The Town of Shelburne _____ Date

Name Title The City of South Burlington _____ Date

Joe Flynn Secretary 9/7/2023

Name Title Vermont Agency of Transportation _____ Date

Name Title The University of Vermont _____ Date

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 Name Title The Town of Shelburne _____
 Date

 Name Title The City of South Burlington _____
 Date

 Name Title Vermont Agency of Transportation _____
 Date

Richard H Cate
Digitally signed by Richard H Cate
 Date: 2023.08.02 16:52:09
 -04'00'

 Name Title The University of Vermont _____
 Date

 Name Title The Town of Williston _____
 Date

 Name Title The City of Winooski _____
 Date

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 Name Title The Town of Shelburne _____ Date

 Name Title The City of South Burlington _____ Date

 Name Title Vermont Agency of Transportation _____ Date

 Name Title The University of Vermont _____ Date

Erik Wells Town Manager *Erik Wells* 7/28/23

 Name Title The Town of Williston _____ Date

 Name Title The City of Winooski _____ Date

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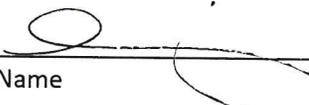
 Name Title The Town of Shelburne _____ Date

 Name Title The City of South Burlington _____ Date

 Name Title Vermont Agency of Transportation _____ Date

 Name Title The University of Vermont _____ Date

 Name Title The Town of Williston _____ Date


 Name Title City Manager 9/14/2023

 Name Title The City of Winooski _____ Date

**Appendix D: Stormwater Ordinance including 2014
Expired Permit Additions**

Link to entire document:

https://www.essex.org/index.asp?SEC=B1514A56-E23E-43B7-9195-5ED284507A8F&Type=B_BASIC

Town of Essex Selectboard

Town Ordinance

The Selectboard of the Town of Essex hereby ordains that Chapter 10.20 be added to the Municipal Code:

Chapter 10.20

STORM WATER

Sections:

- 10.20.010 General Provisions
 - 10.20.011 Basis for the Ordinance
 - 10.20.012 Purpose
 - 10.20.013 Applicability
 - 10.20.014 Documents Incorporated by Reference
 - 10.20.015 Definitions
 - 10.20.016 General Exemptions
- 10.20.050 Illicit Discharges
 - 10.20.051 Illicit Discharges-General
 - 10.20.052 Discharge Prohibitions.
 - 10.20.053 Suspension of MS4 Access.
 - 10.20.054 Industrial or Construction Activity Discharges.
 - 10.20.055 Monitoring of Discharges.
 - 10.20.056 Requirement to Prevent, Control, and Reduce Storm Water Pollutants.
 - 10.20.057 Watercourse Protection.
 - 10.20.058 Notification of Spills.
- 10.20.060 Erosion and Sediment control
 - 10.20.061 Erosion and Sediment Control-General.
 - 10.20.062 Erosion and Sediment Control Applicability
 - 10.20.063 Disturbance of Less Than One Acre of Land
 - 10.20.064 Applicability of State Erosion and Sediment Control Permits
 - 10.20.065 Permit Required.
 - 10.20.066 Erosion and Sediment Control Plans
 - 10.20.067 Construction Site and Driveway Access Requirements
 - 10.20.068 Inspection
- 10.20.070 Development Storm Water Management.
 - 10.20.071 Development Storm Water Management - General
 - 10.20.072 Development Storm water Management Applicability
 - 10.20.073 Storm Water Design Manual.
 - 10.20.074 General Performance Criteria.
 - 10.20.075 Basic Storm Water Management Design Criteria.
 - 10.20.076 Requirements for Storm Water Management Plan Approval.
 - 10.20.077 Construction Inspection.
 - 10.20.078 As-built Plans.
 - 10.20.079 Landscaping and Stabilization Requirements.
- 10.20.080 Storm Water Control - Operation and Maintenance.
 - 10.20.081 Design.
 - 10.20.082 Routine Maintenance.
 - 10.20.083 Maintenance Easement.
 - 10.20.084 Maintenance Covenants.
 - 10.20.085 Maintenance Inspections.
 - 10.20.086 Records of Installation and Maintenance Activities.
 - 10.20.087 Failure to Maintain Practices.
- 10.20.090 Riparian Buffer Zones (reserved for future).
- 10.20.100 Waivers
- 10.20.105 Appeals
- 10.20.110 Enforcement.
 - 10.20.111 Stop-work order; Revocation of Permit.
 - 10.20.112 Violation and Penalty.
 - 10.20.113 Notice of Violation.
 - 10.20.114 Appeal of Notice of Violation.
 - 10.20.115 Enforcement Measures after Appeal.
 - 10.20.116 Cost of Abatement of the Violation.
 - 10.20.117 Injunctive Relief.
 - 10.20.118 Violations Deemed a Public Nuisance.
 - 10.20.119 Remedies not Exclusive.
- 10.20.120 Other Applicable Regulations.
- 10.20.130 Adherence to Public Works Specifications.
- 10.20.140 Fees, Fines, and Applicable Charges.
- 10.20.150 Severability.

APPENDIX A: Small Site Erosion Control Guide
APPENDIX B: Town of Essex Erosion and Sediment Control Permits Application
APPENDIX C: Storm Water Management Permit and Plan
APPENDIX D: Storm Water Management Design Criteria

§10.20.010 General Provisions

This chapter is adopted pursuant to the Town's enabled right to adopt ordinances, bylaws, and regulations according to Section 103(a), et seq. of the Town of Essex Charter, and Sections 3508 and 3617 of Title 24, Vermont Statutes Annotated.

§10.20.011 Basis for the Ordinance

A. Land development activities and associated increases in site impervious cover often alter the hydrologic response and water quality aspects of local watersheds and increase storm water runoff rates and volumes, flooding, stream channel erosion, sediment transport and deposition and the concentration of waterborne pollutants and pathogens.

B. Clearing and grading during construction tend to increase soil erosion and reduce the native vegetation important for terrestrial habitat, for stream regulation through shading and for maintenance of natural food cycles important to food chains and aquatic habitat.

C. Improper design and construction of storm water management practices can increase downstream flooding and increase the velocity of storm water runoff causing stream bank erosion and build-up of sedimentation.

D. Impervious surfaces allow less water to percolate into the soil, thereby decreasing groundwater recharge and stream base flow.

E. Storm water runoff, soil erosion and non-point source pollution can be controlled, minimized and in some cases eliminated through the regulation of storm water runoff from land development activities. Illicit discharges must be eliminated.

F. The regulation of storm water discharges from new development and redevelopment of existing sites, the elimination of illicit discharges and the control of erosion and sediment discharge is in the public interest and will minimize threats to public health and safety

G. Economic loss and stream water quality degradation can result from these adverse impacts. Pet and wildlife wastes in storm water may raise bacteria levels, potentially resulting in loss of recreation use of the streams and Lake Champlain

§10.20.012 Purpose

The purpose of this chapter is to provide for increased regulation to address the items outlined in Section 10.20.011 and to thereby protect the public health, safety, and general welfare of the Town of Essex through the establishment of storm water best management practices in the following areas:

- A. Illicit Discharges (reference Section 10.20.050).
- B. Erosion and Sediment Control (reference Section 10.20.060).
- C. Development Storm Water Management (reference Section 10.20.070).
- D. Storm Water Control, Operation, and Maintenance (reference Section 10.20.080).
- E. Riparian Buffer Zones (reserved for the future)

In addition, this chapter ensures compliance with the storm water management provisions of the Small Municipal Separate Storm Sewer Systems (MS4), General Permit No. 3-9014, for those construction sites and post construction storm water management projects which disturb 1 acre or more of earth.

§10.20.013 Applicability.

This chapter applies to all property within the Town of Essex, Vermont outside the Village of Essex Junction and shall apply specifically as indicated in other sections by topic matter in this Ordinance.

§10.20.014 Documents Incorporated by Reference.

The latest versions of the following documents are incorporated herein by reference:

- A. *Town of Essex Outside the Village of Essex Junction Official Subdivision Regulations.*
- B. *Town of Essex Outside the Village of Essex Junction Official Zoning Bylaws.*
- C. *Town of Essex Standard Specification for Construction.*
- D. *Vermont Storm water Management Manual, Volumes I and II.*
- E. *Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites*
- F. *Town of Essex Storm Water Management Plan dated April 2003*

§10.20.015 Definitions.

As used in this chapter:

"*Accelerated erosion*" means erosion caused by development activities that exceeds the natural processes by which the surface of the land is worn by the action of water, wind, or chemical action.

“*Applicant*” means a property owner or duly designated agent who files an application for a land disturbance activity.

“*Best management practices*” (BMP’s) means schedules of activities, prohibitions of practices, maintenance procedures, the use of pollution control devices and other management practices to prevent or reduce the amount of pollution introduced to receiving bodies of water from storm water runoff. BMP’s can include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

“*Building*” is as defined in Article XXVII of the Town of Essex Zoning Bylaws, as amended.

“*Channel*” means a natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

“*Clean Water Act*” means the federal Water Pollution Control Act (33 USC §1251, et seq.), and any subsequent amendments thereto.

“*Clearing*” means any activity that removes the vegetative surface cover.

“*Construction activity*” means activities such as clearing and grubbing, grading, excavating, and demolition. Coverage for construction site runoff under the State of Vermont General Permit may be required for projects resulting in land disturbance of 1 acre or more of land.

“*Conveyance*” means the process of water moving from one place to another.

“*Detention*” means the temporary storage of storm water runoff in a storm water system with the goal of controlling peak discharge rates and providing gravity settling of pollutants.

“*Detention facility*” means a detention basin or alternative structure designed to temporarily store stream flow or surface runoff and to gradually release stored water at controlled rates.

“*Development*” is as defined in Article XXVII of the Town of Essex Zoning Bylaws, as amended.

“*Drainage easement*” means a legal right granted by a landowner to a grantee allowing the use of land for storm water management purposes.

“*Drainage way*” means a channel that conveys surface runoff through the site.

“*Erosion*” means when land is diminished or worn due to wind or water. Often the eroded debris (silt or sediment) becomes a pollutant via storm water runoff. Erosion occurs naturally but can be intensified by land clearing activities such as farming, development, road building, and timber harvesting.

“*Erosion and sediment control plan*” means a plan that indicates the specific measures and their sequencing for use to control sediment and erosion on a development site during and after construction.

“*Existing development*” means a development that was built prior to the effective date of the adoption of this Ordinance.

“*Grading*” means excavation or fill of material, including the resulting conditions thereof.

“*Hazardous materials*” means any material, including any substance, waste, or combination thereof, that because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

“*Hotspot*” means an area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water.

“*Hydrologic soil group*” (HSG) means a Natural Resource Conservation Service classification in which soils are categorized into 4 runoff potential groups. The groups range from “A” soils with high permeability and little runoff production to “D” soils that have low permeability rates and produce much more runoff.

“*Illicit discharge*” means any direct or indirect non-storm water discharge to the storm drain system, except as may be exempted under this chapter.

“*Illicit connections*” means either of the following definitions:

- A. Any drain or conveyance, whether on the surface or subsurface, that allows an illicit discharge to enter the storm drain system including but not limited to any conveyances that allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency.
- B. Any drain or conveyance connected from a commercial or industrial land use to the storm drain system that has not been documented in plans, maps or equivalent records and approved by an authorized enforcement agency.

“*Impervious cover*” means human-made surfaces including, but not limited to, paved and unpaved roads, parking areas, building roofs, driveways (paved and unpaved) walkways and compacted surfaces, from which precipitation runs off rather than infiltrates. A measure of imperviousness is a “C” value for runoff under of the Unified Soil Classification System of .70 or greater.

“*Industrial activity*” means activities subject to NPDES Industrial Permits as defined in 40 CFR §122.26(b)(14).

“*Industrial storm water permit*” means a NPDES permit issued to a commercial industry or group of industries that regulates the pollutant levels associated with industrial storm water discharges or specifies on-site pollution control strategies.

“*Infiltration*” means the process of percolating storm water into the subsurface.

“*Infiltration facility*” means any structure or device designed to infiltrate retained water to the subsurface. These facilities may be above or below grade.

“*Jurisdictional wetland*” means an area inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

“*Land disturbance activity*” means any activity that changes the volume or peak flow discharge rate of rainfall runoff from the land’s surface. This may include grading, digging, cutting, scraping, or excavating soil, placement of fill materials, paving, construction, substantial removal of vegetation, or any activity that bares soil or rock or involves the diversion or piping of any natural or human-made watercourse.

“*Landowner*” means the legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.

“*Maintenance agreement*” means a legally recorded document that acts as a property deed restriction and that provides for long-term maintenance of storm water management practices.

“*Maximum extent practicable*” (MEP) means the requirement in the federal Clean Water Act permitting discharges from municipal storm sewers to include controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the state of Vermont determines appropriate for the control of such pollutants.

“*Minimum control measures*” means any BMP or other method used to prevent or reduce the discharge of pollutants to waters of the United States.

“*MS4*” means the municipal separate storm water system.

“*National Pollutant Discharge Elimination System*” (NPDES) means the name of the surface water quality program authorized by Congress as part of the 1987 Clean Water Act. This is EPA’s program to control the discharge of pollutants to waters of the

United States and means a permit issued by EPA (or by a state under authority delegated pursuant to 33 USC §1342(b)) authorizing the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

“*New development*” means the construction of new impervious surfaces on a tract or tracts of land occurring after the effective date of this Ordinance

“*Non-point source (NPS) pollutants*” means pollutants from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even into underground sources of drinking water.

“*Non-storm water discharge*” means any discharge to the storm drain system that is not composed entirely of storm water.

“*Nonstructural best management practices*” means non physical methods or activities used to mitigate the adverse impacts of storm water runoff including, but not limited to ordinances, maintenance activities and education/outreach activities.

“*Offset fee*” means a monetary compensation paid to a local government for an inability to meet pollutant load reduction targets.

“*Offsite*” means the land within the development’s drainage area that is not owned or controlled by the permit applicant.

“*Outfall*” means the point where drainage discharges from a pipe, ditch, or other conveyance to a receiving body of water.

“*Perimeter control*” means a barrier that prevents sediment from leaving a site by filtering sediment-laden runoff or diverting it to a sediment trap or basin.

“*Person*” means any individual, association, organization, partnership, firm, corporation, or other entity recognized by law and acting as either the owner or as the owner’s agent.

“*Phasing*” means clearing of a parcel of land in distinct phases, with the stabilization of each phase completed before the clearing of the next.

“*Point source pollutant*” means pollutants from a single, identifiable source such as a factory or refinery.

“*Pollutant*” means anything that causes or contributes to pollution. Pollutants may include, but are not limited to, paints, varnishes and solvents, oil and other automotive fluids, non-hazardous liquid and solid wastes and yard wastes, refuse, rubbish, garbage, litter, or other discarded or abandoned objects, and accumulations, so that same may cause or contribute to pollution, floatables, pesticides, herbicides,

and fertilizers, hazardous substances and wastes, sewage, fecal coliform and pathogens, dissolved and particulate metals, animal wastes, wastes and residues that result from constructing a building or structure, and noxious or offensive matter of any kind.

“Recharge” means the replenishment of underground water reserves.

“Redevelopment” means in the context of storm water, any construction, alteration, or improvement exceeding 10,000 SF on previously developed land.

“Riparian Buffer Zone” means the width of land adjacent to streams or lakes between the top of the bank or top of slope or mean water level and the edge of other land uses. Riparian buffer zones are typically undisturbed areas that protect the waterbody and adjacent riparian corridor ecosystem from the impact of adjacent land uses.

“Riparian corridor” means the waterbody and width of adjacent land that supports a distinct ecosystem with abundant and diverse plant and animal communities and which provides for channel stability of the water body.

“Runoff” means drainage or flood discharge that leaves an area as surface flow or as pipeline flow that has reached a channel or pipeline by either surface or sub-surface routes.

“Sediment” means soil, sand, and minerals washed from land into water, usually after rain. Sediment can destroy fish-nesting areas, clog animal habitats, and cloud water so that sunlight does not reach aquatic plants.

“Sediment control” means measures that prevent eroded sediment from leaving the site.

“Sheet flow” means the portion of precipitation that moves initially as overland flow in very shallow depths before eventually reaching a stream channel.

“Site” means a parcel of land or contiguous combination thereof, where grading work is performed as a single unified operation.

“Stabilization” means the use of practices that prevent exposed soil from eroding.

“Start of construction” means the first land-disturbing activity associated with a development, including land preparation such as clearing, grading, and filling, installation of streets and walkways, excavation for basements, footings, piers, or foundations, erection of temporary forms, and installation of accessory buildings such as garages.

“Stop work order” means an order issued requiring that all construction activity on a site be stopped.

“Storm drainage system” means facilities by which storm water is collected and/or conveyed including, but not limited to, any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered

drainage channels, reservoirs, and other drainage structures.

“Storm water” means any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

“Storm water management” means the use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, discharge volumes, and/or peak flow discharge rates.

“Storm water pollution prevention plan” means a document describing the BMP’s and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to storm water, storm water conveyance systems, and/or receiving waters to the maximum extent practicable.

