

October 26, 2018



David Pasco
Vermont Department of Environmental Conservation |
Watershed Management Division
1 National Life Drive | Montpelier, VT 05620-3522

RE: *Developing Public-Private Partnerships (P3) to Meet the Stormwater General Permit for Parcels with \geq 3 Impervious Acres*

Dear David:

Watershed Consulting Associates, LLC (Watershed), and local partners Hoyle Tanner & Associates, Inc., AES Consulting, North Woods Ecological Consulting (certified WBE, DBE certified), and the Lake Champlain Basin Regional Planning Commissions are pleased to submit this proposal and qualifications package for "Developing Public-Private Partnerships (P3) to Meet the Stormwater General Permit for Parcels with \geq 3 Impervious Acres."

We have assembled a unique and very capable team to tackle this complex project.

- ❖ Our proposal initially provides a budget to attend planning sessions with the Vermont DEC to discuss the 3 Acre Permit and the challenges, opportunities, and limitations for treating runoff from these sites. These planning sessions will set the stage for this project and will help the Vermont DEC as the permit is introduced Statewide.
- ❖ Watershed recognizes that coordination and outreach with the Vermont DEC, municipalities, and private landowners is the cornerstone of a successful project. Moreover, our partnership with the Regional Planning Commissions enables us to offer a team of professionals that have been heavily involved in stormwater planning efforts for years in many Vermont communities.
- ❖ Experienced in diverse stormwater-related issues and design, our project team specializes in efficient and effective investigation, analysis, modeling, and the design of robust, sustainable, and aesthetic stormwater Best Management Practices with a focus on Green Stormwater Infrastructure.
- ❖ Watershed has a long history working in the Lake Champlain Watershed and in many of the communities likely to be included in this project. We have already assessed many 3 Acre sites and surrounding drainage areas that may be excellent candidates for study under this project, and uniquely understand the needs of these communities and the related water quality issues present in these sub-watersheds.
- ❖ We are putting forth a robust proposal which will require the majority of the budget the Vermont DEC has allocated for this project. We feel that this scope will provide the DEC with the greatest value because of the team involved and the proposed scope of work. Our project scope and fee presented in this proposal is scalable, meaning that if the Vermont DEC wishes to award this contract to multiple proposer teams, it can be scaled appropriately.

Our qualifications, experience, and drive for protecting our water resources in creative and effective ways sets us apart from our competitors. I am certain that our team will provide a superior deliverable. We would be privileged to have the opportunity to work with the Vermont DEC, municipalities, and private landowners to develop solutions to meet the Stormwater General Permit for Parcels with \geq 3 Impervious Acres.

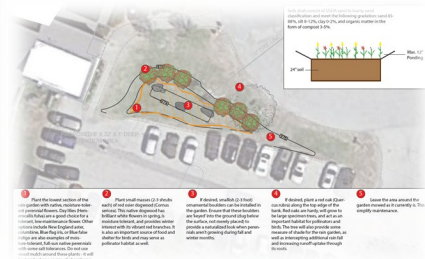
Sincerely on behalf of the project team,



A handwritten signature in black ink, appearing to read 'Andres Torizzo'.

Andres Torizzo
WCA Principal

Developing Public-Private Partnerships (P3) to Meet the Stormwater General Permit for Parcels with ≥ 3 Impervious Acres

Request for Proposals Response October 26, 2018



<p>Submitted To: David Pasco Vermont Department of Environmental Conservation Watershed Management Division 1 National Life Drive Montpelier, VT 05620-3522</p> 	<p>Submitted By: Andres Torizo, Principal Watershed Consulting Associates, LLC 208 Flynn Avenue Burlington, VT 05401 802-497-2367 andres@watershedca.com</p> 
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Partner Firms and Organizations:





I. Project Background and Understanding

The Vermont Department of Environmental Conservation (VT DEC) is required to adopt a general permit to manage stormwater from parcels with ≥ 3 impervious acres that lack a current stormwater permit that meets the 2002 or 2017 Stormwater Management Manual requirements (henceforth known as “3-acre sites”). These larger impervious surfaces can be found in many municipalities across the Lake Champlain Basin and frequently have collected, unmanaged drainage systems that focus significant runoff volume and wash off pollutants directly to local waterways. Often, drainage systems on these 3-acre sites are commingled with other developed land drainage systems, both publicly and privately owned. In addition, many of these sites are located within urban areas with constraints including urban fill soils, high groundwater, utilities, contamination, and lack of open space. These constraints can make meaningful direct treatment expensive or in a worst-case scenario, impossible. The impending 3-acre permit requirement to manage runoff from these impervious surfaces can conflict with the inherent challenge and complexity of providing direct treatment for these surfaces. However, the drainage from these 3-acre sites can sometimes be managed effectively in other locations with the benefit of additional drainage directed to the practice. See Table 1 for an example of this scenario in St. Albans, VT. In this case, direct treatment of the 3-acre site is possible but cost prohibitive. By entering into a public-private partnership, an additional nearly 80 acres (~50 acres of impervious) could be managed, significantly decreasing the cost per acre of impervious managed and pound of phosphorus removed and helping the City of St. Albans meet their other Municipal Separate Storm Sewer System (MS4) permit requirements. Conversely, in some instances a 3-acre site may have a large open area optimal for stormwater management. Additional public or private drainage could be directed to this location for treatment in a much more cost-effective way than managing both drainages separately.

Table 1. Cost benefit table for a proposed site in St. Albans, VT.

Project Name	Project Cost	Drainage Area (acres)	Impervious Cover Managed (acres)	Cost per Impervious Acre Managed	P Reduction (lb/yr)	Cost per lb P Managed
Retrofit for 3-acre site only	\$513,072	9.76	5.9	\$86,521	12.1	\$42,403
Retrofit for larger drainage area containing 3-acre site	\$1,674,000	89.60	54.6	\$30,659	101.3	\$16,522

The goal of this project is to work with municipalities and private landowners to develop partnerships to comply with the stormwater general permit requirements for parcels with 3 or more acres of impervious cover. The selected consultant will work with the VT DEC to develop a process for making stormwater treatment as cost effective and efficient as possible while achieving water quality goals set forth in the Lake Champlain TMDL. To that end, 10-15 sites will be selected for 30% design across 10 municipalities in the Lake Champlain Basin that contain 3-acre sites. Proposed designs will maximize phosphorus reductions in a cost-effective manner, prioritize infiltration practices where feasible, and incorporate green stormwater infrastructure (GSI). These practices will involve management of additional non-jurisdictional impervious cover abutting the regulated 3-acre sites. As part of the development of these designs, public-private partnerships (P3) will be created to improve water quality locally and across the basin.

