



October 1, 2016
File: 195311311

Attention: Christy Witters, MS4 Permit Coordinator

Vermont DEC – Watershed Management Division
Stormwater Management Program
One National Life Drive, Main 2
Montpelier, VT 05620-3522

Dear Christy,

**Reference: Burlington International Airport (BTV)
Semi-Annual Flow Restoration Report for Permit No. 7021-9014 (MS4)
including Flow Restoration Plan and MS4 Incorporation Forms for State Issued
Stormwater Permits**

On behalf of the Burlington International Airport (BTV), we are pleased to provide the Semi-Annual Flow Restoration Report for Permit No. 7021-9014 (MS4) including Flow Restoration Plan (FRP) and MS4 Incorporation Forms for State Issued Stormwater Permits.

As part of this submission, we formally request incorporation of BTV's ten (10) currently active Operational Stormwater Discharge Permits into BTV's General Permit 3-9014 (2012) MS4 authorization.

Please find enclosed the following information for your review:

1. *Flow Restoration Plan including FRP status updates.*
2. *Notice of Intent for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4) General Permit 3-9014 including:*
 - *Notice of Intent for General Permit 3-9014 (MS4) dated September 30, 2016*
 - *MS4 Incorporation Forms for each of the ten operational permits*
 - *Designer's Statement of Compliance for each of the ten operational permits*
 - *Copy of each permit for references purposes*
3. *Stormwater Management Program (SWMP) – Volume 1 revisions dated September 30, 2016.*
4. *SWMP -- Volume 2 (the Stormwater Pollution Prevention Plan) revisions, dated September 30, 2016.*

No changes or revisions were made to Volume 3 of the SWMP.

5. *CD containing the electronic files of the above referenced materials.*



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including Flow Restoration Plan and MS4 Incorporation Forms for State Issued Stormwater
Permits**

Should you have any questions, or require further information, please do not hesitate to contact us.

Regards,

STANTEC CONSULTING SERVICES INC.

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cc: Amanda Clayton, P.E., MBA (BTV Director of Engineering and Environmental Compliance)
Jon B. Leinwohl, P.E. (Stantec)
Stantec File

**Burlington International Airport
Semi-Annual Flow Restoration Report
for Permit No. 7021-9014 (MS4)
including
Flow Restoration Plan**

General Permit 3-9014 (2012)

Prepared for:



Burlington International Airport
South Burlington, Vermont

Prepared by:



Stantec Consulting Services, Inc.
55 Green Mountain Drive
South Burlington, VT 05403

September 30, 2016

**BURLINGTON INTERNATIONAL AIRPORT
SEMI-ANNUAL FLOW RESTORATION REPORT FOR PERMIT NO. 7021-9014 (MS4)
INCLUDING
FLOW RESTORATION PLAN**

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1.0 INTRODUCTION

On behalf of the City of Burlington, Burlington International Airport (BTV), this report shall serve as BTV's Semi-Annual Flow Restoration Plan (FRP) Report for Permit No. 7021-9014 [Municipal Separate Storm Sewer System (MS4) General Permit 3-9014]. This semi-annual report details BTV's development and implementation progress of the FRP through October 1, 2016. The report includes BTV's FRP, a description of the Flow Monitoring Program Memorandum of Agreement between the MS4 entities, a status update on the incorporation of expired permits, and a request to incorporate existing operational stormwater permits into MS4 jurisdiction.

2.0 FLOW RESTORATION PLAN

BTV has five outfalls that discharge to Potash Brook, a stormwater impaired water with an approved Total Maximum Daily Load (TMDL). The outfalls discharge to a Class 2 wetland that is contiguous to Potash Brook. In addition, BTV has one non-point source discharge to Centennial Brook, another stormwater impaired water with an approved TMDL. As such, BTV is responsible for development and implementation of an FRP for the portions of the Potash Brook and Centennial Brook watersheds within its boundaries. MS4 communities that discharge into the same stormwater impaired watershed may elect to cooperate to develop a single FRP for the watershed. To that end, BTV is collaborating with the City of South Burlington on these FRPs.

The City of South Burlington has developed an FRP for the Potash Brook watershed. Once approved by the Vermont Department of Environmental Conservation (VTDEC), the Potash Brook FRP will become part of the Stormwater Management Plans (SWMPs) prepared by the MS4 permittees in the Potash Brook watershed, including the City of South Burlington, the Vermont Agency of Transportation (VTrans), the City of Burlington, the University of Vermont (UVM), and BTV. The Potash Brook FRP will act as a guidance document for the MS4 entities as they implement the stormwater Best Management Practices (BMPs) necessary to attain the flow restoration targets established by the Potash Brook TMDL. The Potash Brook TMDL was approved by the U.S. Environmental Protection Agency (EPA) on December 19, 2006. The TMDL suggests an 11.2% increase in stream flow during low flow conditions, and requires a 16.5% reduction in stream flow during high flow conditions (established as the 1-year storm event).