“Storm water retrofit” means a storm water management practice designed for an existing development site that previously had either no storm water management practice in place or a practice inadequate to meet the storm water management requirements of the site.

“Storm water runoff” means flow on the surface of the ground, resulting from precipitation.

“Storm water treatment practices” (STP’s) means measures, either structural or non-structural, that are determined to be the most effective, practical means of preventing or reducing point source or non-point source pollution inputs to storm water runoff and water bodies.

“Structural best management practices” means physical features used to improve storm water quality or reduce peak flows such as detention ponds, grassed swales, sand filters, and infiltration basins.

“Substantially deteriorated” means the condition of a storm water treatment practice that would necessitate repair or reconstruction beyond that which would be considered typical, periodic maintenance for a system of similar design.

“Total maximum daily load” (TMDL) means the maximum amount of pollutants that can be released into a water body without adversely affecting the water quality.

“Urban runoff” means storm water from urban areas that tend to contain heavy concentrations of pollutants from urban activities.

“Wastewater” means any water or other liquid other than uncontaminated storm water discharged from a facility.

“Water quality volume” (Wq_v) means the storage needed to capture and treat 90% of the average annual storm water runoff volume. Numerically (Wq_v) will vary as a function of long-term rainfall statistical data.

“*Watercourse*” means a permanent or intermittent stream or other body of water, either natural or human-made, that gathers or carries surface water.

“*Watershed*” means that geographical area that drains to a specified point on a watercourse, usually a confluence of streams or rivers.

“*Wetland*” means those areas that are inundated by surface or ground water with a frequency sufficient to support plants and animals that depend on saturated soil conditions for growth and reproduction. Designated wetlands in Vermont are classified as Class I, II or III.

§ 10.20.016 General Exemptions

The Illicit Discharge requirements of this Ordinance are applicable in all cases.

The following activities are exempt from review or control under this Ordinance to the extent they do not involve Illicit Discharges:

A. Agricultural and silvicultural activity, except that log landing and log haul roads are subject to the provisions of this Ordinance. In addition, logging or silvicultural activity conducted as a part of a land development application is not exempt from the general provisions of this Ordinance.

B. Repairs to any storm water management system that is deemed necessary by the Town Engineer

C. Cemetery facilities

D. Installation of fence, sign, telephone and electric poles and other kinds of fences, posts or poles.

E. Emergency activity immediately necessary to protect life, property or natural resources.

F. Activities of an individual engaging in home gardening by growing flowers, vegetable and other plants primarily for the use by that person and his/her family.

G. Land development activities that disturb less than one (1) acre.

H. Municipal activities not requiring Site Plan or Subdivision approval. Reconstruction/maintenance of municipal gravel roads shall adhere to the guidelines entitled “Vermont Better Back Roads Manual,” latest version.

§10.20.050 Illicit Discharges

§10.20.051 Illicit Discharges - General.

This sub-chapter regulates non-storm water discharges to the storm drainage system as required by federal and state law. Methods are established for controlling the introduction of pollutants into the municipal separate storm water system (MS4) to meet the following objectives, consistent with the

requirements of the State of Vermont General Permit process:

- A. To regulate the contribution of pollutants to the MS4 by storm water discharges by any user.
- B. To prohibit illicit connections and discharges to the MS4.
- C. To establish legal authority to carry out all inspection, surveillance, and monitoring procedures necessary to ensure compliance with this Ordinance.

§10.20.052 Discharge Prohibitions.

Prohibition of illicit discharges. No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials including, but not limited to, pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water.

The commencement, conduct, or continuance of any illicit discharge to the storm drain system is prohibited except as described herein. The following discharges are exempt from discharge prohibitions established by this sub-chapter:

- A. Flushing of water line or other potable water sources (except when a particular substance in the water is subject to control by State or federal regulation and then the discharge is still exempt if within the limits of acceptability for the controlled substance).
- B. Landscape irrigation or lawn watering (unless such watering results in a direct discharge and the discharge is identified as containing pollutants or chemicals that are required to be controlled by state or federal regulation).
- C. Diverted stream flows.
- D. Rising or pumped ground water, providing such groundwater is not contaminated or polluted.
- E. Ground water infiltration to storm drains.
- F. Foundation or footing drains (not including active ground water dewatering systems) containing no contaminants or pollutants.
- G. Air conditioning condensation (except when control of a particular substance in the water is by federal regulation and then the discharge is still exempt if within the limits of acceptability for the controlled substance).
- H. Uncontaminated springs.
- I. Non-commercial washing of vehicles (unless such watering results in a direct discharge and the discharge is identified as containing pollutants or chemicals that are

required to be controlled by state or federal regulation).

- J. Natural riparian habitat or wetland flows.
- K. Swimming pools (if de-chlorinated— typically less than one PPM chlorine and except when control of a particular substance in the water is by State or federal regulation and then the discharge is still exempt if within the limits of acceptability for the controlled substance).
- L. Fire fighting activities, not including the cleanup of spills or accidents involving contaminated material such as oil spills or hazardous wastes.
- M. Any other water source not containing pollutants.
- N. Discharges specified in writing by an authorized representative of the Town of Essex as being necessary to protect public health and safety.
- O. Dye testing is an allowable discharge, if approved by the Town Engineer.

The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued for the discharge and administered under the authority of the US EPA, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted by the Town for any discharge to the storm drain system.

Prohibition of illicit connections. The construction, use, maintenance, or continued existence of illicit connections to the storm drain system is prohibited.

This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

A person is in violation of this sub-chapter if the person connects a line conveying sewage, laundry waste or other forms of gray water to the MS4 or allows such a connection to continue.

§10.20.053 Suspension of MS4 Access.

Suspension due to illicit discharges in emergency situations. The Town may, without notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge that presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the MS4 or waters of the United States. If the violator fails to comply with a suspension order issued in an emergency, the Town

Engineer may take such steps as deemed necessary to prevent or minimize damage to the MS4 or water of the United States, or to minimize danger to persons.

A person commits a violation of this Ordinance if the person reinstates MS4 access to premises terminated pursuant to this section, without the prior approval of the Town Engineer.

§10.20.054 Industrial or Construction Activity Discharges.

Any person subject to an industrial multi-sector permit or other separately-issued storm water permit by the Town, State or EPA shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Town prior to the allowing of discharges to the MS4.

§10.20.055 Monitoring of Discharges.

Applicability. This section applies to all facilities that have storm water discharges associated with industrial activity, including construction activity.

Access to facilities. Authorized representatives of the Town shall be permitted to enter and inspect facilities subject to regulation under this chapter as often as may be necessary to determine compliance with this chapter. If a discharger has security measures in force that require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to authorized representatives of the Town.

Facility operators shall allow the authorized Town representative ready access to all parts of the premises for inspection, sampling, examination, and copying of records that must be kept under the conditions of an NPDES or State permit to discharge storm water, and the performance of any additional duties as defined by state and federal law.

The Town shall have the right to require the discharger to install on any permitted facility such devices necessary in the opinion of the Town Engineer to conduct monitoring and/or sampling of the facility's storm water discharge at the expense of the discharger.

The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense. All devices used to measure storm water flow and quality shall be calibrated to ensure their accuracy.

Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the operator at the written or oral request of the authorized Town

representative and shall not be replaced. The costs of clearing such access shall be borne by the operator.

Unreasonable delay in allowing the authorized Town representative access to a permitted facility is a violation of a storm water discharge permit and of this Ordinance. A person who is the operator of a facility with a NPDES permit to discharge storm water associated with industrial activity commits a violation of this Ordinance if the person denies the authorized Town representative reasonable access to the permitted facility for conducting any activity authorized or required by this chapter.

If the authorized Town representative has been refused access to any part of the premises from which storm water is discharged, such refusal shall be a violation of this Ordinance. The authorized Town representative may secure warrants from the applicable court having jurisdiction in cases where access is refused.

§10.20.056 Requirement to Prevent, Control, and Reduce Storm Water Pollutants.

The Town has adopted best management practices for any activity, operation, or facility that may cause or contribute to pollution or contamination of storm water, the storm drain system, or waters of the United States through the State of Vermont Phase II Storm-water Permit. The owner or operator of a commercial or industrial establishment shall provide, at their expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses through the use of applicable structural and non-structural BMP's. Further, any person responsible for a property or premise, that is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMP's to prevent the further discharge of pollutants to the MS4. Compliance with all terms and conditions of a valid Multi-sector General permit authorizing the discharge of storm water associated with industrial activity, to the extent practicable, shall be deemed compliance with the provision of this section. These BMP's shall be part of a storm water pollution prevention plan (SWPP) as necessary for compliance with requirements of the NPDES permit.

§10.20.057 Watercourse Protection.

Every person owning property through which an intermittent or continuously flowing watercourse passes, or such person's lessee, shall not deposit in the watercourse or on the land impacted by runoff to the watercourse trash, debris, cut brush, grass or

wood, pet waste and other obstacles that would pollute, contaminate, or significantly alter the natural flow of water through the watercourse. Natural blockages of the stream by wildlife are considered not the responsibility of the landowner or lessee. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

Riparian buffers established as part of development approval and required by Town regulations shall be maintained by the developer and all other subsequent property owners or associations within the development.

§10.20.058 Notification of Spills.

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials that are resulting or may result in illegal discharges or pollutants discharging into storm water, the storm drain system, or waters of the United States from such facility or operation, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify emergency response agencies and the Town Engineer of the occurrence. In the event of a release of non-hazardous materials, said person shall notify the Town Engineer no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the Town Engineer within 3 business days of the phone or in-person notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least 3 years.

§10.20.060 Erosion and Sediment Control

§10.20.061 Erosion and Sediment Control-General.

During construction, soil is vulnerable to erosion by wind and water. Eroded soil endangers water resources by reducing water quality and causing the siltation of aquatic habitat for fish and other desirable species. Clearing and grading during construction causes the loss of native vegetation necessary for terrestrial and aquatic habitat. For erosion and sediment control, this sub-chapter:

- A. Safeguards persons, protects property, and prevents damage to the environment.
- B. Promotes the public welfare by guiding, regulating, and controlling the design, construction, use, and maintenance of any development or other activity that disturbs or breaks the topsoil or results in the movement of earth on land.

§10.20.062 Erosion and Sediment Control Applicability.

This sub-chapter applies to any clearing, grading, construction or land disturbance activity within the jurisdictional area of the Ordinance.

All such activities are regulated under this sub-chapter unless exempted under section 10.20.016

§10.20.063 Disturbance of Less Than One Acre of Land

Erosion Control Permits will not be required for clearing, grubbing, grading or any land disturbance activities that involve one acre or less of contiguous disturbed land, unless a Storm Water Management Plan per Section 10.20.072 is required.

The Town shall provide erosion and sediment control standard diagrams for mandatory compliance on sites that involve less than one acre of disturbance, and that do not require a Storm Water Management Plan. The small site plan diagrams and guidelines shall be provided with the issuance of each building permit issued within the Town and shall be available for all persons within the Town at the Town offices. The information is contained in Appendix A. Non-compliance with any of the provisions within Appendix A is a violation of this Ordinance, subject to the same legal remedies and fines as under the main body of the Ordinance.

Compliance with the erosion control guidelines is also required for individual building construction performed within a larger subdivision or project which is subject to additional conditions imposed under a broader Town or State issued General Permit for Construction Site Runoff.

§10.20.064 Applicability of State Erosion and Sediment Control Permits

The Town shall accept a State of Vermont General Permit for construction site runoff as evidence of meeting Town erosion and sediment control permit requirements for those projects which fall under the jurisdiction of the State requirements. If a state permit is accepted as evidence of compliance with the Town Ordinance, a separate Town application will not be required and Town storm-water permit fees shall be waived.

§10.20.065 Permit Required

No person shall be granted a permit for construction activities disturbing more than one acre of land without the Town Engineer's approval of an erosion and sediment control plan.

Appendix B to this Ordinance contains the requirements for inclusion in an Erosion and Sediment Control Permit issued by the Town. Each permit application shall be accompanied by a non-refundable permit application fee as established by the Selectboard, which shall be reviewed annually. Incomplete applications will not be accepted. The erosion and sediment control plan shall be submitted by a registered professional engineer in the State of Vermont or by a licensed and certified erosion control technician. Each application shall include a statement that any land clearing, construction, or development involving the disturbance of at least one acre of earth shall be in accordance with the erosion and sediment control plan and that an authorized representative of the applicant shall be onsite or readily accessible on all days when construction or grading takes place.

The applicant shall file with the Town, if required based upon the scope of the work, a faithful form of improvement security, such as a letter of credit or similar financial instrument, in an amount deemed sufficient by the Town to cover all costs of improvements, landscaping and maintenance of improvements for such period as specified by the Town, including any necessary amount to cover inflationary and contingency costs, and engineering and inspection costs to cover the cost of failure or repair of improvements installed on the site. If the project is included as part of an overall development involving a formal letter of Credit and Highway Agreement, the estimated costs for erosion control compliance may be included as a line item in the overall development letter of credit.

Review and approval. The Town shall review each application for an erosion and sediment control permit to determine its conformance with the provisions of this regulation. Within 15 business days after receiving an application deemed complete by the Town, the Town shall, in writing: approve the permit application; approve the permit application subject to such reasonable conditions as may be necessary to secure substantially the objectives of this regulation, and issue the permit subject to these conditions; or, disapprove the permit application, indicating the reason(s).

§10.20.066 Erosion and Sediment Control Plans.

A description and listing of the plan requirements is contained in Appendix B.

§10.20.067 Construction Site Access and Driveway requirements.

All construction site accesses shall meet the minimum requirements for a construction access road as contained in Appendix A. In addition:

A. The Town may require more stringent site access requirements if conditions warrant or if the construction site access is not maintained in an acceptable condition.

B. All persons within the Town of Essex are required to take preventative action to prevent the tracking of sediment from construction sites and driveways onto Town or State roads. Immediate action shall be taken by the responsible persons to wet sweep the road and to clean any catch basins or remove such sediment from drainage ditches affected by the tracking of sediment onto paved roadways. Failure to comply shall be a violation of this Ordinance, subject to the remedies contained therein.

§10.20.068 Inspection.

The Town Engineer or his representative shall make inspections on an as needed basis.

For projects operating under a Town approved and issued erosion control plan, periodic scheduled inspections are required by the design engineer or licensed technician to certify the status of the implemented plan. The following inspection schedule is a requirement of the issued permit:

- A. Start of construction.
- B. Installation of sediment and erosion measures.
- C. Completion of final grading.
- D. Close of the construction season (if multi-season).

E. Completion of final landscaping and following clean-up of all impacted Town infrastructure, such as catch basins, storm water piping and detention basins.

The permit holder shall notify the Town Engineer or his authorized representative at least 24 hours in advance of the scheduled inspections by the certifying engineer or licensed technician.

All inspections shall be documented in writing and submitted to the Town Engineer as specified by the approved permit.

The authorized representative of the Town shall enter the property of the applicant as deemed necessary to conduct periodic inspections.

Failure to inspect or keep a written record of the inspection as required shall be considered a violation of this Ordinance.

§10.20.070 Development Storm Water Management

§10.20.071 Development Storm Water Management - General.

This subchapter establishes minimum storm water management requirements for new development/redevelopment to augment existing Town development regulations and to provide controls to protect and safeguard the general health, safety, and welfare of the public. This subchapter:

- A. Minimizes increases in storm water runoff from new development/redevelopment to reduce flooding, siltation, and streambank erosion.
- B. Minimizes increases in non-point source pollution caused by storm water runoff from development that would otherwise degrade water quality.
- C. Minimizes the total annual volume of surface water runoff that flows from any specific site during and following development to not exceed the predevelopment hydrologic regime to the maximum extent practicable.
- D. Reduces storm water runoff rates and volumes, soil erosion, and non-point source pollution, wherever possible, through storm water management controls and to ensure that these management controls are properly maintained and pose no threat to public safety.

§10.20.072 Development Storm Water Management Applicability.

This subchapter applies to all subdivision and site plan applications for new development and redevelopment activities that create new or is an expansion of old impervious surfaces that are equal to or greater than one-half (1/2) acre.

In addition, this subchapter applies to land development activities smaller than the minimum applicability criteria if such activities are part of a larger common plan of development (Master Plan, Planned Residential Development, Planned Unit Development) meeting the applicable criteria, even though multiple separate and distinct land development activities may take place at different times on different schedules.

Exemptions. The following activities shall be exempt from the provisions of this chapter:

Additions/modifications to existing single-family residential structures

Permit required. No landowner or land operator shall receive any Town permit, including a Zoning Permit, required for new development or redevelopment projects that creates a new or expanded impervious area of one-half (1/2) acre or more without first meeting the requirements of this chapter.

Application requirements. Unless specifically excluded by this chapter, any person desiring a permit for a new development or redevelopment project creating or disturbing one acre or more of land and/or creates a new or expanded impervious land area of one-half acre (1/2) acre or greater shall submit to the Town Engineer a Development Storm-water Permit application on a form provided for that purpose.