Watershed has been intimately involved in evaluating and providing solutions for managing 3-acre sites in municipalities across the Lake Champlain Basin for many years. We have developed the majority of the flow restoration plans (FRPs) in the State which have included many 3-acre sites and commingled urban collected stormwater drainages. Examples include Stevens Brook in St. Albans, Potash Brook in South Burlington, and Moon Brook in Rutland City / Rutland Town. We have also completed numerous



stormwater master plans (SWMPs) covering urbanized communities within the Lake Champlain Basin that include 3-acre sites including Middlebury, Brandon, Vergennes, Jericho, Underhill, Fairfax, Barre City, Barre Town, and Berlin. Additionally, we have completed independent master planning studies for large private landowners such as Pomerleau Real Estate. During this study, Watershed analyzed 36 Pomerleau properties across Vermont (with a small number in New York State) and assessed the feasibility and cost of retrofitting these sites with a particular focus on 3-acre sites. Watershed has also participated in brainstorming sessions with Pomerleau, the VT DEC, the City of St. Albans, and members of the Long Creek Watershed Management District in Maine to discuss potential options for how P3s can most effectively manage 3-acre sites.

Our assembled team has synergy and demonstrated experience working together on these issues. Hoyle Tanner and Watershed prepared the Potash Brook FRP which involved 3 complex phases of work and coordination and outreach with the City of South Burlington and private landowners as well as coordination between the City of South Burlington, the City of Burlington, the University of Vermont, Burlington International Airport, and the Vermont Agency of Transportation (VTrans) to ensure that flow reduction targets were met.

North Woods Ecological Consulting has provided wetland evaluation support for the Watershed and Hoyle Tanner team on a complex retrofit study that focused on evaluating the retrofit options for the seven Kennedy Drive stormwater basins in South Burlington to manage additional drainage and maximize phosphorus removal and flow control. Designs were advanced to the 100% level for select projects.

Watershed has long standing relationships working with Ann Smith through her former role at the Friends of the Winooski River, where several 3-acre sites and their larger drainages were investigated including the Pouliot Avenue watershed in Barre City and Barre Town. Within this drainage area there are 3-acre sites, including the Barre Town School, and a significant downstream erosion issue at the stormwater outfall. Watershed worked with Ms. Smith to develop an integrated plan to install stormwater retrofits within the greater watershed and also developed an innovative design to address the erosion at the outfall.

Watershed has worked closely with the six Regional Planning Commissions (RPCs) within the Lake Champlain Basin (Addison County RPC, Chittenden County RPC, Central Vermont RPC, Lamoille County RPC, Northwest RPC, Rutland RPC) and the Rutland Natural Resources Conservation District (NRCD) as well. We have worked to complete many SWMPs within these districts and have developed road erosion plans in Chittenden County municipalities to support the Chittenden County RPC.

II. Scope of Work

Task 1 – Kickoff Meeting, Vermont DEC Planning Sessions

Task 1.1- Kickoff Meeting

A kickoff meeting will be held with the VT DEC and representatives from each of the six RPCs to discuss the project. The VT DEC will be the primary point of contact for this work, but the project will need to be closely coordinated with the municipalities. Having the RPC representatives present will be important as we explain the stormwater master planning process and the expected outcomes of the project. We will also discuss any known stormwater focus areas and any development projects currently under-way or being planned where stormwater management features could be easily incorporated in the municipalities. This information will guide initial site identification and field work.



At the meeting, the team will request any existing data (i.e. GIS layer of 3-acre sites or other pertinent data such as site plans) and will work with the VT DEC and RPCs to gather this material. During this meeting, we will set a schedule for two proposed planning sessions to discuss the impending 3-acre permit, discuss the project timeline, answer any questions, and address any concerns or issues. All information collected from the VT DEC and RPCs will be reviewed by the team and any data gaps identified. We will reach out to any necessary parties to fill these data gaps. We will also compile a digital data library of all pertinent GIS data, which will be distributed. This data includes but is not limited to:

- rivers and streams
- topographic data
- land use / land cover
- road centerlines
- VT River Management Program (RMP) Geomorphic Assessment data
- river corridors
- impervious cover
- stormwater permits
- parcel boundaries
- Natural Resource Conservation Service (NRCS) soils
- surface waters & wetlands
- stormwater infrastructure
- watersheds / subwatersheds
- public parcels
- Federal Emergency Management Agency (FEMA) floodplains

Our team will also gather and review pertinent plan documents for known developments currently planned in order to more comprehensively tailor our solutions to anticipated future conditions. Existing studies, such as geomorphic assessments, downtown planning studies, infrastructure mapping reports, inspection reports from the VT DEC, previous consultants’ analyses and reports, previous topographic surveys, or basin planning documents, will be collected and reviewed as well.

Task 1.1 Deliverables:

- ✓ Kickoff meeting minutes
- ✓ Digital data library
- ✓ Summary memo detailing data including origin, content, and utility

Date: 12-31-18

Task 1.2 and 1.3- 3-Acre Permit Planning Sessions

Two planning sessions are proposed with the VT DEC and RPC representatives to discuss the 3-acre permit in detail and to lay the groundwork for the proposed project. At this initial planning session, the group will discuss the permitting constraints associated with the 3-acre sites. Key questions for discussion will include:

- *Can required treatment for 3-acre sites be provided at an offsite location?*
- *If offsite treatment is provided will a 3-acre site still be issued a permit?*
- *How does the 3-acre site owner pay for offsite treatment?*
- *How is the offsite treatment facility permitted?*

The first session will also be utilized to review any questions from the kickoff with the VT DEC and team partners. For the second planning session, Watershed would present an existing 3-acre drainage area that has already been assessed and had some level of design completed. The team would apply the 3-acre framework to this drainage area, evaluate how the P3 functions, and how permitting would be applied. This initial mock up exercise will allow for refinement of a methodology that can be applied to the sites identified as part of this project.



Task 1.2 and 1.3 Deliverables:

- ✓ Planning session #1 minutes
- ✓ Planning session #2 minutes

Date: 1-31-19

Task 2 – Site Selection for Investigation

Task 2.1 – Tier 1 Priority Ranking Assessment: Selection of Municipalities

The draft GIS shapefile of 3-acre sites will be analyzed to understand the spatial distribution of the parcels within the Lake Champlain watershed. The Team will complete a GIS analysis by overlaying this information with all other known stormwater master planning data that has been generated by Watershed and other consulting groups and organizations. An initial ranking assessment will be completed to initially identify a minimum of ten municipalities to participate in the study. The initial ranking metrics will be developed in consultation with the RPC representatives and candidate towns. The outcome of this first ranking analysis will be a list of a minimum of 10 municipalities that are willing to participate in this study.

Task 2.1 Deliverables:

- ✓ Memorandum, map, and summary table of Tier I ranking

Date: 3-29-2019

Task 2.2 – Tier 2 Priority Ranking Assessment: Selection of Priority Drainage Areas

A second ranking will be completed following the selection of the participating municipalities. The second-tier ranking will focus on pairing down the list of potential sites to a final 10-15 developed land stormwater drainage assessments. This second ranking will be important, especially within larger municipalities where there are multiple 3-acre sites. Note that some of these sites may be standalone while others will require P3. In addition, if some of these sites are fully or partially disconnected and others are directly connected, the directly connected sites which have a greater impact to water quality would be prioritized. In Vermont, many stormwater master planning efforts have been completed or are underway. The team will overlay all existing data associated with these stormwater master planning efforts. The team will also take full advantage of the in-depth, town-specific knowledge held by the municipalities and the RPCs. The team will work with these entities to identify locations with the greatest existing drainage problems or concerns.

