



MUNROE BROOK FLOW RESTORATION PLAN

TCE# 14-042
Shelburne, Vermont

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Prepared For:
Town of Shelburne

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1) EXECUTIVE SUMMARY

The State of Vermont (VT) Agency of Natural Resources (ANR) Department of Environmental Conservation (DEC) has issued a National Pollutant Discharge Elimination System (NPDES) General Permit 3-9014 (2012) for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4). The VT MS4 permit requires communities that drain to waters impaired by stormwater runoff to develop Flow Restoration Plans (FRPs) capable of meeting the targets established in approved stormwater Total Maximum Daily Load (TMDLs). The purpose of this FRP is to identify stormwater Best Management Practices (BMPs), including retrofits to existing BMPs, that will be implemented in order to meet the established TMDL targets for Munroe Brook.

This FRP meets the attainment goals defined in the Munroe Brook TMDL approved by the United States Environmental Protection Agency (EPA) on August 21, 2008. The attainment goals set forth in the TMDL are defined in terms of flow modification in the stream. **The TMDL requires a 6.6% stream flow reduction in Munroe Brook during high flow events (Q0.3%)** and recommends a 9.5% increase in stream flow during low flow (Q95%) conditions (Table 1).

Table 1: Summary of Stormwater TMDL Flow Targets for Munroe Brook

Scenario	High Flow Target Reduction (%)	Low Flow Target Increase (%)
2013 Conditions	6.2	9.5
2013 Conditions with future growth (20 impervious acres)	6.6 ^a	9.5 ^b
2013 Conditions + no Agriculture	4.8	7.4
Current + no Agriculture + future growth ^c	5.2	7.4

^a TMDL flow reduction target of 6.6% (allocation of 4.8% from current urban/developed areas, 0.4% future development, and 1.6% agricultural areas)

^b TMDL flow increase target of 9.5% (allocation of 7.4% from current urban/developed areas, 0 % future development, and 2.1% agricultural areas)

^c Recommended TMDL targets for urban stormwater management only, 2003 conditions & no agriculture

In order to assess the impacts associated with construction of stormwater BMPs in the Munroe Brook watershed, VT DEC provided MS4 permittees with the Vermont Best Management Practice Decision Support System (VT BMP DSS) model. The BMP DSS model was created during the stormwater TMDL development process and is capable of estimating stream flow in Munroe Brook under current conditions. The model can also be modified to show the impact that new or retrofit stormwater BMPs will have on stream flow. Table 2 provides a summary of BMP DSS modeled stream flow in Munroe Brook for a number of model iterations.

Table 2: Summary of Munroe Brook Stream Flow Modeled at the Confluence of Lake Champlain

VT BMPDSS runs	Scenario Description	Area (acres)	Stream Flow (cfs)		% Flow Change from Base	
			High Q0.3	Low Q95	High Q0.3	Low Q95
ANR Original models	Attainment flow *		73.4	1.2		
	ANR Base (2002)	3,454	78.3	1.1	-	-
	ANR Credit (2013)	3,462	78.5	1.1	-0.3	-
Updated Models (1/8/15)	Attainment flow**		74.2	1.2		
	Revised Base	3,454	78.5	1.10	-	-
	Revised Credit	3,484	80.5	1.10	+2.6	-
	Flow Restoration Scenario 7	3,484	74.1	1.10	-5.6	-

* Reflects 6.2% reduction of ANR Base Q0.3 flow and 9.5% increase of ANR Base Q95 Flow

** Reflects 5.2% reduction (Current + No Agriculture + Future Growth Scenario) reduction of Revised Base Q0.3 flow and 9.5% increase of Revised Base Q95 Flow

In order to determine the BMPs necessary to meet TMDL flow targets, the MS4 permittees worked with an engineering consultant to find opportunities in the watershed where existing BMPs could be improved or new BMPs could be installed. This was an iterative process. New BMPs were identified and added to the model until the BMP DSS model output indicated that the required high flow reduction target was achieved. This occurred in iteration 7 of the BMP DSS model run, also known as Flow Restoration Scenario 7 (FRS7).