State permits. Projects requiring a State Storm-water permit may submit a copy of the issued State permit with supporting documentation as evidence of compliance with the requirement for a Town Development Storm-water Management Permit. The permit requirements are found in Appendix C.

Unless otherwise exempted by this chapter, a Development Storm-water Management Permit application must be accompanied by the following for an application to be considered complete: a storm water management plan; a maintenance agreement; an erosion and sediment control permit per Section 10.20.065, if applicable and a non-refundable permit review fee. The storm water management plan shall be prepared to meet the requirements of this chapter, and the fees shall be those established by the Selectboard of the Town, which shall be reviewed annually.

Application review fees. The fee for review of a Development Storm-water Management permit shall be based on the amount of new or disturbed impervious land. The fee shall be used to support local plan review, inspection, and program administration or related municipal storm water projects or storm-water related taskings. The fee must be submitted with the application prior to the issuance of any Zoning Permit for construction.

Application procedure. Applications for Development Storm-water Management Permit Applications must be filed with the Town. An original and three copies of the permit application shall be submitted, including four copies of all supporting documents. Within 15 business days of the receipt of a complete application, including all documents as required by this chapter, the Town shall inform the applicant whether the application, plan, and maintenance agreement is approved, approved with conditions, or disapproved. If the permit application, final storm water management plan, and maintenance agreement are approved (with or without conditions), a Development Storm-water Management Permit shall be issued.

Permit duration. Permits issued under this section shall be valid from the date of issuance through the date three years after the Town notifies the permit holder that all storm water management practices have passed final inspection.

Other related permits. Issuance of a local Development Storm-water Management Permit does not negate the requirement of the applicant to obtain State or other storm-water permits as may be required.

§10.20.073 Storm Water Design Manual.

The storm water manual as referenced in this chapter refers to the technical analysis and design standards specified in the *Vermont Storm Water Management Manual* (volumes I and II), latest revision.

§10.20.074 General Performance Criteria.

The following performance criteria shall be addressed for storm water management at all sites:

- A. All site designs shall establish storm water management practices to control the peak flow rates of storm water discharge associated with specified design storms, as noted in the Vermont Storm Water Management Manual, Volumes I and II, aimed at reducing the generation of storm water. These practices should seek to use pervious areas for storm water treatment and to infiltrate storm water runoff from driveways, sidewalks, rooftops, parking lots, and landscaped areas to the maximum extent practical to provide for both water quality treatment and control of quantity.
- B. All storm water runoff generated from new development shall not discharge storm water directly into a jurisdictional wetland or local water body without adequate treatment. Where such discharges are proposed, the impact of the proposal on wetland functional values shall be assessed using a method acceptable to the Town. In no case shall the allowable impact on functional values be any less than the impact allowed by the Army Corps of Engineers (ACE) or the state wetlands office (or its successor).
- C. Annual groundwater recharge rates shall be maintained by promoting infiltration through the use of structural and non-structural methods. At a minimum, annual recharge from the post development site shall be at the same rate as the annual recharge from pre-development site conditions.

- D. For new development, structural storm water treatment practices, where required, shall be designed at a minimum to remove 80% of the average annual post development total suspended solids load (TSS) and 40% of the total phosphorus load, unless a TMDL has been established requiring a more stringent criteria in the receiving water. It is presumed that a STP complies with this performance standard if it is: sized to capture the prescribed water quality volume, designed according to the specific performance criteria outlined in the current state storm water manual, constructed properly, and maintained regularly.
- E. To protect stream channels from degradation, a specific channel protection criteria shall be provided as prescribed in the current state storm water manual.
- F. Storm water discharges to critical areas with sensitive resources (e.g., swimming areas, recharge areas, water supply reservoirs) may be subject to additional performance criteria, or may need to use or restrict certain storm water management practices.
- G. Certain industrial sites are required to prepare and implement a storm water pollution prevention plan and shall file a notice of intent (NOI) under the provisions of the National Pollutant Discharge Elimination System (NPDES) general permit. The storm water pollution prevention plan requirement applies to existing and new industrial sites.
- H. Storm water discharges from land uses or activities with higher potential pollutant loadings, know as "hotspots," may require the use of specific structural STP's and pollution prevention practices.
- I. Prior to design, applicants are required to consult with the Town to determine if they are subject to additional storm water design requirements.
- J. The calculations for determining peak flows as found in the current storm water design manuals shall be used for sizing all storm water management practices.
- K. An evaluation may be required of any downstream impacts.

§10.20.075 Basic Storm Water Management Design Criteria.

Minimum control requirements are contained in Appendix D to this Chapter, which is incorporated herein by reference.

Maintenance agreements. All storm water treatment practices shall have an enforceable operation

and maintenance agreement to ensure the system functions as designed. This agreement will include any and all maintenance easements required to access and inspect the storm water treatment practices and to perform routine maintenance as necessary to ensure proper functioning of the storm water treatment practice. In addition, a legally binding covenant specifying the parties responsible for the proper maintenance of all storm water treatment practices shall be secured prior to issuance of any permits for land disturbance activities.

On projects involving storm-water systems that will ultimately become the responsibility of the Town because of location in the public right of way or on public land, the maintenance agreement shall identify the responsibilities of all parties from permit approval through transfer of responsibility to the Town.

§10.20.076 Requirements for Development Storm Water Management Plan Approval.

A storm water management plan is required for all developments, meeting the criteria of section 10.20.072. No application for development, meeting the criteria of section 10.20.072, will be approved unless it includes a storm water management plan detailing in concept how runoff and associated water quality impacts resulting from the development will be controlled or managed. This plan must be prepared by a professional engineer and must indicate whether storm water will be managed on-site or off-site and, if on-site, the general location and type of practices. The complexity and details of the submitted plan may vary depending upon the extent of the submitted project.

The storm water management plan(s) shall be referred for comment to all other interested agencies, and any comments must be addressed in a final storm water management plan. This final plan must be signed by a licensed, professional engineer, who will verify that the design of all storm water management practices meet the submittal requirements. No building permit shall be issued until a satisfactory final storm water management plan, or a waiver thereof, shall have undergone a review and been approved by the Town after determining that the plan or waiver is consistent with the requirements of this chapter.

§10.20.077 Construction Inspection.

The applicant must notify the Town in advance before the commencement of construction. Regular inspections of the storm water management system construction shall be conducted by the professional design engineer and certified upon completion to the Town.

The Town shall also conduct periodic inspections as verification of the work progress and compliance with the approved plans. All inspections shall be documented and written reports prepared that contain the following information: date and location of the inspection; whether construction is in compliance with the approved storm water management plan; variations from the approved construction specifications; and, any violations that exist.

If any violations are found, the property owner shall be notified in writing of the nature of the violation and the required corrective actions. All corrective actions shall be made within a reasonable time as determined by the Town. If corrective actions are not taken in accordance with the Town's schedule, it shall be considered a violation of this Ordinance subject to the penalties established herein. If the situation is determined to pose an immediate threat to the environment or the public health, safety and welfare, the Town may order work to cease on the project until the corrections are satisfactorily completed.

§10.20.078 As-built Plans.

All applicants shall submit actual "as-built" plans for any storm water management practices after final construction completion. The plan must show the final design specifications for all storm water management facilities and must be certified by a professional engineer. A satisfactory final inspection by the Town Engineer is required before the release of any performance securities may occur.

If the final construction is substantially different from the approved plans, a final plan amendment may be required as part of the development review process.

§10.20.079 Landscaping and Stabilization Requirements.

Any area of land from which the natural vegetative cover has been either partially or wholly cleared or removed by development activities shall be revegetated within 10 business days from the substantial completion of such clearing and construction, or as otherwise approved by the Town. The criteria for vegetative cover are identified in Appendix D.

A landscaping plan must be a component element of the final design describing the vegetative stabilization and management techniques to be used at a site after construction is completed. This plan will explain not only how the site will be stabilized after construction, but who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved. This plan must be prepared by a registered landscape planner or other qualified person, and must be approved prior to receiving a

permit. A landscaping plan submitted in compliance with other Town requirements as noted in the Subdivision Regulations or Zoning Bylaws will satisfy the requirements in this Ordinance provided the landscaping plan addresses the requirements of this Ordinance.

§10.20.080 Storm Water Control, Operation and Maintenance.

§10.20.081 Design.

All storm water Best Management Practices (BMP's) shall be designed to minimize the need for maintenance and reduce the chance of failure in accordance with the design guidelines outlined in the most current state storm water management manual.

Storm water easements and covenants shall be provided by the property owner for access for facility inspections and maintenance. Easements and covenants shall be recorded in the Town Land Records for any storm water discharge permit.

§10.20.082 Routine Maintenance.

All storm water BMP's shall be maintained according to the measures outlined in the current state storm water management manual or as directed in approval documents issued by the Town specific to the permit.

§10.20.083 Maintenance Easement.

Prior to the issuance of any permit that has a storm water management facility as one of the requirements of the permit, the property owner of the site must execute a maintenance access agreement that shall be binding on all subsequent owners of land served by the storm water management facility. The agreement shall provide for access to the facility at reasonable times for periodic inspection by the Town and for regular or special assessments of property owners to ensure that the facility is maintained in proper working condition to meet design standards and any other provisions established by this chapter. The easement agreement shall be recorded in the Town Land Records.

§10.20.084 Maintenance Covenants.

Maintenance of all storm water management facilities shall be ensured through the creation of a formal maintenance covenant that must be approved by the Town and recorded in the Town Land Records prior to final plan approval. As part of the covenant, a schedule shall be developed for when and how often maintenance will occur to ensure proper function of the storm water management facility. The covenant shall include plans for periodic inspections to

ensure proper performance of the facility between scheduled cleanouts.

The Town, in lieu of a maintenance covenant, may accept dedication of an existing or future storm water management facility for maintenance, provided such facility meets all the requirements of this chapter, includes adequate and perpetual access and sufficient areas, by easement or otherwise, for inspection and regular maintenance, and the components of the system are entirely within a Town right-of-way or Town easement. All storm water management facilities must undergo, at a minimum, an annual inspection to document maintenance and repair needs and ensure compliance with the requirements of this chapter and accomplishment of its purposes. These needs may include: removal of silt, litter, and other debris from all catch basins, inlets and drainage pipes, grass cutting and vegetation removal, and necessary replacement of landscape vegetation. Any identified maintenance needs must be addressed in a timely manner, as determined by the Town, and the inspection and maintenance requirement may be increased as deemed necessary to ensure proper functioning of the storm water management facility.

§10.20.085 Maintenance Inspections.

Inspection programs. Inspection programs may be established on any reasonable basis including, but not limited to: routine inspections; random inspections; inspections based on complaints or other notice of possible violations; inspection of drainage basins or areas identified as higher than typical sources of sediment or other contaminants or pollutants; inspections of businesses or industries of a type associated with higher than usual discharges of contaminants or pollutants or with discharges of a type that are more likely than the typical discharge to cause violations of state or federal water or sediment quality standards or the NPDES storm water permit; and, joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in drainage control facilities; and, evaluating the condition of drainage control facilities and other storm water treatment practices.

Right-of-entry for inspection. When any new drainage control facility is installed on private property, or when any new connection is made between private property and a public drainage control system, sanitary sewer or combined sewer, the property owner shall grant to the Town the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This includes the right to enter a property when it has a reasonable basis to believe that a violation of this chapter is oc-

curing or has occurred, and to enter when necessary for abatement of a public nuisance or correction of a violation of this chapter.

§10.20.086 Records of Installation and Maintenance Activities.

Parties responsible for the operation and maintenance of a storm water management system including but not limited to catch basins, pipes and treatment systems shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least 5 years. These records shall be made available to the Town during inspection of the facility and at other reasonable times upon request.

§10.20.087 Failure to Maintain Practices.

If a responsible party fails or refuses to meet the requirements of the maintenance covenant, the Town after reasonable notice may correct a violation of the design standards or maintenance needs by performing all necessary work to place the facility in proper working condition. In the event that the storm water management facility becomes a danger to public safety or public health, the Town shall notify the party responsible for maintenance of the storm water management facility in writing. Upon receipt of that notice, the responsible person shall have 30 days to effect maintenance and repair of the facility in an approved manner. After proper notice, the Town may assess the owner of the facility for the cost of repair work and any penalties, and the cost of the work shall be a lien upon the real estate furnished with such service in the same manner and to the same effect as taxes are a lien upon real estate under section 5061 of Title 32 and shall be an assessment enforceable under the procedures set forth in section 3504 of Title 24.

§10.20.090 Riparian Buffer Zones (Reserved for Future)

§10.20.100 Waivers.

Every applicant shall provide for storm water management as required by this chapter, unless a written request is submitted to the Town Selectboard to waive applicable portions of this Ordinance.

Input from the Town Engineer shall be obtained as to whether there is a technical basis for the granting of a waiver.

Minimum requirements for storm water management may be waived in whole or in part provided at least one of the following conditions applies:

- A. It can be demonstrated that the proposed development will not impair attainment of the objectives of this chapter.

- B. Alternative minimum requirements for on-site management of storm water discharges have been established in a storm water management plan approved by the Town.
- C. Provisions are made to manage storm water by an off-site facility. The off-site facility is required to be in place, designed and adequately sized to provide a level of storm water control that is equal to or greater than that which would be afforded by on-site practices and there is a legally obligated entity responsible for long-term operation and maintenance of the storm water practice.
- D. The Town finds meeting the minimum on-site management requirements is not feasible due to the natural or existing physical characteristics of a site.
- E. Non-structural practices will be used on the site that reduce: the generation of storm water from the site, the size and cost of storm water storage, and the pollutants generated at the site. These non-structural practices are explained in detail in the current state design manual and the amount of credit available for using such practices shall be determined by the Town.

In instances where one of the above conditions applies, the Town may grant a waiver from strict compliance with this chapter, as long as acceptable mitigation measures are provided. However, to be eligible for a waiver, the applicant must demonstrate to the satisfaction of the Town that the waiver will not result in any of the following impacts to downstream waterways: deterioration of existing culverts, bridges, dams, and other structures; degradation of biological functions or habitats; accelerated stream bank or streambed erosion or siltation; or increased threat of flood damage to public health, life, and property.

Furthermore, where compliance with minimum requirements for storm water management is waived, the applicant shall satisfy the minimum requirements by meeting one of the following mitigation measures approved by the Town.

Mitigation measures may include, but are not limited to, the following: the purchase and donation of privately owned lands, or the grant of an easement to be dedicated for preservation and/or re-forestation (these lands should be located adjacent to the stream corridor to provide permanent buffer areas to protect water quality and aquatic habitat); the creation of a storm water management facility or other drainage improvements on previously developed properties, public or private, that currently lack storm water management facilities designed and constructed pur-

suant to the purposes and standards of this chapter; monetary contributions (fee-in-lieu) to fund storm water management activities such as research and studies.

- A. Where the Town waives all or part of the minimum storm water management requirements, or where the waiver is based on the provision of adequate storm water facilities provided downstream of the proposed development, the applicant shall be required to pay a fee based on the impact of the impervious area created in an amount determined by the Town.
- B. In lieu of a monetary contribution, an applicant may obtain a waiver of the required storm water management practice by entering into an agreement with the Town for the granting of an easement or the dedication of land by the applicant, for the construction of an off-site storm water management facility. The agreement shall be entered into by the applicant and the Town prior to the recording of a plat(s) or, if no record of a plat(s) is required, prior to the issuance of any Zoning Permit for construction.

§10.20.105 Appeals.

Any applicant aggrieved by a decision of the Town not associated with a noticed violation of this Ordinance may appeal that decision in writing to the Selectboard within 15 calendar days of such decision. With public notice, the Selectboard shall hold a hearing within calendar 30 days of such an appeal and shall render a decision within calendar 15 days after the close of such hearing. Following the Selectboard's decision, any person aggrieved by the decision may appeal that decision to the appropriate court. The administrative process must be exhausted before appeal to court.

§10.20.110 Enforcement.

§10.20.111 Stop-work Order; Revocation of permit.

Should any person holding a development storm water permit or erosion and sediment control permit pursuant to this chapter, violate the terms of the permit or implement site development in such a manner as to materially adversely affect the health, welfare, or safety of persons residing or working in the neighborhood or development site, the Town may suspend or revoke the storm water permit.

§10.20.112 Violation and Penalty.

No person shall construct, enlarge, alter, repair, or maintain any grading, excavation, fill, or cause the

same to be done, contrary to or in violation of any terms of this Ordinance. Any person violating any of the provisions of this Ordinance or a permit issued hereunder shall be subject to a civil penalty of Five Hundred Dollars (\$500.00) for each violation of this Civil Ordinance.

Each day that any violation of any of the provisions of this Ordinance or a permit issued hereunder continues shall constitute a separate offense.

Any person, partnership, or corporation convicted of violating any of the provisions of this chapter shall bear the expense of any required restoration. The Town may recover all attorney's fees, court costs, and other expenses associated with enforcement of this chapter, including sampling and monitoring expenses.

§10.20.113 Notice of Violation.