The City of South Burlington has also developed an FRP for the Centennial Brook watershed, which will act as a guidance document for the MS4 entities as they implement the stormwater BMPs necessary to attain the flow restoration targets established by the Centennial Brook TMDL. The Centennial Brook TMDL was approved by the U.S. EPA on September 28, 2007. This TMDL suggests a 23.2% increase in stream flow during low flow conditions, and requires a 63.4% reduction in stream flow during high flow conditions (established as the 1-year storm event). The Chittenden County Regional Planning Commission (CCRPC) completed a study in July, 2013 to



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estimate the expected non-jurisdictional impervious area future growth in the Centennial Brook watershed over the next 20 years. The CCRPC study resulted in a reduction of the high flow target from 63.4% to 51.6%, and this is the target used in the City of South Burlington's Centennial Brook FRP.

In accordance with the requirements in the MS4 General Permit, the FRP for discharges to impaired waters with an approved TMDL (Potash Brook and Centennial Brook) will contain the following elements:

- Identification of Required Controls
- Design and Construction Schedule
- Financial Plan
- Regulatory Analysis
- Identification of Regulatory Assistance
- Third-Party Implementation

Details on each of these elements are provided below.

2.1 IDENTIFICATION OF REQUIRED CONTROLS

The FRPs for Potash Brook and Centennial Brook identify a suite of stormwater BMPs that will be used to achieve the flow restoration targets. The Potash Brook FRP identifies a total of 107 sites, while the Centennial Brook FRP identifies a total of 27 sites within the watershed. According to the MS4 General Permit, if a stormwater-impaired watershed includes lands outside the boundaries of a small MS4 permittee, the FRP shall address the permittee's commensurate share of necessary BMP implementation based on percent impervious land cover.

To that end, the City of South Burlington has developed a list of BMPs to achieve its flow restoration targets, and BTV is collaborating with the City of South Burlington to achieve the flow restoration targets within the BTV MS4 area of Potash and Centennial Brooks.

BTV's commensurate share is a small fraction of the total impervious area within the Potash Brook watershed. According to the Potash Brook FRP Allocation Tables, BTV owns 72.1 acres within the watershed, with 31.99 acres of impervious cover. This represents 3.5% of the total watershed impervious cover, and 0.6% allocation of target high flow reduction.

The City of South Burlington's Potash Brook FRP identifies one (1) BMP that could address BTV's commensurate share of flow restoration responsibility in this area.

- South Burlington ID PB0009 includes a proposed subsurface infiltration gallery to be constructed near Airport Drive and Airport Road, where a house was removed in 2015. A stormwater line along Airport Drive would be intercepted and conveyed to this infiltration gallery (see Appendix A).



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BTV's commensurate share of the Centennial Brook watershed is a small percentage of the total impervious area within the watershed. According to the Centennial Brook FRP Allocation Tables, BTV owns 23.4 acres within the watershed, with 3.1 acres of impervious cover. This represents 1.1% of the total watershed impervious cover, and 0.6% allocation of target high flow reduction.

The City of South Burlington has identified three (3) BMPs in the Centennial Brook FRP for which BTV could achieve its commensurate share of the flow restoration targets (see Appendix A).

- South Burlington ID CB0008/Retrofit #21: Dumont Avenue. This includes construction of a subsurface infiltration gallery on Dumont Avenue. This would include diverting flow from catch basins to underground recharge chambers on an empty lot, with ultimate discharge to an existing pipe outlet to Centennial Brook.
- South Burlington ID CB0018/Retrofit #200 includes construction of an infiltration gallery on North Henry Court. This area is currently a dead end road with excess impervious area. The proposed project includes construction of a rain garden/bioswale with an overflow to a leaching catch basin at the end of the road.
- South Burlington ID CB0023/Retrofit #25, the Picard Circle Infiltration Gallery, includes construction of a subsurface infiltration gallery within the lots acquired by BTV where houses were removed in 2015.

2.2 DESIGN AND CONSTRUCTION SCHEDULE

The Potash Brook and Centennial Brook FRPs include a design and construction schedule for the identified BMPs. These schedules include a discussion of any permits or other regulatory approvals necessary for implementation of the required BMPs. The schedules provide for implementation of the required BMPs as soon as possible, but no later than 20 years from MS4 permit issuance. The schedule for the Potash Brook BMPs concludes before December 5, 2032.

The Design and Construction schedule takes into account project ranking, cost, and overall watershed benefit with various adjustment factors. The BTV associated BMPs described above have the following implementation schedules and costs:

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Table 1. BMP Implementation and Costs

BMP Name	Proposed Implementation	Estimated Project Cost 2014	Estimated Project Cost with Inflation
PB0009, Airport Drive	FY 2025	\$439,000	\$608,000
CB0008/Retrofit #21. Dumont Ave Infiltration Gallery	FY 2020	\$27,000	\$32,000
CB0018/Retrofit #200. North Henry Court	FY 2032	\$27,000	\$46,000
CB0023/Retrofit #25. Picard Circle Infiltration	FY 2020	\$318,000	\$380,000

2.3 FINANCIAL PLAN

A financial plan that estimates the costs for implementing the BMPs and describes a strategy for financing is a required element of the FRP. The financing plan includes the steps each permittee will take to implement the financing plan. The City of South Burlington Potash Brook and Centennial Brook FRPs include cost estimates for each of the BMPs, using 2014 cost estimates with an annual 3% inflation rate as noted above.

The VTDEC and the contributing MS4s permittees within these watersheds have signed a Memorandum of Agreement (MOA) to perform monitoring and other data collection required under the MS4 permitting program. Each MS4 permittee, including BTV, has been assigned a percentage of the total cost of the contracted work over a five year timeframe (see attached Appendix B). This type of collaborative arrangement will also apply to implementation and financing of the BMPs.