The low flow target, which was included in the TMDL as a recommendation, was not met. Conditions within the watershed, in particular soil types, are not able to accommodate the infiltration based BMPs that would help meet the low flow target. Given that the TMDL requires the high flow target be met, but only recommends that the low flow target be achieved, this FRP has prioritized BMPs which help to meet the high flow target. This resulted in inclusion of detention based BMPs, which do not increase stream flow during low flow conditions.

The final BMP plan included in the Munroe Brook FRP includes 10 BMPs that are already in place and 20 new or retrofit BMPs. Construction of these BMPs has been scheduled so that work is completed before December 5, 2032, as required by the VT MS4 permit. It is estimated that construction of these BMPs will cost approximately \$7.2M.

2) INTRODUCTION

Vermont DEC issued a revised NPDES General Permit 3-9014 for Stormwater Discharges from Small MS4's in 2012. The revised MS4 permit required communities that drain to waters impaired by stormwater runoff to develop FRPs capable of meeting the targets established in approved stormwater TMDLs.

The purpose of this FRP is to identify stormwater BMPs, including retrofits to existing BMPs, that will be implemented in order to meet the established TMDL targets for Munroe Brook. The ultimate goal of this FRP is to restore Munroe Brook so that it is removed from the State's list of impaired waters.

Munroe Brook is currently included on the Vermont 303(d) list of impaired waters. The source of impairment is identified as unmanaged stormwater runoff. MS4 permittees discharging to Munroe Brook are required to create a FRP for all stormwater impaired waters within their jurisdiction. The Munroe Brook impaired watershed is located almost entirely within the Town of Shelburne, with the exception of a small portion along the northern boundary that is located in the City of South Burlington. VTrans, which has been designated a Non-Traditional MS4, also has jurisdiction over portions of the drainage area along the U.S. Route 7 corridor.

VT DEC prepared, and the United States EPA approved, a stormwater TMDL for the Munroe Brook watershed in 2008. The *Total Maximum Daily Load to Address Biological Impairment in Munroe Brook* (September 2008) document includes an aggregate Waste Load Allocation (WLA), which applies to various watershed sources. No specific WLA was specified for MS4 sources. **The attainment goals set forth in the Munroe Brook TMDL are defined as stream flow targets. The TMDL requires a reduction in stream flow during high flow events (Q0.3%) and recommends an increase in stream flow during low flow (Q95%) conditions.**

3) WATERSHED MODELING

In order to assess the impacts associated with construction of stormwater BMPs in the watershed, Vermont DEC provided MS4 permittees with the VT BMP DSS model. The VT BMP DSS model was created during the TMDL development process and is capable of estimating stream flow under current conditions as well after stormwater BMPs are installed in the watershed.

BMPs were identified and incorporated into the VT BMP DSS watershed model in an iterative fashion. Identified BMPs were added to the VT BMP DSS model, which then

assessed the impact on stream flow. Potential BMPs were identified and included in the model over 7 iterations. The results of these BMP iterations are summarized in Table 3.

Additionally, drainage area information for existing BMPs was updated in the BMP DSS model. Review of the GIS mapping and field verification showed an increase in the overall watershed area of approximately 30 acres. This change resulted in a 2.6% increase in peak flow, as indicated in Table 3.