A desktop assessment will be conducted for the study area, involving a thorough review of existing GIS resources and associated attribute data including those listed above (Task 1.1) as well as any other pertinent data identified. This data will be used to identify and map the following information within drainage areas that have at least one 3-acre site:

1. stormwater subwatersheds with particularly high impervious cover
2. stormwater subwatersheds that are more directly connected to water bodies (direct pipes to streams or via overland flow)
3. areas where build-out studies (as available) have predicted major development where stormwater impacts may worsen in the future
4. properties with older stormwater permits that will be required to upgrade under the forthcoming stormwater regulations (so-called '1-' and '2-' permits)



5. more developed road segments appropriate for GSI practices utilizing a methodology adapted from the “Promoting Green Streets” report published by the River Network (July 2016)
6. road erosion inventory or assessment data already collected for any of the study towns using the most current inventory and prioritization methods where available

Using this data, the 3-acre drainage areas within the 10 municipalities will be prioritized and summarized into map and table format.

Task 2.2 Deliverables:

- ✓ Memorandum, map and summary table of Tier 2 ranking

Date: 4-30-2019

Task 2.3 – Vermont DEC and Municipal Meetings

A series of meetings will be arranged with the VT DEC and host municipalities to present the findings of the Tier 1 and 2 ranking analysis and to solicit input on the selected drainage areas for investigation.

Task 2.3 Deliverables:

- ✓ Vermont DEC and municipal meeting minutes

Date: 5-31-2019

Task 3 – Stormwater Retrofit Assessment of Selected Drainage Areas

Task 3.1 – Desktop Assessment

For the selected drainage areas and 3-acre sites, an initial desktop investigation will be completed. Relevant plans will be acquired from the municipality or VT DEC, and land ownership, soil conditions, and stormwater flow patterns will be analyzed. Initial potential retrofit points will be defined. For these locations, screening for natural resource constraints included wetlands or hydric soils, floodplain or floodway concerns, and river corridor or stream buffers will be completed.

Task 3.1 Deliverables

- ✓ Map of initial project sites to field investigate

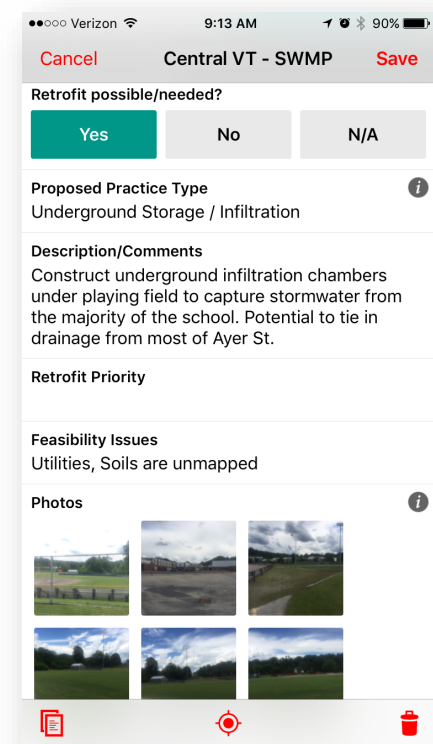
Date: 7-31-2019



Task 3.2 – Digital Map and App Preparation

The data products developed in Task 1 as well as those acquired in Task 2 will be used to prepare digital field maps for field investigations of potential stormwater management sites. Base layers will include parcel boundaries, public parcels, stormwater infrastructure, hydrologic soil group, river corridors, and wetlands.

We will also use this time to adapt our location-specific SWMP mobile app for these priority drainage areas. The app will be pre-loaded with the potential BMP sites identified in Task 3.1 so that they can be easily located in the field. The app will be used to collect information including site suitability, photographic documentation, follow-up notes, and other pertinent data. We can easily collect, organize, and store complex geolocated field data and securely upload it to the Cloud for later use. We have found that utilizing a custom mobile app for this type of work saves a significant amount of time and effort in data collection and organization. Additionally, data can easily be shared with project partners if requested. We have used this app extensively for a variety of projects.



Example screen from data collection app.

Task 3.2 Deliverables

- ✓ Technical memo summarizing targeting methodology and next steps

Date: 7-31-2019

Task 3.3 – Field Data Collection and Feasibility Assessment #1

After the initial retrofit list is created, targeted field investigations will be completed. We will visit each prospective BMP location identified in Task 3.1. During these site visits, we will determine the best stormwater management practice appropriate for the site-specific conditions found in the field, take photo documentation, assess project feasibility, determine if any ancillary benefits exist (i.e., educational, flood mitigation, etc.), and note any potential questions about the site for follow-up (e.g., parcel ownership, utilities location, road right-of-way width, etc.). During this phase of investigation concerns such as wetland proximity, floodplain or floodway concerns, hydric soils, river corridors or stream buffers, or other natural resource concerns will be investigated to determine how they could affect site feasibility.

Task 3.3 Deliverables

- ✓ Interim memo with site visit progress

Date: 10-31-2019

Task 3.4 – Update Project List and Maps

It is expected that through the course of these field visits, additional stormwater retrofit sites may be identified that were not included in the initial desktop assessment. Conversely, some site locations that



seemed like potential opportunities for BMP implementation may be excluded from further analysis if site conditions in the field prove prohibitive. BMP location lists and maps will be updated with this information. Summary field data sheets will also be created for each potential project.

Task 3.4 Deliverables

- ✓ Updated table and maps of potential projects with those eliminated from further consideration removed and any new projects added
- ✓ Preliminary field data sheets for each retrofit site

Date: 11-29-2019

Task 3.5 – Initial Stakeholder Outreach

It is expected that many of the identified projects will be located on private properties, and past experience has taught us that landowner coordination can be one of the most time consuming and sensitive tasks to undertake when completing a scope of work such as this. As such, private landowner interest will be gauged at this early stage in the process. Assuming each municipality could provide a copy of their Grand List and that digital parcel map information is available, the appropriate landowner contact information will be obtained by the project team. If data is not available, a map will be produced with point locations of potential BMPs and provided to the municipality. They will be asked to provide a contact list for the identified properties.

Landowner outreach will be coordinated by AES Environmental Consulting with support from the RPCs and, where relevant, the Rutland NRC. The project will be explained to the property owners and the retrofit concepts discussed. The outreach team will ensure that the landowners understand how the 3-acre permit will impact them specifically (if applicable) and fully communicate the environmental benefits of the project as well as the benefits to the community. The outreach team will catalogue landowner interest.

This initial outreach will allow the team to assess the interest of landowners in pursuing these projects at this early stage and will prevent advancement of projects with unwilling landowners. Projects with unwilling landowners will be removed from further consideration. A brief summary of the stakeholder input process and results will be summarized in a memo, and a table of the projects with landowner feedback will be provided.