As described in the FRPs, it is the City of South Burlington'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. In 2015 the Vermont legislature created the Clean Water Fund (CWF). This fund was provided with \$2,005,000 in 2015 and \$7,688,000 in 2016, and will likely receive additional funding in the years to come. The City of South Burlington and BTV intend to work closely with legislative representatives to ensure that this funding is made available for the stormwater improvements included in the FRPs.

BTV also intends to seek funding for implementing its commensurate share of the BMPs within the watersheds, including requests from the CWF and other sources. BTV is committed to



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participating in a cost share with the City of South Burlington to implement its FRP in a manner that is fair and reasonable for the airport. It is also noted that BTV reserves the right to achieve its FRP commitments through implementing projects of its own choosing that may not be identified on South Burlington's present list of proposed watershed improvement projects.

2.4 REGULATORY ANALYSIS

A regulatory analysis that identifies and describes what, if any, additional regulatory authorities the permittee will need in order for the permittee to implement the FRP, including but not limited to the authority to require low impact development BMPs, is a required element.

BTV's stormwater is regulated by VTDEC, and projects must also be in compliance with FAA requirements. As such, any proposed BMP to be implemented by BTV must comply with both VTDEC and FAA regulations. These will be verified as projects develop.

Low impact development BMPs do not apply to BTV because BTV does not have any landowners within its jurisdiction.

2.5 IDENTIFICATION OF REGULATORY ASSISTANCE

According to the MS4 Permit, the FRP will include an identification of regulatory assistance that the permittee will need from the Secretary in order to effectively implement the FRP. This should include an assessment of aspects of the FRP where the regulatory analysis indicates that the permittee's authority may not be sufficient to effectively implement the FRP.

Identification of regulatory assistance does not apply to BTV.

2.6 THIRD-PARTY IMPLEMENTATION

In accordance with the MS4 permit, an FRP requires identification of the name of any party, other than the permittee, that is responsible for implementing any portion of the FRP.

BTV anticipates working with South Burlington to implement the Potash Brook and Centennial Brook FRPs, including the design and construction schedules for those BMPs identified as its commensurate responsibility. BTV also reserves the right to implement a BMP of its own choosing, if appropriate. As an example, this may include removal of all BTV-owned impervious surfaces located within the Centennial Brook watershed in order to achieve the required flow reduction.

2.7 SUMMARY

This FRP was completed to meet the requirements of the MS4 general permit. In accordance with the General Permit 3-9014, the MS4s are required to submit a final FRP to VTDEC no later



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than three (3) years from the date of the permit reauthorization, or October 1, 2016. This FRP, and the Potash Brook and Centennial Brook FRPs referenced herein, fulfill those requirements.

The Potash Brook and Centennial Brook FRPs will become a part of BTV's SWMP upon approval by the Secretary of VTDEC. Once approved, the contributing MS4s are required to implement the FRPs. A description of the progress toward the flow target reductions will be included in BTV's MS4 annual reports.

3.0 FLOW MONITORING PROGRAM

In September of 2015, VTDEC received bids from three independent contractors/consultants to perform a joint MS4 flow monitoring program. Under the proposed flow monitoring program, eleven stream gauge stations will be established and maintained for a period of three years with an option for two additional years. After bid review by DEC and selected MS4 community representatives, Stone Environmental, Inc., of Montpelier, Vermont was selected as the primary consultant for establishing and maintaining the stream gauge stations.

During review of the bids, several cost allocation formulas for covering the cost of the flow monitoring program were circulated and reviewed amongst all MS4 communities. A proposed formula was subsequently agreed upon by all MS4 communities, including BTV.

A draft Memorandum of Agreement (MOA) between VTDEC and the MS4 communities, including proposed cost allocations, was circulated to MS4 communities in November, 2015 for review. The final MOA was subsequently issued for public notice beginning on November 17, 2015, and extending through December 17, 2015. No external comments were received during the public notice period. The final MOA was distributed to MS4 community members for approval and signature on February 22, 2016.

The final cost sharing for BTV includes \$3,623 for Year 2017, \$2,805 for Year 2018, \$2,796 for Year 2019, \$2,087 for Year 2020, and \$2,140 for Year 2021. The fees will begin for Fiscal Year 2017 with invoices to be sent out to individual MS4 communities on July 1, 2016. Invoices will be due May 1, 2017. A copy of the final signed MOA is provided in Appendix B.

4.0 STATUS OF EXPIRED PERMITS

On September 30, 2015, BTV formally requested incorporation of BTV's two (2) expired operational stormwater discharge permits (Permit Nos. 1-0839 and 1-1391) into BTV's General Permit 3-9014 (2012) MS4 authorization per subsection IV., C., 1.,c), (3), Schedule of Compliance, Month 24.

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As part of this submittal, BTV submitted a Notice of Intent (NOI) for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4) General Permit 3-9014, Initial Designer's Statement of Compliance for Permit Nos. 1-0839 and 1-1391, revisions to Volume 1 of BTV's SWMP, and the application fee. The fee was subsequently refunded as VTDEC determined that incorporation of an operational permit by the MS4 does not constitute a "change in activities."

Stormwater system evaluations for both expired permit systems as prepared by Stantec Consulting Services, Inc., for the South Burlington Stormwater Utility and as documented in the BTV Stormwater Utility Credit Analysis dated February 22, 2013 were also submitted for VTDEC review.