Table 3: Summary of BMP DSS Model Runs

VT BMPDSS runs	Scenario Description	Area (ac)	Flow (cfs)		% Flow Change from Base	
			High Q0.3	Low Q95	High Q0.3	Low Q95
ANR Original Model Runs	Attainment flow *		73.4	1.2		
	ANR Base (2002)	3,454	78.3	1.1	-	-
	ANR Credit (2013)	3,462	78.5	1.1	-0.3	-
Updated VT BMP DSS Model Runs	Attainment flow**		74.2	1.2		
	Revised Base	3,454	78.5	1.08	-	-
	Revised Credit	3,484	80.5	1.08	+2.6	0
	FRS1	3,484	77.3	1.08	-1.5	0
	FRS2	3,484	77.5	1.08	-2.1	0
	FRS3	3,484	75.9	1.08	-3.4	0
	FRS4	3,484	74.7	1.08	-4.9	0
	FRS5	3,484	74.1	1.08	-5.7	0
	FRS6	3,484	74.2	1.08	-5.4	0
FRS7	3,484	74.1	1.08	-5.6	0	

* Reflects 6.2% reduction of ANR Base Q0.3 flow and 9.5% increase of ANR Base Q95 Flow

** Reflects 5.2% reduction (Current + No Agriculture + Future Growth Scenario) of Revised Base Q0.3 flow and 9.5% increase of Revised Base Q95 Flow

The BMPs included in the final BMP DSS model run will meet the high flow reduction target of the TMDL of 5.2%. This addresses peak flow requirements for developed land along with a projected non-jurisdictional growth of 20 acres of impervious surface in the Munroe Brook Watershed. This FRP does not address flow reduction requirements for agricultural areas within the watershed.

The TMDL's recommended low flow target is not met. This is the result of detention based BMPs being utilized to meet the high flow target. Detention based BMPs do not provide a significant improvement in stream flow during low flow conditions. Infiltration based BMPs would serve to meet both the high and low targets simultaneously. Based on information provided by web soil survey data and site observations, there was little opportunity for inclusion of infiltration based BMPs in the Munroe Brook watershed. However, soil borings were not carried out at BMP site locations, as projects included in the VT BMP DSS model were only developed to a concept level. It is recommend that as project design and engineering moves forward that each project be evaluated for additional opportunities to provide infiltration based on actual soil boring data. This

could increase recharge to groundwater, which would in turn increase stream flow during the low flow condition.

4) IDENTIFICATION OF REQUIRED CONTROLS

In 2014 site visits were performed throughout the Munroe Brook watershed to identify and evaluate existing stormwater BMPs that were candidates for retrofits as well as find locations for new BMPs. The BMPs included in this FRP are based on the results of this field work, potential construction costs, and the BMPs performance in the VT BMP DSS model. In general, priority was given to retrofit BMPs as they typically provide a better cost/benefit ratio than construction of new BMPs.

Each potential BMP site was reviewed to determine its ability to meet the channel protection criteria (CPv) from the 2002 Vermont Stormwater Management Manual. The CPv criteria requires 12 hour detention of stormwater runoff during the 1-year, 24-hour storm event in cold water fish habitats and 24 hour detention in warm water fish habitats. Munroe Brook is classified as a warm water fish habitat; therefore BMPs were designed to meet the 24-hour detention standard. Since the 1-year, 24-hour storm event is a close approximation to the storm event associated with the Q0.3 flow defined in the TMDL this criterion was utilized as part of the FRP evaluation. Hydrologic modeling for BMPs is provided in Appendix B.

As previously noted, BMPs included in the final FRP were only developed to a concept level. Significant field work was performed to identify and screen candidate sites, but this work did not include a detailed hydrologic analysis, property research, site engineering, wetlands delineation, and other necessary studies which will be required to move these projects towards a final engineering design and ultimately construction. There may be constraints that prevent certain BMPs from being utilized, either wholly or in part, in the FRP. **All BMP sites included in this FRP will require additional permitting, engineering and design work to determine the feasibility of installing a BMP in the specified location.**

Table 4 lists the BMPs included in this FRP and provides general information about each BMP. Detailed information for each BMP, including maps, can be found in Appendix A. All of the BMPs included in Table 4 have been incorporated into the BMP DSS model. If the BMP includes a note that indicates "No change" then this BMP will not require additional work. If either already meets the current design standards (2002) or retrofits of this BMP did not provide any additional benefit in the BMP DSS model.