Task 3.5 Deliverables

- ✓ Summary memo describing stakeholder input process
- ✓ Table of projects with landowner feedback

Date: 3-31-2020

Task 3.6 –Project Ranking

An initial project ranking will take place at this stage to narrow down the large list of projects to those that should be advanced to 30% level engineering design. The unified prioritization matrix as developed by the VT DEC will be utilized at this stage to rank the projects. These lists and associated maps and preliminary field data sheets will be distributed to the appropriate municipalities and landowners. The project team will solicit feedback from each municipality and landowner either via email or through a conference call. Local knowledge from the municipalities and RPCs will be critical in identifying those projects that are high priority for the municipalities as well as those that are likely not feasible. The list will be revised following



these conversations. During these conversations, the project team will inquire whether each municipality would like the project team to further explain the projects with the municipal Boards.

For each selected project retrofit site, the project team will create drainage area delineations using the best available topographic information (Light Detection and Ranging (LiDAR) contours available from the Vermont Center for Geographic Information (VCGI)) and generate detailed landuse GIS data layers to be used for pollutant loading and hydrologic and hydraulic modeling. Modeling will allow us to properly size each retrofit practice to meet at least the treatment goal of 50% of the water quality volume.

The project team will conduct additional field visits with representatives from the RPCs, and/or the applicable municipality, and/or the private landowner(s) to confirm project details, ensure project parameters are clearly defined, verify and refine mapped stormwater infrastructure data (verifying pipe connections, catchbasin locations, etc.), and refine drainage area delineations with both best available topographic information (LiDAR contours available from VCGI) and field observations of drainage breaks. Permitting concerns such as possible Act 250, River Corridor, Stream Alteration, Underground Injection Control, or Wetlands will be further verified and addressed at this time. Additionally, any easements or rights-of-way will be investigated to the greatest degree possible to ensure that all possible encumbrances are known.

If wetlands concerns are identified, North Woods Ecological Consulting will conduct individual site visits to advise the project team whether a project should be further pursued, discarded from further design, or if the design should be altered to comply with wetlands regulations.

We will generate maps showing each site's drainage area, the approximate retrofit practice location and size, as well as a table showing site ranking. A more in-depth BMP summary sheet will be created with modeled pollutant loading information, a cost estimate, BMP sizing and location, and other descriptors. All materials and the ranking process will be summarized in a memo.

For projects located on private property, landowner agreement will be secured. The project team will attempt to obtain landowner permission via phone, email, or through a personal contact from one of the project stakeholders. This landowner outreach will be managed by AES Environmental Consulting. A letter of municipal or private landowner commitment and/or participation will be obtained at this stage.

Task 3.6 Deliverables

- ✓ Table with preliminary project ranking
- ✓ Memo describing ranking methodology
- ✓ Revised field data sheets with ranking information
- ✓ Letters of participation for municipalities and/or private landowners for each project to be advanced

Date: 3-31-2020

Task 4 – 30% Level Engineering Designs

Task 4.1 – Site Surveys and Baseplans

To support the creation of 30% design plans, the project team will conduct site surveys. The survey crew will collect critical stormwater infrastructure elevation data including pipe and rim inverts. A combination



of LiDAR elevation data and field-collected vertical data will provide the detail necessary to accurately identify and model stormwater flow paths. Vertical and horizontal control will be based on NAVD88 and NAD83 using GPS equipment (assuming adequate signal strength on-site) or robotic total station. The team will also locate known geographic points and clearly marked property boundaries.

The team will then prepare an orthophoto baseplan of each project area that includes tax map boundaries and parcel identification numbers. LiDAR elevation data will be used to illustrate topographic contours, and each base map will incorporate vertical control of stormwater infrastructure as described above.

For any sites specifying infiltration, soil infiltration tests will be conducted to verify that soils are of sufficient quality to allow for infiltration as specified under the Vermont Stormwater Management Manual. Soils will be logged for texture, structure, consistence, moisture content, and redox features (USDA classification). The project team will also conduct due diligence regarding utility conflicts in the area, either using previously mapped infrastructure of known quality or via the results of the individual site surveys.

Task 4.1 Deliverables

- ✓ Existing condition baseplans
- ✓ Memo describing results of infiltration testing for those project sites that require infiltration

Date: 6-30-2020

Task 4.2 – Modeling and Sizing of Retrofit Practices

Modeling will be completed for each site to properly size stormwater retrofits and ensure the minimum 50% water quality volume standard is being met using HydroCAD. The Source Loading and Management Model for Windows (WinSLAMM) will be used to estimate the current pollutant load from each site as well as to model the expected pollutant removal. The EPA's Spreadsheet Tool for Estimating Pollutant Load (STEPL) will also be used, where applicable, to calculate nutrient and sediment load reductions from large erosional areas such as gullies.

Task 4.2 Deliverables

- ✓ Modeling summary

Date: 6-30-2020

Task 4.3 – Proposed condition plan development

30% Concept Designs will be developed for each of the 10-15 priority sites. These 30% plans will be of sufficient detail to show layout, approximate final grading (where necessary), infrastructure placement and type, planting plans (if applicable), and any associated sections or details. We envision preparing one sheet per project location which illustrates critical site features. We will include cross sectional views of selected practices and typical details sufficient to understand the conceptual project layout and design intent. These plans will not be sufficient for construction on their own but should be of sufficient detail for planning purposes and application for grant funding for final design and implementation funds. This task will also include initial construction cost estimates (with contingency amounts built-in to reflect the preliminary nature of the designs), design criteria for all aspects of the designs, and our site-specific geotechnical report.



The team will provide an internal quality assurance / quality control review of each conceptual plan and evaluate the proposed design for long-term effectiveness, maintenance, cost, and constructability.

Prior to finalizing the 30% plans, the project team will submit the draft plans to the VT DEC, municipality, private landowner for review and comment. A review meeting will be held with all appropriate parties. This will provide an opportunity for a face-to-face discussion of the designs, and time to address and resolve any remaining project issues and comments prior to the advancement of final 30% plans. Once approved, the project team will finalize the plans with suggested changes and prepare cost projections for each practice to include the cost of time and materials to construct the practice as well as any costs associated with final design, permitting, and construction oversight.

Task 4.3 Deliverables

- ✓ Draft 30% designs for 10-15 projects
- ✓ Review meeting minutes

Date: 8-31-2020

Task 4.4 – Feasibility assessments #2

A list of all possible permitting requirements for each site will be compiled. This is to include federal, state, and local permitting. The team will ensure that all possible permitting hurdles are well understood and that if a site does require a permit, there will be a high likelihood of obtaining that permit.

Task 4.4 Deliverables

- ✓ Memo describing permit review process and results

Date: 8-31-2020

Task 4.5 – VT DEC, municipal, and private landowner meetings

Final meetings will be held with the VT DEC, applicable municipalities, and private landowners to ensure that 30% designs meet the expectations of all stakeholders. If necessary, revisions may be made following these meetings.