VTDEC review and MS4 permit amendment were pending authorization of the Lake Champlain TMDL by U.S. EPA. On June 17, 2016, EPA established new phosphorus TMDLs for the twelve Vermont segments of Lake Champlain. As of this September 30, 2016 report, VTDEC is currently acting on the NOI to incorporate BTV's expired permits into MS4 authorization.

5.0 MS4 INCORPORATION OF OPERATIONAL STORMWATER PERMITS

On behalf of BTV, this report serves as the formal request to incorporate BTV's ten (10) existing, currently active operational stormwater discharge permits into BTV's General Permit 3-9014 (2012) MS4 authorization. This includes the following permits:

- No. 3028-9010.A – BTV's Master Permit
- No. 3028-9010.2 – Taxiways 'B', 'C', 'J', and 'G' (Muddy Brook Watershed)
- No. 3028-INDS.AR – Taxiways 'B', 'C', 'J', and 'G' (Potash Brook Watershed)
- No. 3028-9010.1 – Reconstruct, Mark & Groove Runway 15-33
- No. 3845-9010 – Heritage Flight Aviation Campus Expansion
- No. 3028-9015.1 – Quarry Area Access Road
- No. 3028-INDS.3 – Aircraft Sewage Receiving Station
- No. 3028-9015.2 – Construct, Mark, and Light Taxiway 'G'/'K'
- No. 3845-9015.1 – Heritage Aviation Parking Lot
- No. 3028-INDS.4 – BTV Consolidated Car Rental Facility

5.1 NOTICE OF INTENT

This request includes a *Notice of Intent for General Permit 3-9014 (MS4)* dated September 30, 2016, as well as the following required elements:

- MS4 Incorporation Forms for each of the ten operational permits



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- *Designer's Statement of Compliance* for each of the ten operational permits
- A copy of the original permits for reference purposes.

These are found in Appendix C.

5.2 SWMP – VOLUME 1 REVISIONS

The submittal also includes revisions to the *Stormwater Management Program (SWMP)– Volume 1* dated September 30, 2016, including:

- Cover Sheet (Revised September 30, 2016)
- Table of Contents (Revised September 30, 2016)
- Subsection 2 entitled *Discharges to Impaired Waters (Flow Restoration Plan)* (Revised September 30, 2016)
- Minimum Control Measure 5, Post-Construction Stormwater Management, lists the stormwater management practices associated with the permits to be incorporated (Revised September 30, 2016).
- Appendix B – Post Construction Runoff Control Plan Documentation (Revised September 30, 2016)
- *Appendix D – Storm Sewer Mapping* (also known as *Burlington International Airport, Multi-Sector General Permit (MSGP) Site Drainage Map* dated April 1, 2012, with revisions dated September 30, 2016 – Full Size)

The SWMP Volume I, including its Appendices B and D, is found in Appendix D.

5.3 SWMP – VOLUME 2 (SWPPP) REVISIONS

The submittal includes revisions to the *SWMP -- Volume 2 [the Stormwater Pollution Prevention Plan (SWPPP)]*, dated September 30, 2016. The revised sections include:

- Cover Sheet (Revised September 30, 2016)
- Table of Contents (Revised September 30, 2016)
- Introduction (Revised September 30, 2016)
- Section 3.2 Narrative Site Description (Revised September 30, 2016)
- Section 3.5 Description of Receiving Waters (Revised September 30, 2016)
- Section 7.4 Monitoring Associated with Discharges to Impaired Waters (Revised September 30, 2016)
- Section 11.0 Summary of Updates (Revised September 30, 2016)

A complete SWPPP is attached in Appendix E. Note that no changes or revisions were made to Volume 3 of the SWMP.



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5.4 ADDITIONAL MATERIALS

Additional materials included in this submittal include:

- CD containing the electronic files of the above referenced materials and plan.

APPENDIX A
PROPOSED BMP SUMMARY SHEETS

Potash Brook FRP BMP Summary Sheet

Site name: Airport Drive **South Burlington ID:** PB0009

Approximate address:	Airport Dr and Airport Rd, South Burlington	MS4 where BMP is located:	BTV	New or existing BMP?	New
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Proposed BMP type: Infiltration Gallery

Proposed BMP description: Construct subsurface infiltration chambers in southernmost lot where houses will be removed. Intercept stormline running south down Airport Dr.	Proposed BMP details	
	Estimated project cost	\$439,000
Feasibility concerns:	Drainage area (acres)	9.65
	Impervious area managed (acres)	2.70
	% Impervious	28%
	Land owner where BMP is	MS4 Owned
	BMP Footprint Size (acres)	0.09
	BMP Depth (feet)	3.50
	Hydrologic soil group	A
	MS4s contributing drainage to BMP	South Burlington, BTV
	Primary land use in drainage area	Residential
	Regional project? (2 or more landowners)	Yes
	Channel protection volume managed (ac-ft)	0.46
	Volume infiltrated (ac-ft)	0.46
Primary or secondary BMP?	Primary	
Expired permit(s)?	No Permit	