Table 4: Summary of Best Management Practices Included in Munroe Brook Flow Restoration Plan

BMP ID #	Model ID	State Permit Number	Site Name	BMP Type	Notes
M01	134	1-0607 A	Westview Estates	Wet Pond	Retrofit outlet structure, lower permanent pool
M02	135	1-0607 B	Westview Estates	Wet Pond	Retrofit outlet structure, lower permanent pool
M03	138	1-0732 B	Deer Run	Wet Pond	Retrofit outlet structure
M04	140	1-0732 C	Farmstead Drive	Detention Pond	No change, BMP to be verified installed as assumed
M05	142	1-1155 P2	Pinnacle at Spear	Wet Pond	Retrofit outlet structure, converted to wet pond
M06	143	1-1155 P5	Pinnacle at Spear	Detention Pond	Retrofit outlet structure
M07	148	1-1155 P3	Pinnacle at Spear	Detention Pond	Retrofit outlet structure
M08	150	1-1291	Route 7	Wet Pond	Storage expanded with underground storage
M09	152	1-1390	Automaster Mini	Detention Pond	Retrofit outlet structure
M10	154	1-1400 A	Shelburne Meadows Business Park	Detention Pond	Retrofit outlet structure, expanded storage
M11	156	1-1400 B	Shelburne Meadows Business Park	Detention Pond	Retrofit outlet structure
M12	158	1-1534	Boulder Hill	Detention Pond	Retrofit outlet structure, expanded storage
M13	160	6959-INDO	Roberts Mini Storage	Detention Pond	No change
M14	161	6959-INDO	Roberts Mini Storage	Detention Pond	No change
M15	171	4444-INDS	Sutton Farms	Wet Pond	No change
M16	176	3443-INDS 2	South Pointe	Detention Pond	Retrofit outlet structure
M17	178	4096-INDS P3	South Village	Wet Pond	No change
M18	180	4096-INDS P1	South Village	Wet Pond	No change
M19	182	4096-INDS P2	South Village	Wet Pond	No change
M20	185	3928-INDO	Hullcrest Park	Detention Pond	No change
M21	193	6938-INDS P1	Automaster Parking Expansion	Detention Pond	No change

M22	194	6938- INDS P2	Automaster Parking Expansion	Detention Pond	No change
M23	195	6909- INDS	Lilly Creek	Detention Pond	No change
M27	199	1-0732 A	Deer Run	Wet Pond	New BMP (located where BMP was never built)
M28A	205	N/A	Shelburne Camping	Wet Pond	New BMP
M28B	206	N/A	Shelburne Camping	Wet Pond	New BMP
M29	207	N/A	Shelburne Commons- Rice Lumber	Wet Pond	New BMP
M32	201	N/A	Drew Lane	Wet Pond	New BMP
M34	208	N/A	Hullcrest South	Wet Pond	New BMP
M35	203	N/A	Morse Drive Neighborhood	Wet Pond	New BMP

5) DESIGN AND CONSTRUCTION SCHEDULE

A design and construction schedule is a required element of the final FRP. This schedule must show how the proposed BMPs included in the FRP can be implemented over a timeframe of less than 20 years from the date of MS4 permit issuance. This means that all BMPs associated with FRPs must be implemented prior to December 5, 2032.

The BMPs included in this FRP were scheduled with consideration given to expired permit sites, performance in the watershed, and estimated construction costs. As retrofit BMPs typically provide a better cost/benefit ratio than construction of new BMPs, retrofit projects were placed toward the front end of the construction schedule. A final BMP implementation schedule is included in Table 5.

The BMP schedule presented in this FRP is expected to receive updates on an annual basis. Projects will be added, modified, or removed as necessary to meet FRP flow targets and respond to real world conditions. This is necessary primarily due to the fact that the BMPs presented in this FRP have only been developed to concept level planning. It is reasonable to anticipate that changes will occur when these concepts are further developed. Depending on actual circumstances, the level of treatment achieved may be more or less than the level of treatment anticipated (e.g. variations in soil conditions allow for either more or less infiltration of stormwater runoff than originally anticipated). These type of modifications are common when advancing BMP plans from concept to final design. Therefore, flexibility in the schedule is necessary to accommodate these changes.