Whenever the Town finds that a person violates a prohibition or fails to meet a requirement of this Ordinance or any permit issued hereunder, the Town may order compliance by written notice of violation to the responsible person. Such notice may require without limitation: the performance of monitoring, analyses, and reporting; the elimination of illicit connections or discharges; that violating discharges, practices, or operations shall cease and desist; the abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property; payment of a fine to cover administrative and remediation costs; and, the implementation of source control or treatment BMP's.

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to re-mediate or restore within the established deadline, the work will be done by the Town or its designated contractor and the expense thereof shall be charged to the violator.

§10.20.114 Appeal of Notice of Violation.

Any person receiving a notice of violation may appeal the determination of the authorized representative of the Town to the Selectboard. The notice of appeal must be received by the authorized representative of the Town or the Town Clerk within 5 business days from the date of the notice of violation. After public notice, the Selectboard shall conduct a hearing on the appeal. The hearing shall take place within 30 calendar days of the date of receipt of the notice of appeal. The decision of the Town Selectboard shall be final, subject to appeal procedures under Vermont Statutes.

§10.20.115 Enforcement Measures after Appeal.

If the violation has not been corrected pursuant to the requirements set forth in the notice of violation or, in the event of any appeal, within 10 business days of the decision of the Town upholding the violation, then representatives of the Town shall be authorized to enter upon the subject property and take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the Town to enter upon the premises for the purposes set forth above.

§10.20.116 Cost of Abatement of the Violation.

Within 30 calendar days after abatement of the violation, the property owner shall be notified of the cost of abatement, including administrative costs. The property owner may file a written protest objecting to the amount of the assessment within 10 calendar days. If the amount due is not paid within a timely manner as determined by the decision of the Town or by the expiration of the time in which to file an appeal, the charges shall become a lien upon the real estate furnished with such service in the same manner and to the same effect as taxes are a lien upon real estate under section 5061 and Title 32 and shall be an assessment enforceable under the procedures set forth in section 3504 of Title 24.

Any person violating any of the provisions of this section shall become liable to the Town for the cost of abating such violation. Interest at the legal percentage rate established by State Statute shall be assessed on the balance beginning on the 1st day of the 1st month following discovery of the violation.

§10.20.117 Injunctive Relief.

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Ordinance or any permit issued hereunder. If a person has violated or continues to violate the provisions of this chapter, the Town may petition for an injunction restraining the person from activities that would create further violations or compelling the person to perform abatement or remediation of the violation.

§10.20.118 Violations Deemed a Public Nuisance.

In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this Ordinance or any permit issued hereunder is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily

abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

§10.20.119 Remedies not Exclusive.

The remedies listed in this chapter are not exclusive of any other remedies available under any applicable federal, state, or local law and it is within the discretion of the Town to seek cumulative remedies.

§10.20.120 Other Applicable Regulations.

In case of any other applicable regulation, bylaw, ordinance, or statute that differs from this chapter, the stricter shall apply.

Any requirements under this chapter may be administered by the Town through other regulatory and permitting processes including but not limited to the reviews enabled in the Essex Zoning Bylaws and the Essex Subdivision Regulations.

§10.20.130 Adherence to Public Works Specifications.

All development, redevelopment, construction, etc. shall adhere to the Town's Public Works Specifications.

§10.20.140 Fees, Fines, and Applicable Charges.

The Town Selectboard shall adopt a schedule of reasonable fees, fines, and other charges applicable to carrying out the purposes of this chapter, and shall review the schedule of fines and fees on an annual basis.

§10.20.150 Severability.

If any portion of this chapter is held unconstitutional or invalid by a court of competent jurisdiction, the remainder of this chapter shall not be affected.

Approval of any storm water management system design and installation by the granting of a municipal storm water permit and certificate of compliance shall not imply that the approved system will be free from malfunction. Proper maintenance of storm water systems is vital to their proper functioning. The provisions of this chapter shall not create liability on the part of the Town, of any Town official, or employee for the storm water management system.

Adopted this _____ day of _____, 2005, by the Essex Selectboard

Tom E. James, Chair

Jeffrey B. Carr, Vice Chair

Thomas W. Torti, Clerk

Linda K. Myers

Alan L. Nye

Received for Record by Essex Clerk this _____ day of _____, 2005.

Appendix D:
Stormwater Ordinance
2014 Expired Permit Additions

TOWN OF ESSEX SELECTBOARD CHANGES TO TITLE 10.20, STORM WATER ORDINANCE

The Selectboard of the Town of Essex hereby ordains that the following changes be made to the Municipal Ordinance, Title 10.20, Storm Water Ordinance. Added material is underlined, with the exception that entire added chapter sub-sections shall be noted in the heading as “**added in entirety**”. Deleted material is in brackets and struck through.

Add the following to Section 10.20.015, Definitions:

Added in Entirety:

“Authorization to Discharge Permits” means permits issued by the State of Vermont to discharge storm water into receiving water bodies, which may or may not be valid permits at time of adoption of Section 10.20.090 of this Ordinance.

“Expired storm water permits” means storm water permits previously issued by the State of Vermont that are no longer current.

“Flow Restoration Plan (s)” means a stream flow plan required by the State of Vermont designed to implement storm water runoff controls producing runoff characteristics that return stream flows to compliant, stable flow conditions as required to meet the water-quality based TMDL requirements for a particular impaired waterway.

“Impaired waterways” means rivers, lakes, or streams that do not meet one or more water-quality standards, and therefore are considered too polluted for their intended uses.

Non-impaired waterways” means rivers, lakes, or streams that currently meet the designated water-quality standards for the water body.

“Non-public contributing storm water permittee” means a current storm water permit holder, including homeowner associations and any successors or assigns, of either a valid or expired storm water permit that is not a public entity.

“Non-public storm water infrastructure” means storm water infrastructure not owned, operated or maintained by the Town.

“Private (storm water) system owner” means the non-public owner of a storm water system, including homeowner associations and any successors or assigns, consisting of, but not limited to, culverts, pipes, catch basins, treatment ponds, treatment devices, and/or storm water infiltration systems.

“Public storm water infrastructure” means storm water infrastructure such as, but not limited to, culverts, pipes, catch basins, treatment ponds, treatment devices, and/or storm water infiltration systems, all of which is under Town ownership or within Town

easements, and which infrastructure has been accepted by the Town as a component of the Town storm water system or systems.

“Residual Designation Authority (RDA)” means the authority granted to the United States Environmental Protection Agency and delegated to the State of Vermont to issue a permit directly to a party or parties discharging storm water to a water body where a TMDL supports such a determination and where discharges are contributing to water quality violations.

“Shared storm water system” means a storm water system such as, but not limited to, culverts, pipes, catch basins, treatment ponds, treatment devices, and/or storm water infiltration systems which consist of both public and non-public storm water infrastructure.

“Unpermitted (storm water) discharges” means a system discharging storm water to a stream or watercourse that has never been issued any type of authorization to discharge storm water by either the Town or the State of Vermont.

“Valid storm water system” means a system which has been issued a storm water permit by the Town or the State of Vermont that is current with respect to the issuance and expiration dates of the permit.

Revise Section 10.20.090 to delete reference to (~~Riparian Buffer Zones (Reserved for Future)~~) and rename): Establishment and Transfer of Responsibility for State of Vermont issued Department of Environmental Conservation Authorization to Discharge Permits under General Storm Water Permits and for Unpermitted Discharges to Impaired Waterways within the Town of Essex, Inclusive of the Village of Essex Junction

Add Section 10.20.90: (added in entirety):

10.20.090 Establishment and Transfer of Responsibility for State of Vermont issued Department of Environmental Conservation Authorization to Discharge Permits under General Storm Water Permits and for Unpermitted Discharges to Impaired Waterways within the Town of Essex, Inclusive of the Village of Essex Junction (the “Town”) to NPDES MS4 General Permit 3-9014.

A. The Vermont Agency of Natural Resources Department of Environmental Conservation (“DEC”) issues Authorization to Discharge Permits under General Permits for area or site-specific storm water discharges to applicants, including municipalities, private parties, and shared storm water systems involving both privately-owned and publicly-owned components.

B. Valid storm water system discharge permits have been issued by the DEC for projects in the non-impaired and impaired waterways within the Town, and the Town has either accepted full responsibility for such permits in these waterways or shared permit responsibility based upon the percentage of impervious area contributed by the

publicly-owned component of the system in comparison to the impervious area contributed by the privately-owned component.

C. As of the adoption of this Ordinance, valid storm water system discharge permits have not been issued to expired storm water permit holders in the impaired waterways due to the inability to legally authorize, under State law, renewal of the previously issued Authorization to Discharge Permits.

D. Current responsibility for previously issued expired storm water permits and valid storm water system discharge permits in the impaired watersheds in the MS4 area varies widely. In some cases, there is a well-defined chain of responsibility from the "owner" of the original permit to the current permit holder. In other cases, permit responsibility is either poorly defined or non-existent notwithstanding that permit responsibility runs with the land. Some expired and valid (permit) discharges are defined in the original permit as directly to a stream or water body; in others, they are defined as being directed to or connected into a shared storm water system.

E. Pre-existing unpermitted storm water discharges occur within the impaired and non-impaired waterways. These discharges were either never issued permits or the discharges occurred before DEC began issuing discharge permits. Pre-existing unpermitted storm water discharges into impaired waterways may obtain legal coverage under the MS4 general permit in the manner outlined in this Ordinance.

F. The Village of Essex Junction ("Village") regulates storm water discharges through its Land Development Code. The Village intends to amend its Ordinances to incorporate the terms of this Town Ordinance, which is intended to apply to storm water discharges in the Town, inclusive of the Village. To the extent the terms of this Ordinance conflict with the Village Ordinance, the Town Ordinance governs.

G. For purposes of this Ordinance, the "appropriate legislative body" for the Town outside the Village shall be the Selectboard, and for the Village, the Board of Trustees. Either appropriate legislative body may delegate its authority under this Ordinance to an appropriate municipal panel.

10.20.091 General Approach and Purpose

A. The Town seeks to develop consistent policy and procedures for determination of storm water permit responsibility for both valid storm water system discharge permits and expired storm water permits, and to establish minimum requirements for transfer of expired and future new permit responsibility by and between the appropriate parties.

B. MS4 responsibility for operation, repair and maintenance of storm water infrastructure extends only to public storm water infrastructure and proportional shared

responsibility on shared storm water systems, and is separate and distinct from permit responsibility. The Town may accept permit responsibility if determined by the appropriate legislative body to be in the Town's best interests. Factors to be considered when determining whether acceptance of permit responsibility is in the Town's "best interests" include, but are not limited to, whether improved water quality is not otherwise obtainable without additional Town participation, potential cost savings to the Town, or provision of land or easements for treatment or storage of storm water for shared systems. The non-public contributing storm water permittee shall be responsible for the operation, maintenance, repair, replacement and upgrade of the non-public infrastructure, unless the Town determines that accepting some or all of this responsibility to be in its best interests as defined above.

10.20.092 NPDES Phase 2 MS4 Requirement for Expired Authorization to Discharge Permits

A. The Vermont Agency of Natural Resources (VANR) Authorization to Discharge Permit Number 7025-9014 issued to the Town and Authorization to Discharge Permit Number 7024-9014 issued to the Village under NPDES MS4 General Permit 3-9014 requires the Town and the Village, separately as MS4 permittees, to submit to the Secretary of VANR a plan for addressing expired storm water permits discharging to the MS4 permittee's system, which was accomplished through the proposed adoption of this Ordinance.

B. A compliance date of October 2015 is set within the Authorization to Discharge Permits for verification of the condition of all public and non-public storm water infrastructure identified in and approved under each original expired permit.

C. On expired permits within the impaired waterways or with regard to discharges that have no permits in the impaired waterways, it is the intent of the VANR to either have these permits ultimately come under the umbrella of the Town MS4 Permit or issue Residual Designation Authority (RDA) permits directly to each permittee or party responsible for the storm water discharge not covered under the MS4 umbrella permit.

10.20.093 Classification of Storm Water Systems within the Town as relates to Authorization to Discharge Permits

A. Due to the complexity and variety of existing permit "ownership" and types of permits, the Town has classified all valid storm water system discharge permits and all expired storm water permits into one of the following four types for purposes of determining permit responsibility:

1. Type 1 Storm Water System:

a. A Type 1 storm water system consists of a system of storm water infrastructure that is entirely on public land (public rights of

way, municipally-owned property or on public storm water easements) and owned by the Town, including residential subdivisions or groups of houses with no non-public storm water infrastructure, such as privately-owned catch basins or privately-owned storm water pipelines connected into storm water systems on public land (excluding private underdrain systems). For purposes of this Ordinance, a "private underdrain system" is storm water infrastructure serving individual private lots or buildings from the private lot or building to the point of interconnection with public storm water infrastructure.

b. Examples of Type 1 storm water systems include:

1) Public buildings such as municipal offices, police stations, fire stations, municipal highway garage complexes, schools or other educational facilities with no on-site storm water infrastructure (other than underdrains connected with public storm water infrastructure) which do not discharge directly into a stream, and/or similar facilities.

2) Residential subdivisions with valid or expired permits in the Town. Those residential subdivisions presently identified by the Town as meeting the Type 1 criterion are listed in Table 1 in the Appendix to this Ordinance. Table 1 may be revised by the Town, acting through its Municipal Manager or their designee(s) as such additional systems are identified.

c. Type 1 storm water systems do not include any private lot, residential subdivision or groups of housing covered under an expired storm water permit that has non-public storm water infrastructure such as catch basins and pipelines (excluding private underdrain systems) connected into public storm water infrastructure.

2. Type 2 Storm Water System:

a. A Type 2 storm water system consists of a system of storm water infrastructure that is entirely contained on private property, discharges directly or indirectly to a stream or other recognized water body and is not directly connected by piping to a Type 1 or Type 3 storm water system.

b. Examples of Type 2 of storm water systems include:

1) Private residential, commercial or industrial systems that retain all storm water flows onsite as originally designed and

have valid or expired permits for such discharge, and private residential, commercial or industrial systems that discharge some or all of their storm water flows to a stream or other recognized water body.

2) Select storm water systems in the Town. Those private residential, commercial or industrial systems presently identified by the Town as meeting the Type 2 criterion are listed in Table 1 in the Appendix to this Ordinance. Table 1 may be revised by the Town, acting through its Municipal Manager or their designee(s) as such additional systems are identified.

3. Type 3 Storm Water System:

a. A Type 3 storm water system consists of a shared storm water system covered under either valid and/or expired storm water permits that combines storm water flow from both public and non-public storm water infrastructure before discharging storm water directly or indirectly into a stream, swale or other method of water conveyance to waters of the State.

b. Examples of Type 3 storm water systems include:

1) Non-public storm water infrastructure systems that discharge directly to public storm water infrastructure; public storm water infrastructure systems that discharge to non-public storm water infrastructure; public and non-public infrastructure systems that discharge to a common storm water pond or open swale on public or private property or to an outfall pipe leading to a stream, swale or other conveyance to a recognized water body; other systems that combine storm water flow from both public and non-public storm water infrastructure; prior valid storm water permits involving both public and non-public components covered under one issued permit with responsibility defined in the permit between public and non-public contributors to a storm water system.

2) Those combined public-private systems in the Town presently identified by the Town as meeting the Type 3 criterion are listed in Table 1 in the Appendix to this Ordinance. Table 1 may be revised by the Town, acting through its Municipal Manager or their designee(s) as such additional systems are identified.

4. Type 4 Storm Water System:

- a. Any other type of storm water system not covered under Types 1 through 3.
- b. Unique storm water systems with valid or expired storm water permits not included in Types 1 through 3 have not been identified as of the date of adoption of this Ordinance. This category is reserved for such systems.
- c. Storm water systems involving both Town and Vermont Agency of Transportation (VTRANS) infrastructure.
- d. Those combined public-private systems in the Town that are identified by the Town as meeting the Type 4 criterion will be listed in Table 1 in the Appendix to this Ordinance created by the Town, acting through its Municipal Manager. Table 1 may be revised by the Town, acting through its Municipal Manager or their designee(s) as additional systems are identified.

B. Prior to adoption of this section, the Town has not accepted full or shared permit responsibility for Authorization to Discharge permits within the impaired watersheds.

10.20.094 Methodology for Establishment of Permit Responsibility for Each Type of Storm Water System

A. Type 1 Storm Water Systems

1. The Town accepts responsibility for all valid Type 1 storm water system permits in the non-impaired waterways, all expired Type 1 storm water system permits in the impaired waterways, and all future Type 1 storm water system permits. These permits will be consolidated under the Town's NPDES MS4 General Permit 3-9014.
2. The Town accepts responsibility for the operation, maintenance, repair, replacement and upgrade of all public storm water infrastructure included in Type 1 storm water systems, with the exception of private underdrain systems and overland storm water flow systems from private lands such as driveways, open swales, and vegetated land. Such private underdrain systems and overland flow systems shall remain the responsibility of the property owner.
3. Acceptance of storm water permit responsibility by the Town does not relieve individual property owner(s) or housing and/or homeowner association(s), or any successor(s) and assign(s), from compliance with other sections of the Town's storm water ordinance or State

environmental regulations, including but not limited to sections dealing with illicit discharges, offsite discharge of sediment, site erosion, fertilizer application with respect to phosphorous and overall compliance with best storm water management practices as defined in adopted regulations or ordinances.