Task 4.5 Deliverables

- ✓ Meeting minutes

Date: 8-31-2020

Task 5 – Final Report

Task 5.1 – Final summary report with all supporting documentation

A final summary report will be prepared. We will summarize the process and methods used to arrive at the selected municipalities and priority sites including our recommendations for an implementation schedule. A brief narrative describing the proposed stormwater treatment practices and anticipated benefits to water quality and hydraulics at each project location will be included. Additionally, we will make recommendations regarding implementation of proposed projects not selected for further design including



next steps with respect to design or construction, and identify potential sources of funding for these steps. This is intended to help the VT DEC and municipalities develop priorities after the top 10-15 sites have been implemented. We may also make recommendations regarding general road construction practices for both paved and unpaved roads, potential guidance for zoning or planning with respect to adoption of local stormwater regulations, and recommendations for non-structural practices (e.g., salt application reductions) that could increase progress towards water quality goals.

The project team will submit a final report with individual sections for each study area assessed. In total, 10-15 large-scale 30% plans will be submitted in digital PDF format. Cost information, expected pollutant reductions, and recommended next steps to move the projects to implementation will also be included. This deliverable will also include the batch import file as required by the Ecosystem Restoration Program.

Task 5.1 Deliverables

- ✓ Final reports
- ✓ Final 30% design for 10-15 projects
- ✓ Batch import file

Date: 9-30-2020

Task 5.2 – Presentation of project to local Boards and VT DEC

A final presentation will be made to each municipality's Board and the VT DEC. This presentation will summarize the process of site selection, practice design, 30% plan development, and public-private partnerships that were created as a part of this project and explain the next steps towards implementation.

Task 5.2 Deliverables

- ✓ Presentation summary

Date: 9-30-2020

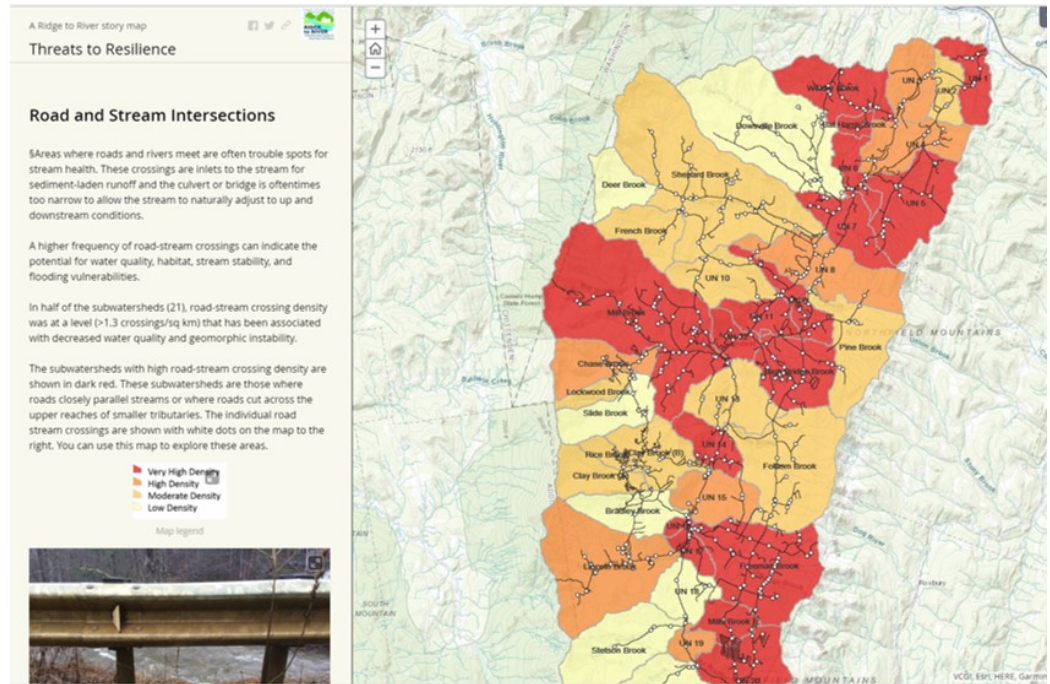


Additional Task –Story Map

Story Maps:

Watershed has found that Story Maps are excellent at conveying complex, interactive, spatially-linked data. Story Maps are engaging and informative. Narrative text, photos, and tables can be viewed alongside interactive site maps.

Watershed has worked on a large number of Story Maps, including several for the Friends of the Mad River's Ridge 2 Rivers program, as listed below:



Example of a Story Map created for the Ridge 2 Rivers program (Friends of the Mad River).

- [Stormwater Master Planning at Harwood Union Middle & High School](#)
- [Stormwater Master Planning at Warren Elementary School](#)
- [Stormwater Master Planning at Fayston Elementary School](#)
- [Stormwater Master Planning for Fuller Hill Rd, Warren](#)
- [Threats to Resilience](#)
- [Data Needs](#)

Story Maps can be a very valuable communications and marketing tool to engage members of the public in the project process, especially as it relates to moving a project towards implementation. These maps can also be very illustrative in explaining a project to grant-making organizations when soliciting implementation funding.

Additional Tasks Deliverables

✓ Story Map

Date: 9-30-2020



III. Final Thoughts

Many firms throughout Vermont are becoming increasingly involved with stormwater management as the field gains momentum in light of changing regulations and increased attention being paid to the issues surrounding stormwater. Watershed has long focused exclusively on stormwater management issues in the State of Vermont and knows the field better than other consulting firms, especially given the depth of experience with stormwater master planning throughout the State at multiple scales. Our project partners each add value, expertise, and critical local knowledge to the team. In light of our history of collaboration on many projects with each of these team members, we are confident in our ability to work with each of the project partners efficiently to tackle this complex problem and produce superior deliverables. We look forward to working with you.

IV. Project Team

Watershed Consulting Associates, LLC is pleased to collaborate with partners Hoyle, Tanner, and Associates, Inc., North Woods Ecological Consulting, AES Environmental Consulting, the Rutland Natural Resources Conservation District, and the six Regional Planning Commissions in the Lake Champlain Basin for completion of this exciting project. We are an interdisciplinary team of engineers, hydrologists, planners, and GIS specialists **uniquely qualified** for this project. Our team is a wise choice because:

- ❖ Stormwater management and design is our **specialty and focus**.
- ❖ We have specialized experience showcasing **Green Stormwater Infrastructure (GSI) and Low Impact Development techniques** integrated with conventional grey retrofit solutions for stormwater master plan retrofit projects.
- ❖ **We are experts in an array of fields** needed to address the complexities of retrofits in priority watersheds: Hydrology, Hydrogeology, Planning, Engineering, GSI, Urban Design, and Outreach.
- ❖ Our team is familiar with the newest **State of Vermont Stormwater Design Standards and Permitting** critical for assessing project feasibility at the initial planning phase, and tailoring solutions to the specific project.
- ❖ We have extensive stormwater retrofit solution **design experience with complex site constraints**.
- ❖ We can create **compelling design material to more effectively communicate** with project stakeholders.