Additionally, in order for project implementation to move forward in a cost effective manner, the MS4s will need to take advantage of opportunities for stormwater improvements as they present themselves. For example, a private property owner may decide to redevelop their property on a schedule that was not anticipated in the current BMP implementation schedule. If this occurs, the MS4s may need to shift

available resources from a scheduled project in order to take advantage of a cost savings opportunity.

Finally, projects may need to be shifted in the BMP schedule based on Vermont's changing regulatory system. VTDEC is currently developing an implementation plan for the Lake Champlain Phosphorous TMDL. When this document is finalized, the MS4 permit will require regulated entities to develop Phosphorus Control Plans (PCPs), similar in size and scope to the FRPs being developed as part of stormwater TMDLs. When this occurs, the FRPs will likely need to be revised based on PCP requirements, which are yet to be defined by VTDEC.

Table 5: BMP Implementation Schedule

Project ID	Project Name	Project Rank	BMP Description	Construction Fiscal Year
M2	Westview Estates	1	Wet Pond	2019
M1	Westview Estates	2	Wet Pond	2019
M3	Deer Run	4	Wet Pond	2020
M10	Shelburne Meadows Business Park	3	Detention Pond	2021
M11	Shelburne Meadows Business Park	6	Detention Pond	2021
M4	Farmstead Drive	5	Detention Pond	2022
M5	Pinnacle @ Spear		Wet Pond	2022
M6	Pinnacle @ Spear		Detention Pond	2022
M7	Pinnacle @ Spear		Detention Pond	2022
M9	Automaster (CEA 99 design)	7	Detention Pond	2023
M32	Drew Lane	11	Wet Pond	2023
M16	South Pointe		Detention Pond	2023
M29	Shelburne Commons-Rice Lumber	10	Wet Pond	2024
M27	Deer Run	8	Wet Pond	2025
M12	Boulder Hill	9	Detention Pond	2026
M35	Morse Drive Neighborhood	12	#N/A	2027
M28B	Shelburne Camping	15	Wet Pond	2028
M28A	Shelburne Camping	16	Wet Pond	2028
M34	Hullcrest South	14	#N/A	2029
M8	Route 7	13	Wet Pond	2030
M13	Roberts Mini Storage		Detention Pond	NA
M14	Roberts Mini Storage		Detention Pond	NA

M15	Sutton Farms		Wet Pond	NA
M17	South Village		Wet Pond	NA
M18	South Village		Wet Pond	NA
M19	South Village		Wet Pond	NA
M20	Hulcrest Park		Detention Pond	NA
M21	Automaster Parking Expansion		Detention Pond	NA
M22	Automaster Parking Expansion		Detention Pond	NA
M23	Lilly Creek		Detention Pond	NA

6) FINANCIAL PLAN

Subject to the requirements of the MS4 permit, a financial plan is required as part of the final FRP. This plan must provide initial BMP cost estimates and demonstrate the means by which BMP implementation will be financed. The financial plan must also include the steps that each MS4 will take to implement the finance plan.

Costs for implementing each BMP were estimated based on a Tetra Tech, Inc. memorandum dated October 30, 2007 (Appendix C). This memorandum provided a methodology for estimating BMP construction costs based on simple BMP attributes. The methodology utilized a construction cost base year of 2000. In order to more accurately estimate these costs over the FRP's 20 year implementation schedule a 2.5% annual inflation rate was applied. Therefore, the estimated costs presented in this FRP reflect anticipated construction costs in the year 2032. While it is likely that many, if not all, of the BMPs will be constructed prior to the year 2032 utilizing these costs provide a margin of safety that will be useful for financial planning. Total project costs were calculated based on the following equation:

$$\text{Total Cost} = \text{Installation Cost (I)} + \text{Land Cost (L)} + \text{Fixed Cost (F)}$$

Where:

I = \$5/cf of CPv detention, inflated at 2.5% to year 2032 = \$11/cf (\$479,160/acre-foot)

L = \$0 as it is not anticipated that it will be necessary to purchase property

F = Design/permitting costs. Varies depending on whether a large project or simple retrofit BMP

For new BMPs and retrofits requiring storage expansion, the Installation Cost (I) value was calculated using the volume of the BMP. For retrofits requiring only a modification to the outlet structure, the I value was estimated based on conservative engineering judgement. In these cases, a minimum I value of \$20,000 was utilized. The Fixed Cost (F) value for BMPs varies based on percentage of Installation Costs, with 5% of the estimated Installation Cost used for large projects and 20% of the estimated Installation

Cost used for small retrofit projects. This reflects a minimum Fixed Cost regardless of project scope. Estimated construction costs for each BMP are shown in Table 6. BMPs with no associated costs have been included in the BMPDSS model as they currently exist. Therefore, no additional implementation costs are anticipated for these BMPs.

The costs included in Table 6 are planning level estimates only. Unforeseen constraints or other factors have the potential to increase or lower the implementation cost of BMPs. These values should be reevaluated during the engineering design process.

Each MS4 that drains to Munroe Brook must determine how it will fund its portion of the FRP. The **Town of Shelburne currently pays for stormwater related costs utilizing the General Fund derived by tax revenue.** The implementation costs associated with this FRP will require a significant increase in expenditures. Shelburne is currently evaluating options for raising additional funds to pay for FRP related work. One option **under evaluation is the implementation of a stormwater utility** or a similar stormwater fee based on impervious area.

In addition to local funding sources, it is the **Town's expectation that significant funding from the State of Vermont and other Federal sources will be available to help with the cost of stormwater TMDL implementation.** The State of Vermont has already taken initial steps towards providing this funding. In 2015 the Vermont legislature created the Clean Water Fund **(CWF)**. The CWF was provided with \$2,005,000 in 2015, and \$7,688,000 in 2016. While these initial investments are not at the level necessary to provide significant funding to the MS4 communities subject to stormwater TMDLs, it is the Town's understanding that the State is working to provide additional funding to the CWF in the future. In December 2016, the State Treasurer and State agencies will be delivering a report to the Vermont legislature that provides options for raising significant money to fund the CWF. **The Town will also pursue funding from existing and new grant sources from other organizations including, but not limited to VTDEC, the Vermont Agency of Transportation, and the Lake Champlain Basin Program.**

Table 6: BMP Cost Estimates

BMP ID #	Site Name	Storage Volume (Acre-Feet)	I	F	Total
M1	Westview Estates	N/A	\$20,000	\$4,000	\$24,000
M2	Westview Estates	N/A	\$20,000	\$4,000	\$24,000
M3	Deer Run	N/A	\$20,000	\$4,000	\$24,000
M4	Farmstead Drive	N/A	\$20,000	\$4,000	\$24,000
M5	Pinnacle @ Spear	N/A	\$20,000	\$4,000	\$24,000
M6	Pinnacle @ Spear	N/A	\$20,000	\$4,000	\$24,000
M7	Pinnacle @ Spear	N/A	\$20,000	\$4,000	\$24,000
M8	Route 7	2.31	\$1,104,464	\$55,223	\$1,159,687
M9	Automaster (CEA 99 design)	N/A	\$20,000	\$4,000	\$24,000
M10	Shelburne Meadows Business Park	0.60	\$287,496	\$14,375	\$301,871
M11	Shelburne Meadows Business Park	N/A	\$20,000	\$4,000	\$24,000
M12	Boulder Hill	2.51	\$1,204,608	\$60,230	\$1,264,838
M13	Roberts Mini Storage	N/A	N/A	\$0	\$0
M14	Roberts Mini Storage	N/A	N/A	\$0	\$0
M15	Sutton Farms	N/A	N/A	\$0	\$0
M16	South Pointe	N/A	\$20,000	\$4,000	\$24,000
M17	South Village	N/A	N/A	\$0	\$0
M18	South Village	N/A	N/A	\$0	\$0
M19	South Village	N/A	N/A	\$0	\$0
M20	Hullcrest Park	N/A	N/A	\$0	\$0
M21	Automaster Parking Expansion	N/A	N/A	\$0	\$0
M22	Automaster Parking Expansion	N/A	N/A	\$0	\$0
M23	Lilly Creek	N/A	N/A	\$0	\$0
M27	Deer Run	0.51	\$242,934	\$12,147	\$255,081
M28A	Shelburne Camping	0.34	\$164,831	\$8,242	\$173,073
M28B	Shelburne Camping	0.60	\$286,059	\$14,303	\$300,362
M29	Shelburne Comms-Rice	3.57	\$1,709,643	\$85,482	\$1,795,125
M32	Drew Lane	0.87	\$416,869	\$20,843	\$437,712
M34	Hullcrest South	1.53	\$731,677	\$36,584	\$768,261
M35	Morse Drive Neighborhood	1.12	\$534,743	\$26,737	\$561,480