Site map **Site photo**

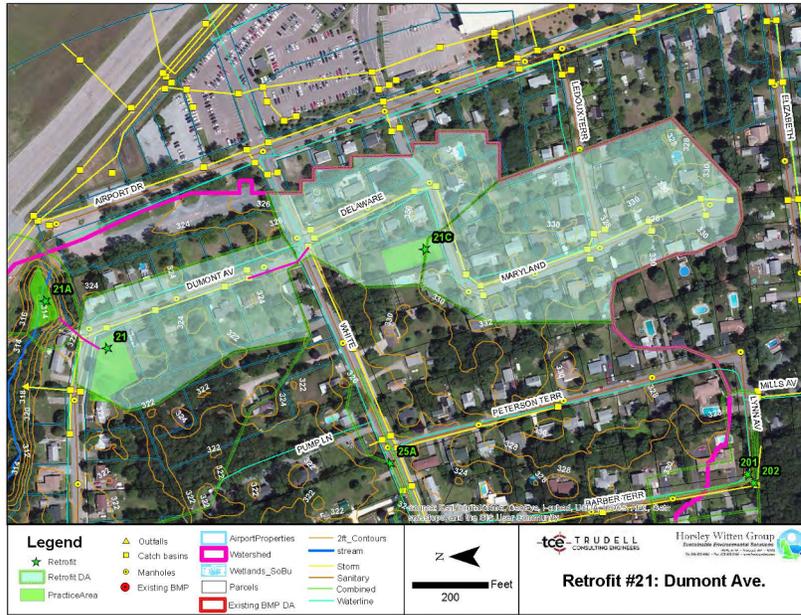


Centennial Brook FRP BMP Summary Sheet

Site name:	Dumont Ave Infiltration Chambers	South Burlington ID:	CB0008
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Approximate address:	Dumont Ave, South Burlington	MS4 where BMP is located:	BTV	New or existing BMP?	New
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Proposed BMP type:	Infiltration Gallery
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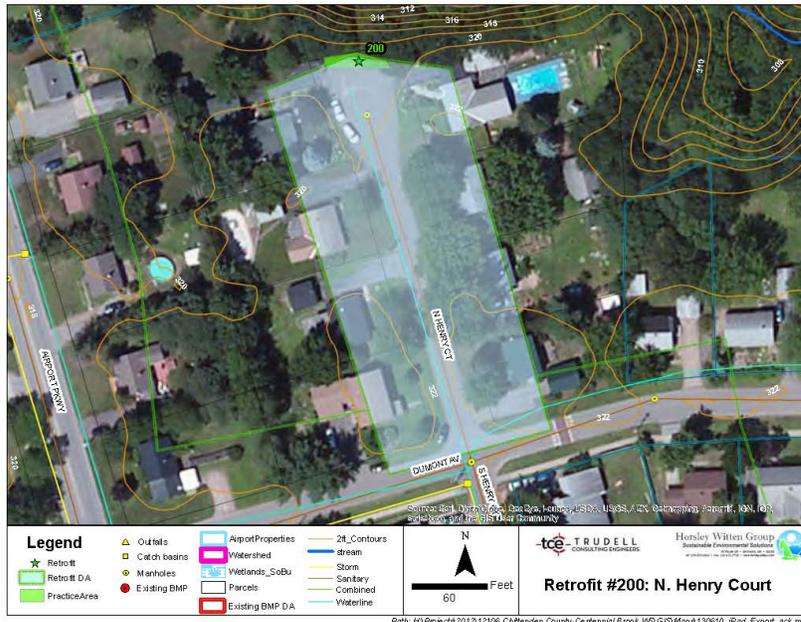


Estimated project cost	\$27,000	MS4s contributing drainage to BMP	South Burlington, BTV
Drainage area (acres)	3.93	Primary land use in drainage	Residential
Impervious acres managed	0.86	2 or more landowners?	Yes
% Impervious	22%	CPv managed (ac-ft)	0.05
Land owner of BMP location	MS4 Owned	Volume infiltrated (ac-ft)	0.05
BMP Footprint Size (acres)		Primary or secondary BMP?	Primary
BMP Depth (feet)		Expired permit(s)?	No Permit
Hydrologic soil group	A		

Proposed BMP description:	Feasibility concerns:
Divert flows from existing catchbasins and convey down Dumont Ave via pipe or swale to underground recharge chambers on empty lot. Options exist for practice type, siting and conveyance mechanism depending on depth to GW, existing inverts, and future use by Airport. Discharge to existing pipe outlet at Airport basin.	Invert at White St. 321.40. Distance to vacant lot on corner – approx. 580' @ .005 slope; pipe outlets at 318.5'. Storage would be below grade. Depth to GW could be an issue and eliminate infiltration option. For above grade system inverts at White/Delaware would need to be raised. May be possible by resetting pipe inverts. Possible to create sand filter on top of UG chambers or shallow infiltration basin.