Project Team Organization:



Watershed Consulting Associates, LLC is a Burlington Vermont-based environmental consulting firm specializing in stormwater management. Watershed will be the **prime consultant** for this project. Watershed consists of a team of hydrologists, engineers, and water quality specialists with extensive experience in watershed investigation, stormwater retrofit evaluations, site design, H&H and water quality modeling, permitting, and GIS mapping & analysis. Watershed has demonstrated experience working with Vermont municipalities on large stormwater master plans focused on phosphorus mitigation. These larger plans have required an integration of municipal, private, and VTrans owned properties. Our team has the experience and expertise to develop these partnerships as efficiently as possible.

Andres Torizzo, Principal and Project Manager, has extensive experience with stormwater mapping, sampling, modeling, and design projects in Vermont and the northeast region. Mr. Torizzo has successfully completed numerous stormwater retrofit assessments and designs in Vermont communities for the VT Agency of Natural Resources, VTrans, municipalities, and private landowners. Mr. Torizzo holds a bachelor's degree in Geological Sciences from Tufts University and a master's degree in Geography (Hydrology Focus) from the University of Colorado at Boulder. Mr. Torizzo has overseen all the stormwater master plans and flow restoration plans developed at Watershed.

Kerrie Garvey, GIS Manager, holds a Master of Science in Natural Resources with a focus on fluvial geomorphology from the University of Vermont (UVM) where she used spatial analysis methods to quantify erosion and deposition associated with stream channel migration. She has extensive experience working with ArcGIS software, developing models and managing large datasets. She worked as a Research Specialist at UVM, developing ArcGIS models to assess road impacts on stream health and map imperious areas with a direct hydrologic connection to surface waters. Ms. Garvey also holds a B.S. in Environmental Studies from Colby-Sawyer College and was employed for several years at a commercial GPS company developing and enhancing an extensive country-wide road network database for use in personal navigation devices.

Kateri (Bisceglia) Gomez, Water Quality Specialist, holds an B.S. in Environmental Science from Northern Vermont University, where she concentrated in water quality analysis and assessment. Ms. Gomez has extensive research experience analyzing the effects of storm events on nitrogen and phosphorus concentrations in local water bodies. With Watershed, she has been an integral team member in the development of numerous stormwater master planning studies, as well as assisting with illicit discharge detection and elimination projects, and long-term water quality monitoring efforts focused on chloride.



Watershed is a leader in stormwater master planning in the State. A sample listing of ongoing and completed master plans is provided below:

Stormwater Master Plans	Flow Restoration Studies
<ul style="list-style-type: none"> ✓ Central Vermont Phase 2 (Calais, Duxbury, East Montpelier, Fayston, Moretown, Warren, Waitsfield, and Woodbury; CVRPC) ✓ Central Vermont Phase 1 (Barre City, Barre Town, Plainfield, and Berlin; CVRPC) ✓ Harwood Union School (Duxbury) ✓ Fayston and Warren Elementary Schools (Fayston & Warren) ✓ Fuller Hill (Warren) ✓ Underhill (CCRPC) ✓ Park Street (Barre City; Friends of the Winooski) ✓ Quarry Hill and Sterling Hill (Barre Town / City; Friends of the Winooski) ✓ Brandon (Town of Brandon) ✓ Jericho (CCRPC) ✓ Town of Northfield GSI retrofits (CVRPC) ✓ Tenney Brook / East Creek (RNRCD) ✓ Middlebury Downtown (Middlebury) ✓ Memphremagog Watershed (Memphremagog Watershed Association) ✓ Dishmill Brook (CNRCD) ✓ Lamoille small sites GSI assessment (LNRCD) ✓ College Street watershed (City of Burlington) 	<ul style="list-style-type: none"> ✓ Stevens Brook (St. Albans City, St. Albans Town, VTrans) ✓ Rugg Brook (St. Albans City, St. Albans Town, VTrans) ✓ Allen Brook (VTrans) ✓ Sunderland Brook (Essex / Colchester) ✓ Indian Brook (Essex) ✓ Potash Brook (South Burlington) ✓ Bartlett Brook (South Burlington) ✓ Munroe Brook (VTrans) ✓ Upper Englesby (private client) ✓ Moon Brook (Rutland Town / VTrans) ✓ Moon Brook (Rutland City)

Hoyle, Tanner & Associates, Inc.

Since 1973, the professionals at Hoyle, Tanner have successfully collaborated with public and private sector clients on hundreds of important projects. With a staff of over 100 engineers, planners, environmental permitting specialists, technicians, inspectors and support personnel, Hoyle, Tanner has evolved and adapted to meet the constantly changing needs of our clients, funding programs and the increasing complexity of design and permitting.

We provide services in the fields of water resources (water, wastewater and stormwater), transportation (bridges, roadways, and aviation), site development (civil, traffic, and parking), structures (buildings) as well as environmental permitting related to all of these disciplines. Our team of professionals includes noted experts in their fields who are routinely invited to share their knowledge in journals and during conference presentations. We strive to improve continuously and are committed to providing value to our clients' projects.

45

YEARS OF NEW ENGLAND
ENGINEERING EXPERIENCE



Our five New England offices are strategically located to serve our clients and provide local access to our talented professionals. We pride ourselves on being a phone call away and firmly believe that our personal relationships with our clients have been and will continue to be our most important key to success.

Hoyle, Tanner Advantages

Personal Service and Responsiveness

We are a mid-sized firm with the regionally known capabilities and expertise of a larger firm but with the culture of providing the personal service of a small firm. Repeat business is the primary source of our project portfolio which is achieved by being competent, reliable, and responsive. We strongly believe that by building mutually-beneficial long-term partnerships with our clients, we will create value and improved success. We urge you to contact some of our client references to hear first-hand how Hoyle, Tanner has not only excelled from a technical standpoint but also as a trusted and responsive advisor meeting the challenges our clients face.

Budget and Schedule Awareness

Hoyle, Tanner employs a progressive and comprehensive company-wide scheduling and budget tracking system to ensure that we accommodate all project schedules while meeting budgets. By paying close attention to these important project aspects, Hoyle, Tanner managers can make real-time adjustments to staff priorities.

We understand that our clients have schedule and budget commitments which they are bound to. Our in-depth knowledge of state, local and federal funding programs allows us to guide our clients to successful projects which maximize available funding. We routinely position our clients for funding through grant and reimbursement programs which minimizes their local contribution but maximizes the value of the project.

Technical Excellence You Can Trust

Environmental engineering in the form of water and wastewater engineering formed one of the cornerstones of Hoyle, Tanner's beginnings as a company in 1973. Over the years, we have assisted hundreds of clients in meeting their environmental compliance requirements; as their requirements have advanced, so have we.

We have experts whose specialties revolve around stormwater as that emerges as the largest compliance burden from the Clean Water Act in this current time.

We also have unparalleled expertise in asset management planning and supplementation. Asset management has become a core component of the majority of our projects and is regularly a requirement of the funding agency. Our corporate philosophy on asset management is that it is essential to fit the appropriate software solution to meet the client's current and future needs. This approach requires us to have an in-depth understanding of our clients' needs.

This client understanding is the core to our approach on every project that we undertake.