Total \$7,257,490

7) REGULATORY ANALYSIS

The VT MS4 permit requires that final FRPs include a regulatory analysis that identifies and describes what, if any, additional regulatory authorities the permittees will need to implement the FRP. Stormwater runoff in the Munroe Brook watershed is currently regulated by the VT DEC stormwater program which regulates new, expanded, or redeveloped sites as dictated by the Stormwater Management Rule for Impaired Waters (Environmental Protection Rules, Chapter 22), by the Town of Shelburne and City of South Burlington through zoning regulations and ordinances, and by VTtrans through 19 V.S.A.1111 which covers discharges in State Right of Ways.

At this time, and based on the above existing regulatory authorities, the MS4s do not anticipate the need for additional regulatory authorities in order to implement the Munroe Brook FRP.

8) REGULATORY ASSISTANCE

The MS4 permit requires this FRP to identify any regulatory assistance the permittees will need from the Secretary in order to implement the FRP, such as use of Residual Designation Authority (RDA) pursuant to 40 C.F.R. §122.26. Based on the above regulatory analysis, and the fact that the BMPs identified in this FRP are capable of meeting the requirements of the TMDL, it is not anticipated that additional regulatory assistance will be necessary to implement the FRP at this time.

9) THIRD-PARTY IMPLEMENTATION

The MS4 permit requires the identification of any party, other than the MS4 permittees, that is responsible for implementing any portion of the FRP. There are several properties in the Munroe Brook watershed that are covered by expired State of Vermont stormwater permits. Some of these sites are located on private property. Properties covered by expired permits may be required to retrofit and/or construct BMPs to meet the level of treatment described in this FRP. The controlling interest of these permits will have the ability to obtain valid permit coverage under an existing Vermont DEC permit programs (e.g. the RDA permit or an individual stormwater permit). The Town of Shelburne is also considering allowing expired permit holders to transfer these permits under the Town's MS4 permit coverage. The details of this transfer are still being evaluated.

10) SUMMARY & IMPLEMENTATION

This FRP was developed for the MS4 permittees located within the Munroe Brook watershed. The proposed BMPs were identified via preliminary field work and discussions with the MS4 permittees. While the BMPs included in this FRP are capable of meeting the requirements of the TMDL, there are likely other combinations of BMPs that are also capable of meeting these same requirements. The permittees are not strictly bound to the BMPs included in this document and plan to make adjustments to this FRP, as necessary over the implementation schedule, in order to achieve the required TMDL stream flow target.

As this FRP is implemented the VT BMP DSS model will be updated to show the impacts of the BMPs as they are actually constructed. The BMP DSS model will also be updated to account for any other changes that occur in the watershed.

Appendix A: Overall BMP Maps and Individual BMP Information

Appendix B: HydroCAD Model Outputs

**Appendix C: Tetra Tech Memorandum dated
October 30, 2007**