B. Type 2 Storm Water Systems

1. The Town shall have no responsibility for the operation, maintenance, repair, replacement or upgrade of non-public storm water infrastructure identified in a valid or expired storm water permit, or non-public storm water infrastructure added subsequent to the original version of a valid or expired permit, to meet an approved Flow Restoration Plan (FRP) unless it is determined by the appropriate legislative body, in its sole discretion, to be in the Town's best interests, as defined in Section 10.20.091.B above, to accept some or all of this responsibility.

2. The Town may accept MS4 permit responsibility for valid or expired Type 2 storm water system permits if requested by the current private storm water system owner and provided the following conditions are satisfied:

a. The private storm water system owner under an original valid or expired permit enters into a written agreement with the Town prior to January 1, 2015, which includes, at a minimum, the requirements set forth in section 10.20.094.b, below. A form of the Type 2 Storm Water System Agreement is provided in Appendix B to this Ordinance. If the private storm water system owner has not entered into a written agreement with the Town by January 1, 2015, the Town will request the State to use its RDA to require permit compliance by the holder of the expired Type 2 storm water permit.

b. The written agreement specified in section 10.20.094.a shall, at a minimum, require the following:

i. All applicable permit fees, including initial fees and all future renewal fees, if any such fees are required, shall be paid by the Type 2 private storm water system owner;

ii. The Type 2 private storm water system owner shall allow the Town to hire a professional engineer, at no cost to the holder of the Type 2 storm water permit, to inspect and certify that the Type 2 non-public storm water infrastructure is in compliance with the infrastructure requirements as contained in the expired permit. The certification shall occur prior to August 1, 2015. Alternatively, the

current holder of the expired non-public storm water permit may hire a professional engineer, acceptable to the Town, to perform the necessary inspection and certification. Future inspections that occur after the initial certification inspection of Type 2 non-public storm water infrastructure shall be conducted by the Town at no charge to the private storm water system owner;

iii. The Type 2 non-public contributing storm water permittee shall correct any deficiencies noted as a result of the engineer's inspection at their own expense prior to the August 1, 2015 date for system certification;

iv. The Type 2 non-public contributing storm water system permittee shall be responsible for permanent maintenance, repair, replacement and upgrade if necessary of all elements covered under the Type 2 storm water system permit. The Town shall conduct annual system compliance inspections to verify the condition and maintenance of the Type 2 storm water system and report findings to the State and the responsible party identified under the Type 2 storm water system permit;

v. The Type 2 non-public contributing storm water system permittee shall sweep clean all paved private roadways or parking lots at least twice per year and clean out all private catch basins whenever the depth of deposited material exceeds 50% of the depth of the catch basin sump, or enter into an agreement with the Town to perform the services for a fee;

vi. The failure of the Type 2 non-public contributing storm water system permittee to perform the required actions under b. iv. and v. shall be deemed a violation of this Ordinance and shall subject the non-public contributing storm water system permittee to penalties under section 10.20.112. The Town has the right but not the obligation to take the necessary actions to insure that the required maintenance is performed and otherwise correct any violation of this Ordinance. The provisions of section 10.20.116 of this Ordinance shall apply in the event the costs for the maintenance or correcting the violation are not paid by the non-public contributing storm water system permittee; and

vii. The cost of required storm water system upgrades to the Type 2 storm water system to meet the Town's adopted and State approved FRP shall be borne by the non-public contributing storm water system permittee unless it is determined by the Town to be in

its best interests as defined in Section 10.20.091.B above to participate in some or all of the system upgrade project or project costs.

3. Any prior written agreements entered into by the Town and non-public contributing storm water system permittees shall remain in full force with respect to cost sharing and operation, maintenance, repair and replacement of existing storm water infrastructure.

a. Permit responsibility and upgrades to meet the FRP are separate elements of storm water responsibility not defined in previous agreements and therefore this Ordinance is the controlling document relative to permitting.

b. In the event of any conflict between pre-existing agreements and the ordinance, the pre-existing agreements shall control.

4. Acceptance of partial storm water permit responsibility by the Town shall not relieve non-public contributing storm water system permittees from compliance with all other elements of the storm water ordinance or State environmental regulations, including but not limited to sections dealing with illicit discharges, offsite discharge of sediment, site erosion, fertilizer application with respect to phosphorous and overall compliance with best storm water management practices as defined in adopted regulations or ordinances.

C. Type 3 Storm Water Systems

1. The Town will not accept responsibility for operation, maintenance, repair, replacement and upgrade to meet an approved FRP of non-public storm water infrastructure identified in a valid or expired storm water permit or non-public storm water infrastructure added subsequent to the original version of the valid or expired permit, unless it is determined by the appropriate legislative body, in its sole discretion, to be in the best interests of the Town, as defined in Section 10.20.091.B above, to accept some or all of this responsibility.

2. The Town will accept MS4 permit responsibility on a proportional basis by relative impervious area contributed within the permitted area of the shared storm water system for the valid or expired Type 3 storm water system permit if requested by the non-public contributing storm water system permittee and provided the following conditions are satisfied:

a. The Type 3 non-public contributing storm water permittee shall enter into a written agreement with the Town prior to January 1, 2015, which includes, at a minimum, the requirements set forth in

section 10.20.094.b.i-vii above. A form of the Type 3 Storm Water System Agreement is provided in Appendix C to this Ordinance. If the non-public contributing storm water system permittee has not entered into a written agreement by January 1, 2015, the Town will request the State to use its RDA to require permit compliance by the Type 3 non-public contributing storm water system permittee.

b. If the Type 3 non-public contributing storm water system permittee elects not to enter into a shared agreement with the Town on MS4 permit responsibility, the Town shall comply with the requirements pertaining to the public storm water infrastructure, and may request the State to use its RDA over that portion of the shared storm water system not included within an agreement with the Town.

c. All applicable permit fees, including initial fees and all future renewals, if such fees are required, shall be shared between the municipality and the non-public contributing storm water permittee on the basis of relative impervious area, unless the appropriate legislative body determines that it is in the Town's best interests, as defined in Section 10.20.091.B above, that such fees shall be paid either on a larger percentage than relative impervious area or in full by the Town. If the Town accepts permit responsibility, then the intent is to consolidate the permit under the municipal NPDES MS4 General Permit 3-9014.

3. Any prior written agreements entered into by the Town and the Type 3 non-public contributing storm water system permittee shall remain in full force with respect to cost sharing and operation, maintenance, repair and replacement of existing storm water infrastructure.

a. Permit responsibilities and upgrades to meet the FRP are separate elements of storm water responsibility not defined in previous agreements and therefore this Ordinance is the controlling document relative to these issues.

b. In the event of any conflict between executed pre-existing agreements and this Ordinance, the pre-existing agreements shall control.

4. Acceptance of MS4 Permit responsibility by the Town does not relieve non-public contributing storm water system permittees from compliance with other elements of the Town's storm water ordinance or State environmental

regulations, including but not limited to sections dealing with illicit discharges, offsite discharge of sediment, site erosion, fertilizer application with respect to phosphorous and overall compliance with best storm water management practices as defined in adopted regulations or ordinances.

D. Type 4 Storm Water Systems

1. Other storm water systems with valid or expired storm water permits that do not qualify as a Type 1, 2, or 3 storm water system.
2. These systems shall be managed on a case by case basis, using the general procedures and methods as applicable from the three system types.
3. Permits involving the Town and VTRANS shall fall under this category. VTRANS is a separate MS4 permittee. Under a future adopted FRP for each impaired waterway, the Town will negotiate an agreement with VTRANS on the level of shared responsibility and costs for meeting the TMDL requirement of each impaired waterway. In the event an agreement cannot be negotiated with VTRANS, the Town will request VANR to use its RDA with respect to those VTRANS direct or indirect discharges contributing storm water flow to the impaired watersheds under the VTRANS MS4 permit.

APPENDIX A

Table 1: Valid and Expired Storm Water Permits in the Village of Essex Junction and the Town of Essex outside the Village as of the Date of Ordinance Adoption

Permit #	Old Permit #	Village or Town	Project Name	Valid (V) or Expired (E)	Ordinance Type	Watershed
2-0855		Village	Village Knoll-Woods End & Acorn	Valid	Type 1	Indian Brook
2-1103		Village	Pleasant Street & East Street	Valid	Type 1	Indian Brook
1-1074		Village	Countryside II Fairview Farms: Chestnut Lane	Expired	Type 2	Indian Brook
1-1074		Village	Countryside II Fairview Farms: Spruce Lane	Expired	Type 2	Indian Brook
1-1074		Village	Countryside II Fairview Farms: Walnut Lane	Expired	Type 2	Indian Brook
2-0835		Village	Village Glen Condos	Expired	Type 2	Indian Brook
1.1527.0111		Village	Highland Village	Expired	Type 2	Sunderland Brook
1-0236		Village	Brickyard	Expired	Type 2 & 3	Indian Brook
1-1074		Village	Countryside II Fairview Farms: Locust Lane	Expired	Type 3	Indian Brook
2-0863		Village	167 Pearl Street (McEwing)	Expired	TBD	Sunderland Brook
2-0633		Town	Shillingford Crossing	Expired	Type 1	Sunderland Brook
3575-9010.R	1-1186	Town	Woodlands I	Valid	Type 1	Alder Brook
1-0667		Town	Woodlands I	Expired	Type 1	Indian Brook
3577-9010.R	1-0667	Town	Woodlands II/Lang Farm Parcel H	Valid	Type 1	Alder Brook

1-0250		Town	Kimberly Drive	Expired	Type 1	Sunderland Brook
3578-9010.R	1-0612 2-0752	Town	Pinewood Development	Valid	Type 1	Winooski River /Alder Brook
3581-9010.R		Town	Heritage Phase II	Valid	Type 1	Alder Brook
3579-9010.R		Town	Old Stage Village	Valid	Type 1	Alder Brook
3580-9010.R		Town	Rivers Bend	Valid	Type 1	Winooski River
3201-9010.R		Town	Pinewood Section G	Valid	Type 1	Winooski River
3267-9010.R		Town	Saybrook	Valid	Type 1	Alder Brook
4367-9010.R		Town	Autumn Knoll	Valid	Type 1	Browns River
3996-9010		Town	Town Swimming Pool Complex	Valid	Type 1	Alder Brook
2-0631		Town	Essex Resort and Spa	Expired	Type 2	Indian Brook
1-1463		Town	VT Systems, Inc.	Expired	Type 2	Sunderland Brook
1-0965		Town	#7 Ewing Place	Expired	Type 2	Sunderland Brook
1-0518		Town	#3 Ewing Place	Expired	Type 2	Sunderland Brook
1-0619		Town	#26 Susie Wilson Road	Expired	Type 2	Sunderland Brook
2-0634		Town	#26 Susie Wilson Road	Expired	Type 2	Sunderland Brook
1-1319		Town	Church of Latter Day Saints	Expired	Type 2	Indian Brook
1-1371		Town	Why Not LLC (Lang Farm Golf Course)	Expired	Type 2	Indian Brook
3324-9010.R		Town	Meadows Edge	Valid	Type 3	Alder Brook
3574-9010.R	1-0730	Town	Forestdale	Valid	Type 3	Winooski River /Alder Brook
3081-9010.R		Town	Perkins Bend	Valid	Type 3	Winooski River

1-1381		Town	The Commons at Essex Way	Expired	Type 3	Indian Brook
1-1307		Town	Homestead Design	Expired	Type 3	Indian Brook
1-0775		Town	The Outlets and Hannafords	Expired	Type 3	Indian Brook
2-0613		Town	The Outlets and Hannafords	Expired	Type 3	Indian Brook
1-1469		Town	Mainstay Suites	Expired	Type 3	Sunderland Brook
1-0552		Town	The Market Place	Expired	Type 3	Sunderland Brook
1-0896		Town	Yankee Enterprises, Oil #1 LLC, Bradley, Oil Annex, Patco Properties	Expired	Type 3	Sunderland Brook
1-0761		Town	Ewing	Expired	Type 3	Sunderland Brook
1-0694		Town	Ewing	Expired	Type 3	Sunderland Brook

Appendix B

TYPE 2 STORM WATER SYSTEM AGREEMENT

This STORM WATER SYSTEM AGREEMENT ("Agreement") is made this _____ day of _____ 20__ by and between the [Village of Essex Junction] [Town of Essex], a Vermont municipal corporation with a principal place of business at [Village address] [81 Main Street], Essex, Vermont 05452 (the ["Town"] ["Village"]), and _____ with a principal place of business at _____ ("Permittee"). The [Town] [Village] and Permittee are sometimes each referred to in this Agreement as a "Party" or collectively as the "Parties."

WITNESSETH:

WHEREAS, the [Town has adopted an amendment to its Storm Water Ordinance] [Village has adopted an amendment to its Village Ordinance , incorporating Section 10.20.90 of the Town Storm Water Ordinance] entitled Establishment and Transfer of Responsibility for State of Vermont issued Department of Environmental Conservation Authorization to Discharge Permits under General Storm Water Permits and for Unpermitted Discharges to Impaired Waterways within the Town of Essex, Inclusive of the Village of Essex Junction; and

WHEREAS, the Storm Water Ordinance amendment identifies the requirements under section 10.20.094.B necessary for the [Town] [Village] to accept storm water permit responsibility for a valid or expired Type 2 storm water permit, as such type is defined in the Ordinance Amendment; and

WHEREAS, Permittee has identified that it is in their best interests to have the [Town] [Village] accept storm water permit responsibility by entering into this Agreement; and

WHEREAS, it is in the best interests of the Parties to work together to achieve State of Vermont storm water permit compliance; and

WHEREAS, the Parties agree that the [Town] [Village] has no responsibility for the operation, maintenance, repair, replacement or upgrade of all non-public storm water or storm water-related infrastructure, or non-public storm water infrastructure added to the original version of a valid or expired storm water permit; and

WHEREAS, the [Town] [Village] may in its sole discretion, if determined by the legislative body to be in its best interests, to accept some or all of the operation, maintenance, repair, replacement or upgrade of all non-public storm water or storm water-related infrastructure, at some future date;

NOW, THEREFORE, in consideration of the matters described above, and of the mutual benefits and obligations set forth in this Agreement, and on the express condition that all conditions precedent described below are satisfied, the Parties agree as follows:

SECTION ONE
[TOWN] [VILLAGE] OBLIGATIONS

The [Town] [Village] agrees to accept full or shared permit responsibility for valid or expired storm water system permits as follows and also shall:

1. Hire a professional engineer, at no cost to Permittee, to inspect and certify that the Type 2 storm water system, including but not limited to catch basins, storm pipes, and treatment facilities, is in compliance with the infrastructure requirements as contained in the expired permit, unless such work is undertaken at no cost to the [Town] [Village] by Permittee. The certification shall occur prior to August 1, 2015.
2. Conduct future inspections that occur after the initial certification inspection of Type 2 storm water systems at no charge to the Permittee.
3. Conduct annual system compliance inspections to verify the condition and maintenance of the Type 2 storm water system and report findings to the State and the Permittee.
4. Inspect and prepare an annual structural condition survey and extent of debris capture in all catch basins contributing storm water flow within the permitted area.
5. At the request of Permittee, arrange for cleaning of non-public catch basins, and to bill such cleaning costs to the Permittee.
6. Make best efforts to minimize the impact on the Permittee's property and their business operations thereon in performing its obligations under this Agreement.

SECTION TWO
PERMITTEE OBLIGATIONS

Permittee shall:

1. Accept all responsibility for the operation, maintenance, repair, replacement or upgrade of non-public storm water infrastructure identified in a valid or expired storm water permit, or non-public storm water infrastructure added subsequent to

the original version of a valid or expired permit, to meet an approved Flow Restoration Plan (FRP) unless it is determined by the appropriate legislative body, in its sole discretion, to be in the [Town's] [Village's] best interests, as defined in Section 10.20.091.B above, to accept some or all of this responsibility.

2. To pay all applicable permit fees, including initial fees and all future renewal fees, if any such fees are required of the Type 2 storm water system.
3. Hire a professional engineer, at no cost to the [Town] [Village], to inspect and certify that the Type 2 storm water system, including but not limited to catch basins, storm pipes, and treatment facilities, is in compliance with the infrastructure requirements as contained in the expired permit, unless Permittee requests such work be performed by the [Town] [Village]. The certification shall occur prior to August 1, 2015.
4. Correct any deficiencies identified in the engineer's storm water system inspection at their own expense prior to the August 1, 2015 date for system certification.
5. Maintain, repair, replace and upgrade as necessary all storm water infrastructure covered under the Type 2 storm water system permit.
6. Sweep clean all paved private roadways or parking lots at least twice per year and clean out all private catch basins whenever the depth of deposited material exceeds 50% of the depth of the catch basin sump, or enter into an agreement with the Town to perform the services for a fee.
7. Bear all costs of required storm water system upgrades (if needed) to the Type 2 storm water system to meet the [Town's] [Village's] adopted and State approved FRP unless it is determined by the [Town] [Village] to be in its best interests as defined in Section 10.20.091.B of the Town's Storm Water Ordinance [as adopted by Village's Land Development Code] to participate in some or all of the system upgrade project or project costs.
8. Comply with all other elements of the Storm Water Ordinance or State environmental regulations, including but not limited to sections dealing with illicit discharges, offsite discharge of sediment, site erosion, fertilizer application with respect to phosphorous and overall compliance with best storm water management practices as defined in adopted regulations or ordinances.