Centennial Brook FRP BMP Summary Sheet

Site name: N Henry Court		South Burlington ID: CB0018			
Approximate address:	N Henry Ct, South Burlington	MS4 where BMP is located:	South Burlington	New or existing BMP?	New
Proposed BMP type:	Infiltration Gallery				

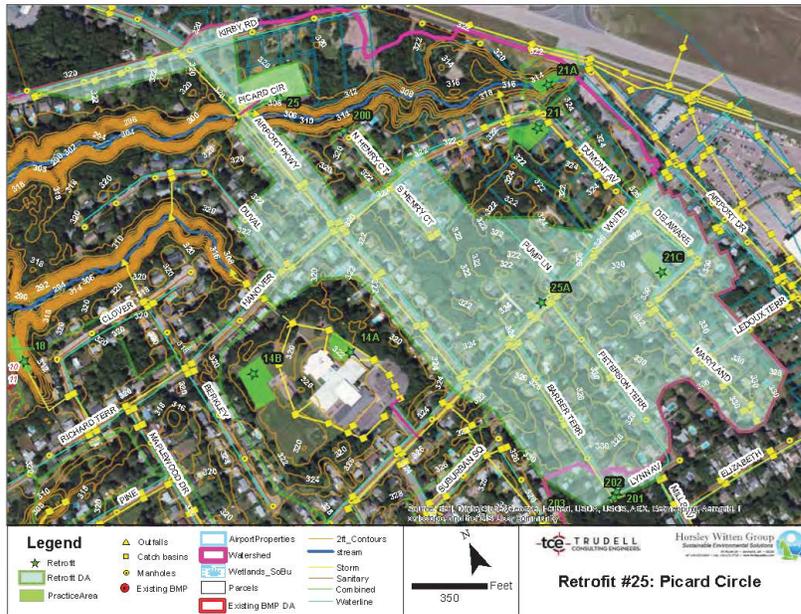


Estimated project cost	\$27,000	MS4s contributing drainage to BMP	South Burlington, BTV	
Drainage area (acres)	1.03		Primary land use in drainage	Residential
Impervious acres managed	0.33		2 or more landowners?	Yes
% Impervious	32%		CPv managed (ac-ft)	0.02
Land owner of BMP location	MS4 Owned		Volume infiltrated (ac-ft)	0.02
BMP Footprint Size (acres)			Primary or secondary BMP?	Primary
BMP Depth (feet)			Expired permit(s)?	No Permit
Hydrologic soil group	A			

Proposed BMP description:	Feasibility concerns:
<p>Dead-end road with excess impervious cover. Currently, drainage comes down the road and flows directly down a steep slope to the stream/wetland area below. Install a rain garden/bio with an overflow to a leaching catch basin at end of road. Dumping of yard waste and debris was also observed down the slope. An old corrugated discharge pipe was found down in stream.</p>	<p>Small project, but could be a good GI demonstration.</p>

Centennial Brook FRP BMP Summary Sheet

Site name: Picard Circle Infiltration		South Burlington ID: CB0023			
Approximate address:	Picard Cir, South Burlington	MS4 where BMP is located:	South Burlington	New or existing BMP?	New
Proposed BMP type:	Infiltration Gallery				



Estimated project cost	\$318,000	MS4s contributing drainage to BMP	South Burlington, BTW						
Drainage area (acres)	51.85		Primary land use in drainage	Residential					
Impervious acres managed	15.84			2 or more landowners?	Yes				
% Impervious	31%				CPv managed (ac-ft)	0.68			
Land owner of BMP location	MS4 Owned					Volume infiltrated (ac-ft)	0.68		
BMP Footprint Size (acres)							Primary or secondary BMP?	Primary	
BMP Depth (feet)								Expired permit(s)?	No Permit
Hydrologic soil group	A								

Proposed BMP description:	Feasibility concerns:
<p>Subsurface infiltration system. All houses within Picard Circle have been purchased by Airport and are now abandoned. Significant site area exists within yards and the road for major underground infiltration/ detention system.</p> <p>Constraints include depth of existing drainage pipe and depth above groundwater (adjacent brook approx 14 feet below existing ground).</p>	<p>Depth of existing drainage line in Airport Pkwy may preclude piping from existing infrastructure to new system. One option would be to install diversion structure and partially submerge existing piping system.</p>

**APPENDIX B
FLOW MONITORING PROGRAM
MEMORANDUM OF AGREEMENT**

MEMORANDUM OF AGREEMENT BETWEEN THE VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION AND THE LISTED MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) COMMUNITIES

This Memorandum of Agreement sets forth the agreement between the parties, Vermont Department of Environmental Conservation (DEC) and the following Municipal Separate Storm Sewer System (MS4) Permittees: Burlington International Airport (BTV), City of Burlington (Burlington), Town of Colchester (Colchester), Village of Essex Junction (Essex Junction), Town of Essex (Essex), Town of Shelburne (Shelburne), City of South Burlington (South Burlington), City of Saint Albans (St. Albans City), Town of Saint Albans (St. Albans Town), University of Vermont (UVM), Vermont Agency of Transportation (VTrans), Town of Williston (Williston), and City of Winooski (Winooski) (collectively referred to as “the Parties”), for the purpose of participating in the Ecosystem Restoration and Water Quality Improvement Special Fund to perform the monitoring and other data collection required under the MS4 permitting program.

I. PROJECT PURPOSE:

The purpose of this Agreement, per Act 171 (H.650), Titled: Conservation and land development; stormwater; municipal separate storm sewer systems, is to aid participating MS4 Permittees in obtaining compliance with the flow monitoring requirements of their MS4 permits.