Wastewater	Water	Civil	Transportation
<ul style="list-style-type: none"> • Treatment System Design & Troubleshooting • Solids Handling Design • Construction Administration/ Inspection • Collection System Design & Rehabilitation • Infiltration/Inflow Analysis & Removal • Computerized Infrastructure Mapping • Permit Assistance & Coordination • Consent Decree/ Administrative Order Negotiations • Industrial Treatment • Asset Management 	<ul style="list-style-type: none"> • Permit Assistance & Coordination • Source Acquisition & Management • Treatment System Design & Troubleshooting • Distribution System Design & Analysis • Water System Modeling • Inter-Municipal Agreement Preparation • Permitting • Construction Administration/ Inspection • Asset Management 	<ul style="list-style-type: none"> • Parking Lot Layout & Design • Stormwater Utilities • Site Planning & Design • Stormwater Management • Solid Waste Planning, Design & Closure Plans • Structural Inspection & Design • Permitting & Approvals • Subdivisions • Utility/Infrastructure Design • Wetlands Permitting/ Mitigation • Conceptual Planning 	<ul style="list-style-type: none"> • Roadway & Highway Design • Planning & Administration • Traffic Signal Design • Traffic & Safety Analysis • Aviation Facility Planning & Design • Bridge Engineering • Intersection Analysis & Design • Stormwater Quality & Management • Right-of-Way Coordination • Land Development • Public Participation • Multi-Modal Sidewalk & Bike Path Design

Innovative Ideas for Better Projects

At Hoyle, Tanner, we are always looking to add value to our clients’ projects. We do this on every project by considering initial and long-term costs, sustainability, innovative materials, accelerated construction methods, schedules, environmental permitting, and effects on abutting properties. There are no “cookie-cutter” solutions for our projects; however, the experience we have gained enables our team to partner with you to make prudent decisions together.

Our Commitment

Hoyle, Tanner is committed to long-term relationships with our clients. Our interest is to exceed your expectations in every way so that we will be your first phone call whenever a need arises. We pride ourselves on providing the type of service you will remember as exceptional. The design of infrastructure projects is much more than solely the technical aspects. We understand this, which is why you have our commitment that we will support you with our expertise from start to finish – from concept development to the ribbon cutting.

Management is a key ingredient to the successful completion of a municipally managed project. To demonstrate the experience of the team members proposed, below are brief descriptions of the team members highlighting their knowledge of the stormwater and MS4 regulations and their capabilities.



Kirstin A. DiPietro Worden, PE
Senior Design Engineer

Ms. DiPietro Worden has 21 years of experience including a range of stormwater engineering projects involving hydraulic design, stormwater treatment system layout, design and implementation of BMPs, stormwater utility implementation, and stormwater sewer use ordinance studies. She is also experienced in the design of water and wastewater treatment facilities, wastewater pump stations, and small-scale sewage disposal systems. Her experience also includes water quality monitoring projects involving Indirect Discharge Permits, landfills, and hazardous waste sites, as well as Phase I and II Environmental Site Assessments. **Ms. DiPietro Worden will be the lead design engineer for development of 30% designs, cost estimating, and other technical aspects of the project.**



Heidi J. Marshall, PE
Project Manager
Senior Project Manager
Senior Engineer

Ms. Marshall is a Senior Project Manager/Senior Engineer with extensive experience in municipal engineering. Her technical expertise includes Clean Water Act mandated Stormwater and Industrial Pretreatment Program Administration; Program development and related training; and project management. Ms. Marshall has been assisting industries and municipalities with NPDES compliance since the 1990s following EPA's publishing of the initial stormwater requirements, assisting communities with preparation of the Notice of Intent, updating Stormwater Management Plans, and providing assistance with the required follow-up actions. **As Project Manager of the Hoyle, Tanner team, Ms. Marshall will oversee and provide QA/QC review of technical designs.**



Howard E. Miller
Senior CADD Technician

Mr. Miller is a Senior CADD Technician for Hoyle, Tanner's Environmental Services Group having more than 25 years of experience with preparation of conceptual, preliminary, and final design plans for water quality projects. Mr. Miller supports all of the group's design plan needs having prepared dozens of implementation plans on stormwater, water, and wastewater improvement projects. Mr. Miller's familiarity with survey base plans, site plan preparation, preparation of details, and inclusion of environmental permitting plans has been a focus of his career. **As the primary CADD Technician for this project, Mr. Miller will be responsible for preparation of base plans and design development plans for the selected improvements.**



North Woods Ecological Consulting, LLC (North Woods) is a Vermont-based, woman owned, small business that specializes in wetland delineation, assessment, permitting, restoration and mitigation. The company is listed in the VTrans Disadvantaged Business Enterprise Program (DBE) directory and thus contributes to the “Fair Share” goals of the VT DEC. North Woods has been budgeted for 3.8% of the total estimated cost estimate for this project, exceeding the 3.52% Women’s Business Enterprise goal. North Woods is based in Burlington, Vermont and services generally extend to residents in Maine, New York, New Hampshire, Massachusetts, and locally in Vermont. North Woods has helped many local landowners, businesses, and municipalities with their wetland related needs.

April Moulaert, Owner and Wetland Expert, is a licensed and certified Wetland Scientist. Ms. Moulaert has over 20 years of experience in the environmental field, including nine years of regulatory and non-regulatory experience in the public sector working for the State of Vermont, and nine years of experience in the private sector as an environmental consultant. Ms. Moulaert has also worked on several ecological restoration grants for non-profit organizations in Vermont and New York.

Ms. Moulaert’s unique mix of experience with government, private sector, and non-profit organizations has allowed her to develop relationships and rapport with a diverse group of contacts. Ms. Moulaert received her B.S. in Natural Resource Management from Cornell University and a M.S. in Soil Science from North Carolina State University.

Ms. Moulaert can be reached via email at april@northwoodsecological.com or by phone at (802) 999-4823.

AES Environmental Consulting (AES) is a Vermont-based registered Domestic Limited Liability Corporation. Ann Smith is the principal and sole employee of the company. During this project, Ms. Smith will serve as the outreach coordinator for the team. She will assess outreach needs on a project by project basis, coordinate with the regional planning commissions (RPCs), and work with the municipalities and private landowners that own or are adjacent to the priority assessment sites. Within the municipalities, she will identify and reach out to the key decision makers and understand their process. She will facilitate meeting and onsite reviews with municipal staff and private landowners including identifying concerns and possible solutions.

Ann Smith, Principal, was the Executive Director of the Friends of the Winooski River (Friends) for 12 years. In that role, the Friends grew significantly with respect to the variety and complexity of the projects. Much of this growth was due to Ms. Smith’s ability to develop relationships with many partners including municipalities. Under her leadership, the Friends worked closely with municipalities to replace and retrofit culverts, restore floodplains, and complete stormwater mitigation projects. The Friends also worked with private landowners and schools on stormwater projects. Under Ms. Smith’s leadership, the Friends has led successful stormwater mitigation projects in diverse sets of communities such as Barre City, Barre Town, Cabot, Bolton and Huntington. She has written many successful grant applications to a variety of funding sources including the Ecosystem Restoration Program. During this project, Ms. Smith will share her knowledge of how a watershed group can establish a mutually beneficial partnership with municipalities and other key landowners such as supervisory unions.