9. Perform any necessary structural repairs to any non-public storm water infrastructure beyond the annual routine maintenance within at least six (6) months of discovery of such needed structural repair or, if not repaired within six months of discovery, reimburse the [Town] [Village] for all its costs for such catch basin repair plus a ten percent (10%) surcharge for associated administrative expenses relating to such repair.

10. Indemnify, defend and hold harmless the [Town] [Village] and its officers, employees, agents, and representatives for and from any claims for liability and or damages arising out of the [Town's] [Village's] performance of the required annual operations and maintenance and required testing of the storm water infrastructure, including all catch basins and pipes, that may occur on Permittee's property, except to the extent such claims (a) arise from the gross negligence or intentional misconduct of the [Town] [Village] or its employees, agents or contractors, or (b) are covered by insurance carried by the [Town] [Village], its agents or contractors.

SECTION THREE MISCELLANEOUS

1. The [Town] [Village] will notify Permittee at such time as the FRP for the watershed in which the property lies is adopted as to any obligations of Permittee to make on-site storm water improvements as required under the FRP.

2. All payments required under this Agreement shall be due upon receipt of an invoice. Any payments not made within thirty (30) days of their due date shall accrue interest at a rate of one percent (1%) per month on the past due amount until paid in full.

3. The Parties covenant and agree that the conditions and obligations under this Agreement shall run with the land, and shall accrue to the benefit of and be binding upon their respective successors and assigns as if they were parties to this Agreement. Any payments required under this Agreement not made when due shall constitute a lien on property of the Party failing to make payment, and shall be collectible in the same fashion as unpaid property taxes.

4. In the event a Party resorts to the judicial process to enforce another Party's obligations hereunder, the prevailing Party shall be entitled to recover its reasonable attorneys' fees.

5. This Agreement shall be interpreted consistent with and governed by the laws of the State of Vermont.

6. This Agreement consists of the entire understanding between the Parties relative to its subject matter, and may not be modified orally, but only by a written instrument signed by all Parties.

IN WITNESS WHEREOF, the Parties have caused their corporate seal to be affixed hereto and these premises to be signed in its name and on its behalf by its duly authorized agent as of the day and date first written above.

_____, VERMONT

Witness

BY: _____
Duly Authorized Agent

Witness

BY: _____
Duly Authorized Agent

STATE OF VERMONT)
)
COUNTY OF CHITTENDEN)

SS.

At Essex in said County this ____ day of _____, A.D., _____, personally appeared _____ duly authorized officer of _____, and he acknowledged this instrument, by him sealed and subscribed to be his free act and deed and the free act and deed of the [Town of Essex] [Village of Essex Junction].

Before me,

Notary Public
My Commission Expires: _____

STATE OF VERMONT)
)
COUNTY OF CHITTENDEN) SS.

At Essex in said County this ____ day of _____, A.D., _____, personally appeared _____ duly authorized officer of _____, and he/she acknowledged this instrument, by him/her sealed and subscribed to be his/her free act and deed and the free act and deed of _____.

Before me,

Notary Public
My Commission Expires: _____

Appendix C

TYPE 3 STORM WATER SYSTEM AGREEMENT

This STORM WATER SYSTEM AGREEMENT ("Agreement") is made this _____ day of _____ 20__ by and between the [Village of Essex Junction] [Town of Essex], a Vermont municipal corporation with a principal place of business at [Village address] [81 Main Street], Essex, Vermont 05452 (the ["Town"] ["Village"]), and _____ with a principal place of business at _____ ("Permittee"). The Town and Permittee are sometimes each referred to in this Agreement as a "Party" or collectively as the "Parties." (*NOTE: May be multiple parties to sign*)

WITNESSETH:

WHEREAS, the [Town has adopted an amendment to its Storm Water Ordinance] [Village has adopted an amendment to its Village Ordinance , incorporating Section 10.20.90 of the Town Storm Water Ordinance] entitled Establishment and Transfer of Responsibility for State of Vermont issued Department of Environmental Conservation Authorization to Discharge Permits under General Storm Water Permits and for Unpermitted Discharges to Impaired Waterways within the Town of Essex, Inclusive of the Village of Essex Junction; and

WHEREAS, the Storm Water Ordinance amendment identifies the requirements in section 10.20.094.C necessary for the [Town] [Village] to accept shared or full storm water permit responsibility for a valid or expired Type 3 storm water permit, as such type is defined in the Ordinance Amendment; and

WHEREAS, Permittee (*NOTE: May be multiple parties*) has identified that it is in their best interests to have the [Town] [Village] accept storm water permit responsibility by entering into this agreement; and

WHEREAS, it is in the best interests of the Parties to work together to achieve State of Vermont storm water permit compliance; and

WHEREAS, the Parties agree that the [Town] [Village] has no responsibility for the operation, maintenance, repair, replacement or upgrade of all non-public storm water or storm water-related infrastructure, or non-public storm water infrastructure added to the original version of a valid or expired storm water permit and shared responsibility on storm water systems consisting of both public and non-public infrastructure; and

WHEREAS, the [Town] [Village] may in its sole discretion, if determined by its legislative body to be in the [Town's] [Village's] best interests, to accept some or all of the operation, maintenance, repair, replacement or upgrade of all non-public storm water or storm water-related infrastructure, at some future date;

NOW, THEREFORE, in consideration of the matters described above, and of the mutual benefits and obligations set forth in this Agreement, and on the express condition that all conditions precedent described below are satisfied, the Parties agree as follows:

SECTION ONE.
[TOWN] [VILLAGE] OBLIGATIONS

The Town agrees to accept full or shared permit responsibility on a proportional basis by relative impervious area contributed by the public and non-public storm water infrastructure within the permitted area for valid or expired storm water system permits. The relative impervious area has been agreed as follows: [Town] [Village] __%; Permittee __%. The [Town] [Village] also shall:

1. Hire a professional engineer, at no cost to the Permittee, to inspect and certify that the Type 3 storm water system, including but not limited to catch basins, storm pipes, and treatment facilities, is in compliance with the infrastructure requirements as contained in the expired permit, unless such work is undertaken at no cost to the [Town] [Village] on non-public storm water infrastructure by Permittee. The certification shall occur prior to August 1, 2015.
2. Conduct future inspections that occur after the initial certification inspection of Type 3 storm water systems at no charge to the Permittee.
3. Conduct annual system compliance inspections to verify the condition and maintenance of the Type 3 storm water system and report findings to the State and the Permittee.
4. Inspect and prepare a structural condition survey and extent of debris capture in all catch basins contributing storm water flow within the permitted area.
5. At the request of Permittee, arrange for cleaning of non-public catch basins, and to bill such cleaning costs to the Permittee.
6. Make best efforts to minimize the impact on any Permittee's property and their business operations thereon in performing its obligations under this Agreement.

SECTION TWO
PERMITTEE OBLIGATIONS

Permittee (*NOTE: May be multiple parties*) shall:

1. Accept all responsibility for the operation, maintenance, repair, replacement or upgrade of non-public storm water infrastructure identified in a valid or expired storm water permit, or non-public storm water infrastructure added subsequent to the original version of a valid or expired permit, or their portion of a shared storm water system to meet an approved Flow Restoration Plan (FRP) unless it is determined by the appropriate legislative body, in its sole discretion, to be in the [Town's] [Village's] best interests, as defined in Section 10.20.091.B of the Storm Water Ordinance to accept some or all of this responsibility.
2. Pay their proportionate share of all applicable permit fees, including initial fees and all future renewal fees, if any such fees are required of the Type 3 storm water system, and
3. Hire a professional engineer, at no cost to the [Town] [Village], to inspect and certify that the non-public or shared portion of the Type 3 storm water system, including but not limited to catch basins, storm pipes, and treatment facilities, is in compliance with the infrastructure requirements as contained in the expired permit, unless Permittee requests such work be performed by the [Town] [Village]. The certification shall occur prior to August 1, 2015.
4. Correct any deficiencies on the non-public portion of the storm water system identified by the engineer's storm water system inspection at their own expense prior to the August 1, 2015 date for system certification.
5. Maintain, repair, replace and upgrade as necessary all non-public storm water infrastructure and to share responsibility for portions of shared storm water systems covered under the Type 3 storm water system permit according to the percentages identified above.
6. Sweep clean all paved private roadways or parking lots at least twice per year and clean out all private catch basins whenever the depth of deposited material exceeds 50% of the depth of the catch basin sump on non-public private storm water infrastructure or enter into an agreement with the [Town] [Village] to perform such services for a fee.
7. Bear the cost of required storm water system upgrades on non-public portions of the shared storm water systems and to share in the costs of all shared elements of the storm water system (if needed) to the Type 3 storm water system to meet the [Town's] [Village's] adopted and State approved FRP according to the percentages identified above unless it is determined by the [Town] [Village] to be in its best interests as defined in Section 10.20.091.B of the Town's Stormwater

Ordinance to participate in some or all of the system upgrade project or project costs.

8. Comply with all other elements of the Storm Water Ordinance or State environmental regulations, including but not limited to sections dealing with illicit discharges, offsite discharge of sediment, site erosion, fertilizer application with respect to phosphorous and overall compliance with best storm water management practices as defined in adopted regulations or ordinances.
9. Perform any necessary structural repairs to any non-public storm water infrastructure beyond the annual routine maintenance within at least six (6) months of discovery of such needed structural repair or, if not repaired within six (months) of discovery, reimburse the [Town] [Village] for all its costs for such catch basin repair plus a ten percent (10%) surcharge for associated administrative expenses relating to such repair; and share in such costs on shared elements of the storm water system according to the percentages identified above.
10. To indemnify, defend and hold harmless the [Town] [Village] and its officers, employees, agents, and representatives for and from any claims for liability and or damages arising out of the [Town's] [Village's] performance of the required annual operations and maintenance and required testing of the storm water infrastructure, including all catch basins and pipes, that may occur on Permittee's property, except to the extent such claims (a) arise from the gross negligence or intentional misconduct of the [Town] [Village] or its employees, agents or contractors, or (b) are covered by insurance carried by the [Town] [Village], its agents or contractors.

SECTION THREE MISCELLANEOUS

1. The [Town] [Village] will notify Permittee at such time as the FRP for the watershed in which the property lies is adopted as to any obligations of Permittee to make on-site storm water improvements as required under the FRP.
2. All payments required under this Agreement shall be due upon receipt of an invoice. Any payments not made within thirty (30) days of their due date shall accrue interest at a rate of one percent (1%) per month on the past due amount until paid in full.
3. The Parties covenant and agree that the conditions and obligations under this Agreement shall run with the land, and shall accrue to the benefit of and be binding upon their respective successors and assigns as if they were parties to this

acknowledged this instrument, by him sealed and subscribed to be his free act and deed and the free act and deed of the [Town of Essex] [Village of Essex Junction].

Before me,

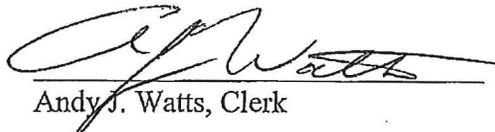
Notary Public
My Commission Expires: _____

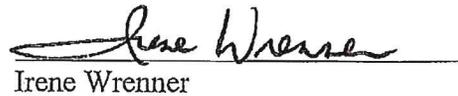
TOWN OF ESSEX SELECTBOARD
CHANGES TO TITLE 10.20, STORM WATER ORDINANCE
Inclusive of Appendix A, B and C:

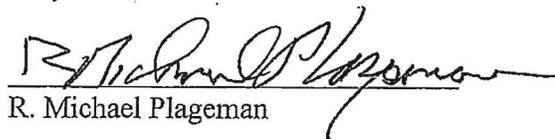
Adopted this 18th day of August 2014 by the Town of Essex Selectboard.


Max Levy, Chair


Brad M. Luck, Vice Chair


Andy J. Watts, Clerk


Irene Wrenner


R. Michael Plageman

Received for Record by Essex Town Clerk this 22nd day of Oct 2014.



**Appendix E: List of Stormwater Treatment Practices the
Town has assumed “Full Legal Responsibility”**

Past Permit #	System Name	STP
3575-9010.R	Lang Farm, Parcel I	Detention berm and sedimentation basin
3577-9010.R	Lang Farm, Parcel H	30' Type I stone-lined ditch & 65' Type II grass-lined swale
3324-9010.R	Meadows Edge	Grassed drainage swales & detention basin
3574-9010.R	Forestdale	Settling tanks & an infiltration basin
3081-9010.R	Perkins Bend	Grass-lined swale & underground detention structure
3578-9010.R	Pinewood	Grassed Swales & special sedimentation removal catch basins
3581-9010.R	Heritage Phase II	Stone filled trench & grass-lined swales
3579-9010.R	Old Stage Village	Grass-lined swales
3580-9010.R	Rivers Bend	Existing natural drainageway (with deeded easement)
3201-9010	Pinewood, Section G	Detention basin
3267-9010.1R	Saybrook	Grassed swales
4367-9010.R	Autumn Knoll	Grass swales, ditching, and detention basin
3996-9010.R	Rec Pool Complex	Stone-lined ditching
5710-INDO.R	Colbert Street Treatment System	Vortechs Model 4000 stormwater swirl concentrator
5944-INDO	Kellogg Road	Controlled outlet structure and stabilized channel
7002-9015	Police Station	Bioretention facility
1-0491	United States Postal Service	Drainage swales (UPGRADE)
1-0518	Ewing Place (Lot 3)	Grass-lined swale
1-0619	Ewing Place (Susie Wilson Rd - Lot 2)	Grassed and stone-lined drainage swales
1-0694	Ewing Place (Lot 1)	Drainage swale
1-0761	Ewing Place (Lot 4)	Grass-lined swale
1-0965	Ewing Place	Storm drainage system consisting of dry well catch basins
2-0634	Ewing Place (Susie Wilson Rd)	Storm drainage system consisting of dry well catch basins
2-0925	Town Market Place	Series of catch basins; via 18" pipe to rip-rapped drainage ditch
1-0552	Town Market Place	Overland flow across grassed terrain
1-0775	Essex Outlets	Detention basin
2-0613	Essex Outlets	Detention basin
1-1307	Essex Outlets	Detention basin
1-0667	Woodlands I	Storm drainage system consisting of catch basins and underdrain stone trenches that outlet to a drainage swale
1-1186	Woodlands II	Storm drainage system consisting of catch basins and underdrain stone trenches that outlet to a drainage swale
1-0250	Kimberly Drive	Pipe discharge through a headwall
1-0896	David Drive	Storm drainage system to a stone-lined ditch
1-1319	The LDS Church	Detention basin #1
		Detention basin #2
1-1371	Links at Lang Farm	Grassed swale to a vegetated wetland
1-1381	The Commons	Detention basin
		Constructed wetland
1-1463	VT Systems, Inc.	Storm drainage system consisting of a catch basin system to a drywell
1-1496	Baymont Inn & Suites	Detention basin
2-0633	Shillingford Crossing	Storm drainage system consisting of catch basins and pipes that outlet to a drainage swale
1-1143	The Edge	Stormwater infiltration system
2-1045	Pearl Street Park	Overland flow across grassed terrain

**Appendix F: VT DEC MS4 Permit Authorization
incorporating the FRPs and Expired Permits for the
Town of Essex and VT DEC MS4 Permit Authorization
incorporating the PCP under the SWMP for the Town of
Essex**



Vermont Department of Environmental Conservation

Watershed Management Division
1 National Life Drive, Main Bldg, 2nd Fl
Montpelier, Vermont 05620-3522

Agency of Natural Resources

[tel] 802-828-1535

August 10, 2017

Dennis Lutz
Town of Essex
81 Main Street
Essex Junction, VT 05452

Re: Authorization to Discharge Permit 7025-9014.A, Town of Essex MS4 amendment

Dear Mr. Lutz,

The Department of Environmental Conservation has reviewed the Town of Essex's application to amend its authorization to discharge stormwater from the municipal separate storm sewer system (MS4) under General Permit 3-9014. The Department has determined that the Notice of Intent (NOI) and Stormwater Management Plan (SWMP), incorporating the Flow Restoration Plan (FRP) requirements complies with the terms and conditions of the General Permit. The MS4 discharge is therefore eligible for coverage under General Permit 3-9014. The amended authorization is enclosed.

A 40-day comment period was provided after the application submittal. Public comments were received from the Conservation Law Foundation concerning the amendment application. A response to those comments has been enclosed along with amended Authorization to Discharge pursuant to General Permit 3-9014.