II. SCOPE OF WORK:

The parties agree to the following:

DEC will develop and manage a contract with a third party to carry out flow monitoring requirements as outlined in the existing MS4 permits. Upon signature of this Agreement, DEC will work with the undersigned MS4 Permittees and the contractor to ensure the flow monitoring requirements are met. As long as the MS4 Permittee contributes to the Water Quality Improvement Special Fund as outlined in Section V, they will be considered in compliance with the flow monitoring requirement of the MS4 permit. All management of the Contractor and non-compliance due to the Contractor will be the responsibility of DEC and will not result in any violations under the MS4 permit for any MS4 Permittee signed onto this MOU. DEC will provide the deliverables as outlined in section VIII.

The Parties will provide data on existing flow monitoring gauge sites, precipitation gauge sites, and other information considered to be necessary for the Contractor to complete the work. The Parties will provide funds, as agreed to in Section V, in order to initiate the flow monitoring. Failure to provide the funds as specified will be considered as non-compliance

with this Agreement and the Party will be responsible for maintaining compliance with the MS4 flow monitoring requirements through other means.

III. PROJECT BENEFITS

This project will help to assess the effectiveness of flow restoration plans for up to eleven stormwater impaired streams. Vermont’s stormwater Total Maximum Daily Loads (TMDL) utilize flow targets to represent a range of stressors to water quality, from pollutant loads, land based and instream erosion, to increased flooding. Implementation of the flow restoration may take over fifteen years in some watersheds. Flow monitoring will be used by DEC and the Parties to ensure that the management practices implemented under the flow restoration plans are making progress towards the TMDL targets, and redirect efforts if needed.

IV. ENTITY ELIGIBILITY

The entities eligible to participate under the memorandum of understanding include any entity that is subject to the Vermont Municipal Separate Storm Sewer System (MS4) General Permit, signed on December 12, 2012. This includes the following MS4 Permittees: Burlington, Colchester, Essex, Essex Junction, Milton, Rutland Town, Rutland City, St. Albans City, St. Albans Town, Shelburne, South Burlington, Williston, Winooski, UVM, BTV, and VTrans.

V. FINANCIAL CONTRIBUTIONS

As developed by the eligible entities, all participating MS4 communities will divide the costs of the contracted work and pay DEC according to the table below.

MS4 Permittee	% of Total Cost	Costs by State Fiscal Years (July 1 – June 30)				
		2017	2018	2019	2020	2021
BTV	2.1%	\$3,623	\$2,805	\$2,796	\$2,087	\$2,140
Burlington	7.4%	\$12,782	\$9,898	\$9,866	\$7,364	\$7,549
Colchester	5.3%	\$9,232	\$7,149	\$7,126	\$5,319	\$5,452
Essex Junction	6.1%	\$10,625	\$8,228	\$8,201	\$6,122	\$6,275
Essex	6.0%	\$10,473	\$8,111	\$8,084	\$6,034	\$6,185
Shelburne	7.0%	\$12,185	\$9,436	\$9,405	\$7,021	\$7,196
South Burlington	17.4%	\$30,170	\$23,363	\$23,287	\$17,383	\$17,818
St. Albans City	6.6%	\$11,418	\$8,842	\$8,813	\$6,579	\$6,743
St. Albans Town	7.1%	\$12,287	\$9,515	\$9,483	\$7,079	\$7,256
UVM	5.5%	\$9,564	\$7,407	\$7,382	\$5,510	\$5,648
VTrans	16.6%	\$28,794	\$22,298	\$22,225	\$16,590	\$17,005
Williston	6.2%	\$10,668	\$8,261	\$8,234	\$6,146	\$6,300
Winooski	6.6%	\$11,363	\$8,799	\$8,770	\$6,547	\$6,711

MS4 Permittee	% of Total Cost	Costs by State Fiscal Years (July 1 – June 30)				
		2017	2018	2019	2020	2021
Total	100.0%	\$173,184	\$134,112	\$133,672	\$99,781	\$102,278

Each participating MS4 Permittee to this agreement is required to submit the payment listed above on or before May 1 each year in order to be considered in compliance with the terms of the agreement for that year. Payments shall be made directly to DEC. If payment is not received in time, monitoring services as provided by the Contractor to the State will be discontinued.

Actual costs are dependent on the finalization of the Contract with the selected Contractor. Fiscal year 2020 and 2021 are anticipated costs based on renewal of the Contract for monitoring services with the selected Contractor.

VI. PROJECT CONTACTS

Parties Contacts
See Attachment A

DEC Contact
David Pasco
Admin. and Innovation Division
802-490-6112
david.pasco@vermont.gov

VII. EFFECTIVE DATE; MODIFICATION

This Memorandum of Agreement shall be effective from the date of execution and shall terminate on June 30, 2021. This Memorandum of Agreement may be amended or modified at any time by mutual written agreement of all Parties.

This agreement will provide monitoring services for the participating MS4 Permittees from State Fiscal Year 2017 (July 1, 2016) through State Fiscal Year 2021 (June 30, 2021).

VIII. DELIVERABLES

Each of the Parties will provide the following deliverables to DEC:

1. Data on existing flow monitoring gauge sites, precipitation gauge sites, and other information considered to be necessary for the Contractor to complete the work, as requested.
2. Notification of any changes in the MS4 Communities' participation in this agreement as early as practicable.
3. Payment of funds as outlined in Section V.