23 state operational permits have been incorporated into the MS4 with this application, as listed on the Authorization. For previously incorporated permits, refer to the authorization under which they were incorporated. Redevelopment or expansion of impervious surfaces on these properties will still be required to obtain operational permit coverage through DEC if the project meets jurisdictional thresholds.

Where the FRP has identified required controls on properties subject to a previously issued permit that will not be taken over by the MS4 and will required landowners to obtain permit coverage through the Department, construction of upgrades will be required within the five-year term of that site's new permit, rather than according to the design and construction schedule presented in the FRP(s).

Sincerely,

Stormwater Management Program

Enclosures

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AUTHORIZATION TO DISCHARGE UNDER
MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
GENERAL PERMIT 3-9014

A determination has been made that the applicant:

Town of Essex
81 Main Street
Essex Junction, VT 05452

meets the criteria necessary for inclusion under General Permit 3-9014. Hereinafter the named applicant shall be referred to as the permittee. Subject to the conditions of General Permit No. 3-9014, the permittee is authorized to discharge stormwater from the small Municipal Separate Storm Sewer System (MS4) located in Essex, Vermont.

This permit amends and replaces previously issued authorization 7025-9014 for the following reasons:

1. An approved Flow Restoration Plans (FRP) for Indian Brook has been made part of the permittee's Stormwater Management Plan (SWMP).
2. An approved Flow Restoration Plans (FRP) for Sunderland Brook has been made part of the permittee's Stormwater Management Plan (SWMP).
3. The following previously authorized State Stormwater Permits have been incorporated into this MS4 permit:

1-0250	1-0518	1-0552
1-0619	1-0667	1-0694
1-0761	1-0775	1-0896
1-0965	1-1143	1-1186
1-1307	1-1319	1-1371
1-1381	1-1463	1-1469
2-0613	2-0633	2-0634
2-0925	2-1045	

Compliance with General Permit 3-9014 and this Authorization

The permittee shall comply with this authorization and all the terms and conditions of General Permit 3-9014, including the payment of annual operating fees to the Department. A billing statement for such fees will be sent to the permittee each year. Any permit non-compliance constitutes a violation of 10 V.S.A. Chapter 47 and may be grounds for an enforcement action or revocation of this authorization to discharge. Nothing in this permit shall be construed as having relieved, modified, or in any manner affected your on-going obligation to comply with all other federal, state or local statutes, regulations or directives applicable to you in the operation of your activities, nor does it relieve you of the obligation to obtain all other necessary state, local and federal permits. Projects identified in the Flow Restoration Plan (FRP) that have a separate state stormwater permit, and have not been incorporated into the MS4 authorization, will be subject to the schedule of compliance of the project's permit, not by the FRP.

Stormwater Impaired Waters Reporting Deadlines

The permittee shall continue to submit a report on a semi-annual basis on the permittee's implementation of the Flow Restoration Plan (FRP). The FRP report shall be submitted every year on October 1st and every year on April 1st with the MS4 Annual Report.

Right to Appeal to the Environmental Court

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at www.vermontjudiciary.org. The address for the Environmental Court is 32 Cherry Street, 2nd Floor Suite 303 Burlington, Vermont 05401 (Tel.# (802) 951-1740).

Effective Date and Expiration Date of this Authorization

This authorization to discharge shall become effective on August 9, 2017 and shall continue until December 5, 2017. Permittees will be contacted to reapply when the MS4 permit has been replaced.

Dated this 10th day of August, 2017.

Emily Boedecker, Commissioner
Department of Environmental Conservation

By



Christy Witter, Coordinator of the Municipal Separate Storm Sewer System (MS4) Permit Stormwater Management Program

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
 AUTHORIZATION TO DISCHARGE UNDER
 MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
 GENERAL PERMIT 3-9014

A determination has been made that the applicant:

Town of Essex
 81 Main Street
 Essex Junction, VT 05452

meets the criteria necessary for inclusion under General Permit 3-9014. Hereinafter, the named applicant shall be referred to as the permittee. Subject to the conditions of General Permit No. 3-9014, the permittee is authorized to discharge stormwater from the small Municipal Separate Storm Sewer System (MS4) located in Essex, Vermont.

This permit amends and replaces previously issued authorization 7025-9014.ARA for the following reasons:

1. The Phosphorus Control Plan (PCP) for the Town of Essex has been submitted and made part of the permittee's Stormwater Management Program (SWMP).

This Authorization replaces the previously incorporated State Stormwater Permits:

1-0250	1-0775	1-1319	2-0634	3574-9010.R	3996-9010.R
1-0491	1-0761	1-1371	2-0925	3575-9010.R	4367-9010.R
1-0518	1-0896	1-1381	2-1045	3577-9010.R	5715-INDO.R1
1-0552	1-0965	1-1463	3081-9010.R	3578-9010.R	5944-INDO
1-0619	1-1143	1-1496	3201-9010.R	3579-9010.R	7002-9015.T
1-0667	1-1186	2-0613	3267-9010.1R	3580-9010.R	
1-0694	1-1307	2-0633	3324-9010.R	3581-9010.R	

Compliance with General Permit 3-9014 and this Authorization

The permittee shall comply with this authorization and all the terms and conditions of General Permit 3-9014, including the payment of annual operating fees to the Department. A billing statement for such fees will be sent to the permittee each year. Any permit non-compliance constitutes a violation of 10 V.S.A. Chapter 47 and may be grounds for an enforcement action or revocation of this authorization to discharge. Nothing in this permit shall be construed as having relieved, modified, or in any manner affected your on-going obligation to comply with all other federal, state or local statutes, regulations or directives applicable to you in the operation of your activities, nor does it relieve you of the obligation to obtain all other necessary state, local and federal permits. Projects identified in the Flow Restoration Plan (FRP) that have a separate state stormwater permit, and have not been incorporated into the MS4 authorization, will be subject to the schedule of compliance of the project's permit, not by the FRP.

Stormwater Impaired Waters Reporting Deadlines

The permittee shall continue to submit a report on an annual basis on the permittee's implementation of the Flow Restoration Plan (FRP). The FRP report shall be submitted every year on April 1st with the MS4 Annual Report.

Phosphorus Control Plan Reporting Deadlines

The permittee shall submit a report on an annual basis on the permittee's development and implementation of the Lake Champlain Phosphorus Control Plan (PCP). The PCP report shall be submitted every year on April 1st with the MS4 Annual Report.

Due Date	Compliance Item
April 1, 2022 and every year thereafter	Submit Annual PCP Report
No later than June 17, 2036	Complete full implementation of the approved PCP

Right to Appeal to the Environmental Court

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at www.vermontjudiciary.org. The address for the Environmental Court is 32 Cherry Street, 2nd Floor Suite 303, Burlington, Vermont 05401 (Tel.# (802) 951-1740).

Effective Date and Expiration Date of this Authorization

This authorization to discharge shall become effective on April 22, 2022 and shall continue until July 27, 2023. Permittees will be contacted to reapply when the MS4 permit has been replaced.

Dated April 22, 2022

Julia S. Moore, Secretary
Agency of Natural Resources



By:
Chris Gianfagna, Stormwater Program Manager

Appendix G: Flow Monitoring Contract with Stone



April 7, 2022

Annie Costandi
Stormwater Engineer
Essex Public Works Department
5 Jericho Road
Essex, VT 05452

Chelsea H. Mandigo
Water Quality Superintendent
Village of Essex Junction
2 Lincoln Street
Essex Junction, VT 05452

Stone Project No. 2022-1052
Subject: Proposal for Indian Brook Flow Monitoring Project

Dear Annie and Chelsea:

Stone Environmental, Inc. (Stone) is pleased to submit this proposal to continue providing continuous flow and precipitation data for Indian Brook.

1. Background

In 2016 Stone and our subcontractor Fitzgerald Environmental Associates (FEA) constructed streamflow gauges on streams in Chittenden and Franklin Counties classified as impaired by excess stormwater runoff, including Indian Brook. We monitored streamflow and precipitation continuously between 2017 and 2021. The purpose of the monitoring program was to quantify the flow characteristics of the streams. The Vermont Department of Environmental Conservation (VTDEC) administered the program with funding from municipalities, including the Town of Essex and the Village of Essex Junction, within whose borders these impaired streams run.

The five-year duration of the VTDEC administered stream gauging program was sufficient for Stone to describe the current flow characteristics of Indian Brook. However, it was too short to detect improvement in the flow characteristics (particularly reduced peak flows and increased baseflows) that are anticipated as a result of investments in stormwater management. Stone and FEA are interested in supporting your water resource improvement efforts by continuing flow monitoring at the Indian Brook gauge to provide important flow data and to begin to evaluate potential changes over time.

2. Scope of Services

Stone and FEA will continue to operate and maintain the existing flow gauge on Indian Brook. Stone will provide streamflow and precipitation data (daily, hourly, and 5-minute duration) for

the free-flowing period of each monitoring year, typically mid-March through November. The following describes the main tasks necessary to provide you with these hydrologic data.

- FEA will conduct routine maintenance of the station. These activities are required approximately monthly. Routine maintenance includes recording staff gauge readings, changing desiccant, downloading the time-lapse camera and changing its batteries, and clearing any debris from the staff gauge and pressure transducer conduit.
- Precipitation rates in the Indian Brook watershed will be measured using the existing rain gauge on the Essex High School property.
- Stone or FEA (depending on availability) will perform manual discharge measurements to verify and extend the existing stage-discharge rating for the Indian Brook gauge.
- Stone will continue to procure necessary equipment and provide instrument technical support and repair.
- Stone will maintain a project website hosting the data, manage the data, perform thorough data quality review, make data adjustments when necessary, and perform hydrologic computations.
- Stone will prepare data summaries and provide the finalized hydrologic data (daily, hourly, and 5-minute duration streamflow and precipitation data) for each monitoring year.
- Stone proposes a three-year monitoring term (2022-2024).

3. Fee and Basis of Billing

Stone shall perform the agreed services on a time and materials basis up to a not-to-exceed cost of \$29,400 for three years of streamflow gauging, equal to \$9,800 per monitoring year. This cost estimate includes equipment costs and cellular data charges. Note that Stone owns all the gauging station equipment and will continue to own the equipment even as we make repairs and replace components under this contract.

The Town will be responsible for payment on behalf of the Town and Village for streamflow and precipitation monitoring in 2022. Stone agrees to bill the Town and Village separately for monitoring costs in 2023 and 2024.

4. Schedule

The term of this contract is March 15, 2022, through June 30, 2025. We will monitor streamflow and precipitation in 2022, 2023 and 2024. Prior years' data will be finalized by June 30 of the following year (for example, the 2024 datasets will be completed by June 30, 2025).

If mutually agreed, this contract may be amended to include additional years of monitoring.

5. Terms of Engagement

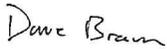
The terms of engagement are described in the attached statement of Terms and Conditions.

6. Acceptance

Please signify your acceptance of this proposal by signing in the appropriate spaces below and returning a copy to Stone. This Contract for Services and the attached Terms and Conditions constitutes the entire agreement between Client and Stone. This executed Contract for Services must be received by Stone prior to our initiation of the work described above.

We look forward to working with you on this project. Should you have any questions, please do not hesitate to contact us.

Sincerely,

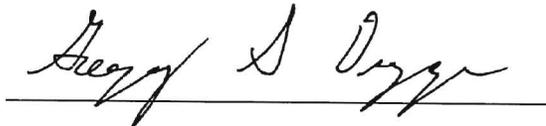


Dave Braun
Water Resources Group Leader

Cell / 802-272-8819
E-Mail / dbraun@stone-env.com

This proposal for services and the attached Terms and Conditions are hereby accepted and executed by a duly authorized signatory who, by execution thereof, warrants that he or she has full authority to act for, in the name, and on behalf of the Client.

By:



Title: Town Manager

Gregory S. Duggan

Date: 4/9/22

Typed/Printed Name



Attachment A: Terms and Conditions

1. Agreement

The Agreement consists of the Proposal that is signed and dated by Stone Environmental, Inc. acting through its officers and employees (Stone) and the Town of Essex/Village of Essex Junction (Client) and these Terms and Conditions which are appended and incorporated by reference (Agreement). It is the mutual intention of the parties that, to the maximum extent permitted by applicable law, Stone's services under this Agreement shall not subject any individual employee, officer, director or shareholder of Stone to any personal liability or exposure for matters arising under, or with respect to, this Agreement or the underlying project. Accordingly, notwithstanding anything to the contrary contained herein, Client agrees that Client's sole and exclusive recourse for all purposes of this Agreement shall be against the corporate entity, and no claims, demands, suits or other actions of any kind or nature shall be asserted against any of Stone's employees, officers, directors or shareholders individually. Services performed under this Agreement will be for Client's exclusive use. Stone's services address current conditions; any delayed use of the results of the services will require updating the services to reflect current conditions. Neither party may assign this Agreement or any rights, claims, or liabilities arising out of this Agreement to any other person or entity without the express written consent of the other party. Any such impermissible assignment shall be void and of no effect.

Statements of Work presented to the client shall be a firm offer for a period of sixty (60) days from the date of the Statement of Work, after which Stone may withdraw or modify the Statement of Work if not

accepted by Client signing the Agreement and returning the signed Agreement to Stone. Except as otherwise expressly provided in this Agreement, the fees, costs, and schedules stated within the Statement of Work constitute

Stone's estimated probable cost and time to complete the specified services. If Stone at any time considers that a material change to the nature, time, or extent of services is required or advisable, Stone shall notify Client of such change. No such change shall be made without Client's consent except as required in an emergency, as discussed in Section 4.

2. Definitions

For the purposes of this Professional Services Agreement, the following words have the meanings ascribed to them below:

- a. "Client" means the Town of Essex/Village of Essex Junction.
- b. "Agreement" means the Terms and Conditions set forth here and the attached Statement of Work containing the scope of services, schedule, and cost estimate, as either may be modified in writing by Stone and Client in accordance with Section 21.
- c. "Stone" means Stone Environmental, Inc.
- d. "Party" means Stone or Client, as indicated by the context.
- e. "Price" means the price set forth in the Statement of Work, subject to adjustment pursuant to the Agreement.
- f. "Project" means the tasks stated in the Statement of Work and all additional tasks performed by Stone.



- g. “Services” means any work performed or to be performed by Stone for Client under the Statement of Work.
- h. “Site” means site upon which services may be conducted or in relation to which services may be performed.

3. Interpretation

Words in the singular also include the plural and vice versa. The captions of sections are for convenience only and shall not limit the meaning or construction of the Agreement. Any reference to a section means a section of the Agreement. Any references in a provision of the Agreement to a specific item as included within a general category shall not exclude items of similar nature, unless otherwise expressly stated herein. If a provision of this Agreement is inconsistent with a provision of Attachment A, the provision of the Attachment A shall prevail.

4. Force Majeure; Emergencies

Price and schedule commitments contained in Attachment A are subject to equitable adjustments for delays caused by Client’s failure to provide required approvals or suitable access to a Site, or for delays caused by unpredictable occurrences or circumstances beyond the reasonable control of either Party, such as fires, floods, earthquakes, strikes, riots, war, terrorism, threat of terrorism and any resulting security measures, acts of God, acts or regulations of any governmental agency, or other acts, including, without limitation, unusual weather conditions (“Force Majeure”). If Stone determines that, based on circumstances surrounding a Project, the health or safety of its personnel or of its subcontractors’ personnel is or may be at risk in performing a Project, such circumstances shall constitute a Force Majeure, and Stone shall have the right to

take whatever measures it deems necessary to protect such personnel and recover the costs from Client. In an emergency affecting the health or safety of persons, the environment, or property of Client or others, if it is impracticable for Stone to obtain prior authorization from Client, Stone shall act at its discretion, to prevent threatened damage, injury, or loss and recover the costs from Client.

5. Labor Rates

Where payment for Services is on a time-and-material or cost reimbursable basis:

- a. Labor, expenses, and subcontracting costs incurred in providing services shall be charged as indicated in Attachment A, as applicable. Stone labor rates apply to all: (i) full-time, part-time, temporary, and secondary employees of Stone and its affiliates; (ii) temporary employees whose direct compensation is paid by a temporary staffing agency; and (iii) staff consultants.
- b. Stone labor rates shall be subject to annual adjustments by Stone on January 1st of each year.
- c. If Stone personnel are called or subpoenaed for depositions, examination, or court appearances in any dispute arising out of the Project and in which Stone is not a named party, Stone shall be reimbursed on a time-and-material basis at its then effective labor rates, including all costs incurred in connection therewith, and such Services shall be governed by the Agreement.