DEC will provide the following deliverables to all participating entities:

1. A comprehensive report outlining Quality Assurance/Quality Control protocols, shall be submitted to all participating entities prior to the initiation of monitoring.
2. Mean daily discharge in cubic feet per second at each site for each day of the monitoring period calculated from measurements taken at five minute intervals.
3. A platform for continuous remote access to streamflow gaging station data (i.e., satellite, radio, or cellular telemetry) complete with real-time data loss notification systems.
4. Mean daily depth of precipitation in inches (to the nearest 0.01 inch) at each site for each day of the monitoring period, calculated from measurements taken at five minute intervals and form of precipitation identified (rain vs. snow).
5. An annual report on each impaired stream with the flow duration curve and calculated flow metrics, and a brief narrative describing the preceding field season, gage configuration, and how data was collected and compiled.
6. On an annual basis, compiled sub-daily data, with field notes available upon request.

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By: e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

BURLINGTON INTERNATIONAL

AIRPORT

By: Gene Richards, III

Title: Director of Aviation

Burlington International Airport

Date: 5/11/16

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

CITY OF BURLINGTON

By: 

Title: Director

City of Burlington

Date: 5/2/16

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

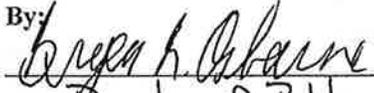
Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

TOWN OF COLCHESTER

By: 
Title: Director of Public Works

Town of Colchester

Date: 3/21/16

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

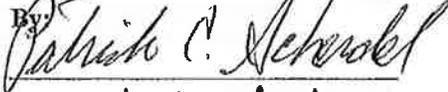
Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

VILLAGE OF ESSEX JUNCTION

By: 

Title: Municipal Manager

Village of Essex Junction

Date: March 15, 2016

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

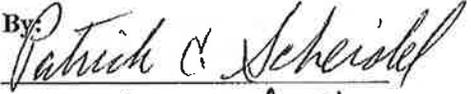
Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

TOWN OF ESSEX

By: 

Title: Municipal Manager

Town of Essex

Date: March 15, 2016

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

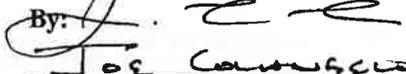
Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

TOWN OF SHELBURNE

By: 
Joe Caruso

Title: Tom Muzyl

Town of Shelburne

Date: 22-FEB-2016

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

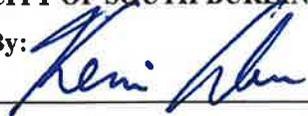
Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

CITY OF SOUTH BURLINGTON

By: 

Title: CITY MANAGER

City of South Burlington

Date: 3/9/16

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By: e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

CITY OF ST. ALBANS

By:

Title: *City Manager*

City of St. Albans

Date: *2/23/16*

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

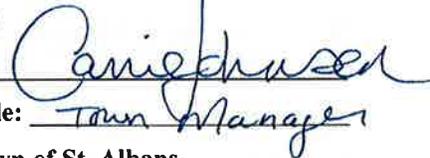
Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

TOWN OF ST. ALBANS

By: 

Title: Town Manager

Town of St. Albans

Date: 5/3/16

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By: e-Signed by George Desch
on: 2016-06-08 18:31:23 GMT

Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

UNIVERSITY OF VERMONT

By: Wida Sealey
Title: Director Campus Planning & C

University of Vermont

Date: 5/3/16

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

VERMONT AGENCY OF

TRANSPORTATION

By:  e-Signed by Chris Cole
on 2016-05-19 14:09:05 GMT

Title: _____

Vermont Agency of Transportation

Date: _____

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

TOWN OF WILLISTON

By: 

Title: Town Manager

Town of Williston

Date: February 22, 2016

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS AGREEMENT.

STATE OF VERMONT

Dept of Environmental Conservation

By:  e-Signed by George Desch
on 2016-06-08 18:31:23 GMT

Commissioner

Dept of Environmental Conservation

Date: _____

THE PARTICIPATING PARTIES:

CITY OF WINOOSKI

By: 

Title: CITY MANAGER

City of Winooski

Date: 2.25.16

Attachment A Project Contacts

Parties Contacts

Burlington International Airport

Amanda Hanaway-Corrente, Director of
Environmental Compliance
802-863-2874
ahanaway@btv.aero

City of Burlington

Megan Moir, Stormwater Program
Manager
802-540-1748
mmoir@burlingtonvt.gov

Town of Colchester

Bryan Osborne, Public Works Director
802-264-5625
bosborne@cochestervt.gov

Village of Essex Junction

Jim Jutras, Public Works
802-878-6943
jim@essexjunction.org

Town of Essex

Dennis Lutz, Public Works Director
802-878-1344
dennis@essex.org

City of South Burlington

Tom DiPietro, Public Works Deputy
802-658-7961
tdipietro@sburl.com

Town of Shelburne

Chris Robinson, Water Quality
Superintendent
802-985-3700
crobinson@shelburnevt.org

City of St. Albans

Chip Sawyer, Planner
802-524-1500
c.sawyer@stalbansvt.com

Town of St. Albans

Nathaniel Neider, Planner
802-524-7589
satplanner@comcast.net

University of Vermont

Linda Seavey, Planning Director
802-656-0215
Linda.seavey@uvm.edu

Vermont Agency of Transportation

Craig DiGiammarino, Manager
802-922-4681
Craig.digiammarino@vermont.gov

Town of Williston

James Sherrard, Stormwater
Coordinator
802-878-1239
jsherrard@willistonvt.org

City of Winooski

John Choate, Utility Manager
802-655-6421
jchoate@winooskivt.org