6. Invoices and Payment

Each invoice is payable by Client within thirty (30) days of the invoice date. All fees quoted are exclusive of goods and services



tax, value added tax, or similar tax as is applied in the country in which Stone provides the services, which shall be charged in addition at the prevailing rate. Stone may submit invoices to Client electronically. The Client shall not in any circumstances or for any reason whatsoever be entitled to make any deduction or withhold any sum from the fees payable to Stone by way of set-off. Unpaid balances shall be subject to interest at the rate of one and one-half percent (1.5%) per month or the maximum amount permissible under applicable law, whichever is less, starting thirty (30) days after the invoice date. Payments received will be applied first to any accrued interest, with the balance of the payment then applied to any unpaid fees. Any additional interest charges will be separately invoiced after the unpaid balance for which such interest charge relates is paid. In addition, Stone may, after giving five (5) days' notice, suspend services without liability until all past due accounts (including fees and accrued interest) have been paid. If Stone must take legal action to be paid for services and prevails, all collection and legal costs associated with such action shall be reimbursed by Client. Notwithstanding any facts and circumstances surrounding the Agreement, Client shall pay Stone for services rendered to it regardless of whether services are intended in whole or in part to benefit a third party.

7. Termination

Subject to Section 6, any Project may be terminated in whole or in part in writing by either Party upon a breach by the other Party of a material obligation of such Party under the Agreement or if a Party goes into liquidation or is otherwise unable to pay its debts as they fall due; resolves to appoint or has appointed for it an administrator,

receiver or other similar officer in relation to the whole or a material part of that Party's business, property or assets; enters into or proposes to enter into a moratorium or voluntary arrangement; or makes a court application (other than for the purposes of an amalgamation or reconstruction resulting in a solvent corporation), provided that no such termination shall be effective unless the breaching Party is given: (i) not less than ten (10) calendar days written notice of intent to terminate; (ii) an opportunity for consultation with the terminating Party prior to the effective date of such termination; and (iii) a reasonable opportunity to cure such a breach to the extent that such breach can be cured. Client may terminate the Agreement for Client's convenience upon ten (10) calendar days written notice to Stone, in which event Client shall pay, in accordance with the terms of Section 6, all outstanding payments for services accrued up to the date of such termination, including, without limitation, demobilization costs. Stone shall calculate a final invoice following the effective date of termination. This Section 7 is not intended to limit Stone's other rights to seek recovery for claims, costs, losses, and liability resulting from Client's breach of the Agreement.

8. Insurance

Stone shall maintain policies of insurance for the following types of coverage, each with a limit of liability of US \$1,000,000 occurrence/\$2,000,000 aggregate for: Commercial General Liability, Contractors Pollution, and Professional Liability. Workers Compensation or equivalent coverage (as required under applicable statute); Employer's Liability with \$1,000,000/\$1,000,000/\$1,000,000; Commercial Automobile Liability with a



combined single limit of \$1,000,000. Excess Liability with a limit of \$4,000,000 which sits over the underlying: General Liability, Contractors Pollution, Professional, Auto and Employers Liability. Upon the written agreement of Stone and Client, Stone may procure and maintain, at Client's expense, policies of insurance in addition to the types of insurance described above or procure insurance coverage of the same types described above with increased policy limits.

9. Indemnification

- a. To the fullest extent permitted by law, Client shall indemnify Stone, its affiliates, and their respective directors, officers, employees, shareholders, agents, and independent contractors (for purposes of Section 8 and 9, "Stone") from and against all liability, claims, suits, losses, damages, and costs, including reasonable attorney's fees (collectively, "Damages") arising out the Agreement, except for any act or omission constituting negligence or willful misconduct by Stone.
- b. Client agrees that Stone shall not be liable to Client or any third party for the creation or existence of any type of hazardous or toxic waste, material, chemical compound, or substance, or any other type of environmental hazard, contamination, or pollution, whether latent or patent, or the releases thereof or the violation of any law or regulation relating thereto, existing at the Site prior to commencement of the performance of services ("Pre-Existing Condition"), and to the fullest extent permitted by law, Client shall indemnify and hold harmless Stone from any and all Damages sustained by them in connection with any Pre-Existing Condition except to the extent any such Pre-Existing Condition is exacerbated

by the negligence or willful misconduct of Stone. Stone's liability hereunder is contingent upon Client informing Stone in writing of any known or suspected Pre-Existing Condition on the Site prior to Stone entering onto the Site.

10. Standard of Care: Limitation of Liability

- a. In performing services, Stone shall exercise that degree of care and skill ordinarily exercised under similar circumstances at the same time by environmental consulting professionals performing substantially similar services at the same or similar locality as that of the Site. Save the foregoing warranty, no representation, warranty, condition, or other term expressed or implied as to the quality or nature of services is given or accepted by Stone, and all such representations, warranties, conditions, and other terms are excluded to the fullest extent permitted by law. If services include estimating the cost or potential cost of remediation or compliance, Stone will prepare such estimate based upon its experience and professional judgment. However, given the nature of such services, Stone does not warrant or guarantee the accuracy of any such estimate.
- b. In no event shall Client or Stone be liable to the other and/or anyone claiming by, through, or under it, including without limitation, insurers, for any lost, delayed, or diminished profits, revenues, business, or opportunities; or any incidental, special, indirect, financial, or economic losses or consequential damages, of any kind or nature whatsoever, however caused.
- c. In no event shall Stone be liable to Client and/or anyone claiming by, through, or under Client including,

without limitation, insurers, for any amount in excess of the lesser of the sums paid by Client to Stone or US\$250,000 in the aggregate. Stone shall have no liability for any claim or demand if Client fails to institute legal proceedings against Stone in respect of such claim or demand within 12 months of its notice of the claim to Stone. Client releases Stone from any damages sustained by Client in excess of the amount specified in this subparagraph 10(c), and/or outside the time frame specified in this subparagraph 10(c).

- d. The provisions of this Section 10 shall (i) apply to the fullest extent allowed by applicable law irrespective of whether liability of Stone or Client is claimed, or found to be based in contract (including breach of warranty or contract), tort (including negligence or negligent misrepresentation), strict liability, or otherwise, and (ii) survive the completion of services or the expiration, cancellation, or termination of this Agreement. Notwithstanding anything to the contrary contained herein, the limitations of liability set forth in Section 10(c) and 10(d) shall not apply if the party seeking to enforce the limitation of liability is deemed, by a court of competent jurisdiction, to have committed gross negligence or willful misconduct, and shall not limit the Parties' indemnification obligations to each other as it relates to third party claims. The provisions of Sections 10(b), 10(c), and 10(d) shall be enforceable as a separate agreement if necessary.
- e. Client acknowledges and agrees that the Cost for Services has been negotiated in consideration of the Parties' agreement to limit certain of Stone's liabilities. Accordingly, Client acknowledges and agrees that the provisions of this Section 10 satisfy any requirement of

reasonableness under any law applicable to the Agreement and any claims relating to or arising in connection with the Agreement.

11. Containment and Disposal

When Stone tests for the presence of toxic, hazardous, or contaminated substances or waste, certain sampling materials are removed for sampling and are handled by Stone as toxic, hazardous, or contaminated materials. If Stone determines or is advised by any governmental agency that containerization of sampling materials is necessary, Stone will inform Client that Stone will perform or oversee appropriate containerization and labeling (at Client's cost and expense), and will leave the containers on Site for proper, lawful removal, transport, and disposal by Client.

12. Right of Entry

Client hereby grants to Stone right of entry to the Site(s), or represents and warrants that permission has been duly granted for a right of entry to the Site(s), from time to time by Stone, its agents, employees, consultants, contractors or subcontractors, upon the Site(s) for the purpose of performing and with the right to perform all acts, assessments, and research, including without limitation the making of test borings, and taking of groundwater, surface water or soil samples, and other testing, measuring or sample gathering as required, and Client agrees to defend, indemnify and hold Stone, its agents, employees, consultants, and contractors or subcontractors harmless from and against any claims of trespass or damage if the Site(s) is not owned by Client.



13. Client Responsibilities

Client shall be responsible for providing all reasonable assistance required by Stone in connection with services, including, without limitation, any assistance specified in the Statement of Work. In particular, Client will provide Stone with the following:

- a. Reasonable ingress to and egress from the Site by Stone and/or its subcontractors and their respective personnel and equipment.
- b. All information related to the Project in Client's possession, custody, or control reasonably required by Stone. Stone has the right to rely, without independent investigation or inquiry, on the accuracy and completeness of any information provided by, on behalf of, or at the request of Client or any governmental agency to Stone or anyone providing services for Stone relating to services. Client agrees to review all proposals, designs, schematics, drawings, specifications, reports, and/or other required Project deliverables prepared by Stone for Client for the accuracy and completeness of factual information provided by or on behalf of Client for inclusion therein, and to make available to Stone any further information within Client's possession that may affect the accuracy or completeness of Stone's report.
- c. If services involve electronic data files that are maintained by or for Client, Client shall be responsible for maintaining backup copies of all such files.

14. Acceptance of Work

Services provided by Stone shall be deemed approved and accepted by Client as and when invoiced unless Client objects within thirty (30) days of the invoice date by written

notice specifically stating the details in which Client believes such services are incomplete or defective.

15. No Third Party Reliance

This Agreement does not, and is not intended to, grant to any person or entity, other than the Parties, any benefit, right, or remedy hereunder, including the right to rely on services or any work product generated by or for Stone. Any work product generated by or for Stone pursuant to the Agreement is provided solely for the purposes stated in the Statement of Work, and Client's use of any such work product for any other purpose shall be at Client's risk and without liability to Stone. If, notwithstanding this Section 15, a court determines that a third party does have the right to rely on the Services, such reliance shall be subject to the Agreement.

16. Severability

Each of the provisions of this Agreement is distinct and severable from the others and if at any time any one or more of such provisions is or becomes invalid, unlawful, or unenforceable (whether wholly or to any extent), the validity, lawfulness, and enforceability of the remaining provisions (or the same provision to any other extent) of this Agreement shall not in any way be affected or impaired, and the Parties agree that they will substitute provisions in a form as similar to the offending provision as is possible without thereby rendering them invalid, unlawful, or unenforceable.

17. Additional Conditions

Set Forth on any Addendum attached hereto by Stone and made a part hereof, are additional provisions (if any) that address issues relating to certain applicable laws and



regulations governing Stone's performance of Services.

18. Confidentiality

To the extent that, in connection with this engagement, Stone comes into possession of any proprietary or confidential information (the "Confidential Information") of the Client, Stone will not disclose such information to any third party without the Client's consent, except (a) as may be required by law, regulation, judicial, or administrative process, or in accordance with applicable professional standards, or in connection with litigation pertaining hereto, or (b) to the extent such information (i) shall have otherwise become publicly available (including, without limitation, any information filed with any governmental agency and available to the public) other than as the result of a disclosure by Stone in breach hereof, (ii) is disclosed by the Client to a third party without substantially the same restrictions as set forth herein, (iii) becomes available to Stone on a non-confidential basis from a source other than the Client which Stone believes is not prohibited from disclosing such information to Stone by obligation to the Client, (iv) is known by Stone prior to its receipt from the Client without any obligation of confidentiality with respect thereto, or (v) is developed by Stone independently of any disclosures made by the Client to Stone of such information. For purposes of this Section and Section 20 below, Confidential Information shall include all work performed under this Agreement and all work-product, materials, products, or services developed or prepared for Client by Stone.

In the event that Stone receives a request from a third party (including a subpoena, summons, or discovery demand in

litigation) calling for the production of privileged information, Stone will promptly notify Client and will follow Client's reasonable instructions regarding any third party requests or needs for such material before we would disclose same as may be required under applicable law or rules. Client agrees to hold Stone harmless from and also assumes responsibility for any expenses (including attorney's fees, court costs, costs incurred by outside advisors, and any other costs imposed whether by way of penalty or otherwise) incurred by Stone as a result of Client's direction to Stone to assert the confidentiality privilege on behalf of Client.

19. Compliance

Stone, by virtue of providing services hereunder, does not assume Client's responsibility, liability or legal responsibility for the Site(s) or otherwise undertake Client's responsibility for reporting to any federal, state, or local public agencies any conditions at the Site(s) that may present a potential danger to public health, safety, or the environment. Client acknowledges that it is Client's responsibility to notify the appropriate federal, state, or local public agencies as required by law, or otherwise to disclose, in a timely manner, any information that may be necessary to prevent any danger to public health or safety, or other reporting or notifications required by law or regulation.

20. Proprietary Information of Stone

Stone wishes to protect its proprietary information (including, but not limited to, equipment designs, processes, custom software and databases, technology, specifications, photographs, technical information,





marketing strategies, and software) (the “Stone Information”). Client agrees to maintain the Stone Information in confidence. Client will not disclose the Stone Information to any third party, nor will Client use the Stone Information for any purpose not related to this Agreement. All proprietary rights (including but not limited to copyright, patent rights, and trade secrets) in and to the Stone Information shall remain property of Stone.

21. Electronic Copies of Agreement

The exchange of copies of this Agreement and of signature pages by facsimile transmission, by electronic mail in “portable document format” (“.pdf”) form, or by any other electronic means intended to preserve the original graphic and pictorial appearance of a document, or by combination of such means, shall constitute effective execution and delivery of this Agreement as to the Parties. Such a copy may be used in lieu of the original Agreement for all purposes, including admission in court as an original document in order to enforce this Agreement.

22. Miscellaneous

If Client engages Stone to provide services on behalf of or for the benefit of a third party, as a material inducement to Stone to enter the Agreement, Client represents and warrants that it has the authority and power to bind any such third party to this Agreement and that by Client’s signature on, or acceptance, of the Agreement, Client does bind such third party to this Agreement. If Stone in its sole discretion agrees in writing to a request by Client that Stone seek payment from such third party, Client will ensure that Stone receives payment for

Services. Upon Client’s acceptance of the Agreement, the terms of the Agreement shall constitute the entire understanding between the Parties and the full and final expression of such agreement superseding all prior and contemporaneous agreements, representations, or conditions, express or implied, oral or written. No provision of the Agreement may be waived, deleted, or modified in any manner, except pursuant to a written agreement between the Parties that states that the Parties intend to modify the Agreement and signed by both Parties. Any and all provisions of the Agreement which by their nature generally would be construed as surviving a termination of the Agreement, shall survive the completion of Services or the expiration, cancellation, or termination of any agreement between Stone and Client, and shall apply to the full extent permitted by law. Client may use its forms and agreements to administer any agreement between Stone and Client, but use of such forms shall be for convenience purposes only, and any provision therein that conflicts with a provision of the Agreement shall be deemed stricken and null and void. A Party giving or making any notice, request, demand, or other communication (each, a “Notice”) pursuant to the Agreement shall give Notice in writing by one of the following methods of delivery, each of which for the purposes of the Agreement shall be deemed to satisfy the requirement of “in writing”: personal delivery; registered or certified mail, return receipt requested, and postage prepaid; internationally recognized overnight courier, all fees prepaid; facsimile; or e-mail. Notice shall be provided to the persons identified in the Agreement.

23. Choice of Law

This Agreement shall be construed and governed in accordance with the laws of the



State of Vermont, excluding choice of law rules. The Client agrees to submit to the jurisdiction of the Courts of Vermont.

24. Arbitration

With the exception of suits for non-payment, all claims, counterclaims, disputes and other matters in question between the Parties hereto arising out of or relating to this Agreement or breach thereof shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association and the Vermont Arbitration Act. Any such arbitration shall take place in Montpelier, Vermont and all costs shall be paid by the Party requesting arbitration. No arbitration arising out of or relating to this Agreement shall include, by consolidation, joinder or in any other manner, any additional person not a party to this Agreement except by written consent containing a specific reference to this Agreement and signed by Stone, Client, and any other person sought to be joined.

Any consent to arbitration of any dispute not described therein or with an additional person or persons duly consented to by the parties to this Agreement shall be specifically enforceable under the prevailing arbitration law.

25. Acknowledgement of Arbitration

We, the undersigned, understand that this Agreement contains an agreement to arbitrate. After signing this document, we understand that we will not be able to bring a lawsuit concerning any dispute that may arise which is covered by the arbitration agreement, unless it involves a question of constitutional or civil rights. Instead, we agree to submit any such dispute to an impartial arbitrator.



**Appendix H: Developed Lands Phosphorus Reduction
Requirements by Lake Segment**

APPENDIX A – Lake Champlain TMDL Required Reductions per Lake Segment

Lake Segment	Developed Lands % Reduction	MS4s within Lake Segment
01. South Lake B	21.1%	---
02. South Lake A	18.1%	---
03. Port Henry	7.6%	---
04. Otter Creek	15.0%	Town of Rutland
05. Main Lake	20.2%	Burlington, Burlington International Airport, Colchester, Essex, Essex Junction, Milton, Shelburne, South Burlington, University of Vermont, Williston, Winooski
06. Shelburne Bay	20.2%	Burlington, Burlington International Airport, Shelburne, South Burlington, University of Vermont
07. Burlington Bay	24.2%	Burlington, South Burlington, University of Vermont
09. Malletts Bay	20.5%	Colchester, Essex, Essex Junction, Milton
10. Northeast Arm	7.2%	Town of St. Albans
11. St. Albans Bay	21.7%	City of St. Albans, Town of St. Albans
12. Missisquoi Bay	34.2%	Milton, Town of St. Albans
13. Isle La Motte	8.9%	---

Appendix I: Indian Brook Flow Restoration Plan

Appendix J: Sunderland Brook Flow Restoration Plan

Appendix K: Phosphorus Control Plan