Rutland Natural Resources Conservation District (Rutland NRCD) is committed to fostering an awareness of the link between stewardship of the natural environment and the agricultural community as well as other landowners, and encouraging and supporting efforts with partners, in meeting the need for natural resource conservation. The Rutland NRCD was established in 1968. It includes the 16 towns in the eastern part of Rutland County and Rutland City. The Rutland NRCD will assist with landowner outreach for the Rutland area. As this area can be particularly complex, the community ties that the Rutland NRCD has already established through their work in the area for the past 50 years will be invaluable in advancing projects.

Nanci McGuire, District Manager, has been with the Rutland NRCD since 1996. Ms. McGuire is very familiar with the Rutland area and graduated of Rutland Senior High School. In her role at the Rutland NRCD, she is responsible for budgeting, grant writing, coordinating educational workshops, and works to promote and implement environmental projects. Ms. McGuire is a member of the steering committee for the Vermont Envirothon, a high school environmental education program and is on the Advisory Board for the Stafford Technical Centers, Forestry and Natural Resources class.

Six Regional Planning Commissions (RPCs), those located within the Lake Champlain Basin, are also members of the project team. The RPCs will be instrumental in several areas of the project including identification of the 10 municipalities and 10-15 drainage areas of focus as well as identification of specific projects within the selected study areas. Once sites are selected for design it would be valuable to have the RPC to assist with outreach and coordination with the municipality or municipalities as well as involved private landowners. The RPCs will also assist with the final project summary including assistance with presenting the plan to the community and promoting the process to be applied elsewhere in the State. The participating RPCs include:

- **Addison County Regional Planning Commission**
- **Central Vermont Regional Planning Commission**
- **Chittenden County Regional Planning Commission**
- **Lamoille Regional Planning Commission**
- **Northwest Regional Planning Commission**
- **Rutland Regional Planning Commission**

Please see the attached letters of support from the RPCs as well as the Rutland NRCD.

More information can be found about each of the project team members in the attached resumes.



V. Project Examples

Bartlett Bay Treatment System South Burlington, VT- 2015-2017

Contact: Tom DiPietro, Stormwater Superintendent, City of South Burlington

Email: tdipietro@sburl.com

Phone: (802) 658-7961 x6108

A project was identified to manage a large residential development in the City of South Burlington during the Bartlett Brook Flow Restoration Plan (FRP). The practice manages both private residential areas and sections of the public road network on land owned by the City of South Burlington. The practice manages 70.7 acres, 16.4 acres of which are impervious cover. The project made use of a previously undeveloped space owned by the City without changing the overall aesthetic character of the area. Prior to this retrofit, significant erosion was noted at the existing stormwater outfalls. After this project was identified during the FRP, the team of Watershed Consulting Associates, LLC (Watershed) and Hoyle, Tanner, and Associates were hired by the City of South Burlington to advance the design for this project to 100% completion and implementation. Following further field investigations and modeling efforts, it was determined that the most effective retrofit for this site would be to direct the unmanaged stormwater runoff to a large gravel wetland. This project was recently constructed and is providing flow control, preventing nutrients and sediment from reaching Bartlett Brook, and mitigating further erosion at the stormwater outfalls.



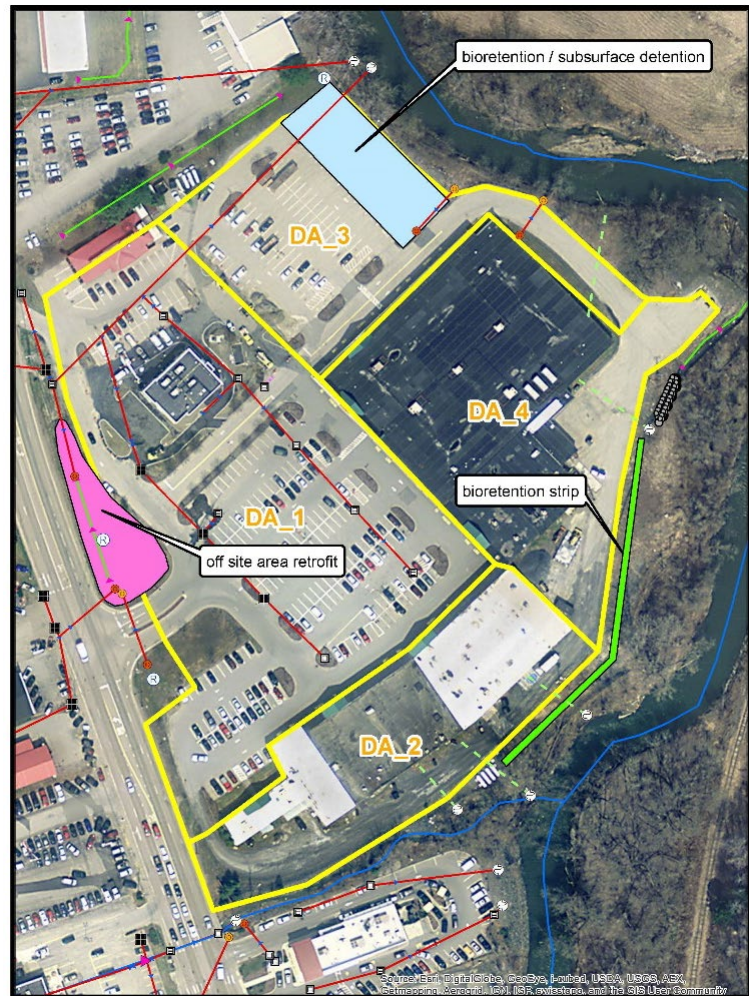


Pomerleau Site Assessments Statewide, VT- 2016

Contact: Pomerleau Real Estate

Email: info@VermontRealEstate.com Phone: (802) 863-8210

Due to requirements set forth in Act 64, Pomerleau Real Estate, who own many properties that may be subject to the ≥ 3 acres of impervious permit, sought to assess their properties to better understand what stormwater permitting and retrofit obligations lie ahead so they may plan accordingly. Watershed Consulting Associates, LLC (Watershed), in partnership with Scott Michael Mapes Environmental Engineering, assessed 36 properties primarily distributed across Vermont with a few in New York. Of these sites, 22 were not covered by a valid state stormwater permit and 32 were within the Lake Champlain Basin. A desktop assessment was first made to determine impervious cover, property boundaries, existing stormwater infrastructure (from mapped data or as-built plans), permitting history, receiving water and associated impairments, manner of discharge, level of treatment, mapped soil conditions, natural resource constraints, available open space, and other pertinent information. Sites were ranked using a prioritization matrix. Then, 10 high priority sites were assessed in the field for retrofit feasibility. Of these 10 sites, four will be subject to the 3-acre permit and five are within stormwater impaired watersheds. Many of the proposed retrofits manage a combination of public and private drainage, and, depending on the site, recommend retrofits on either Pomerleau-owned areas or in publicly-owned spaces. Data were catalogued and a retrofit assessment form was created for each site. A final report, maps, and Best Management Practice retrofit summary sheets were submitted with a discussion of methodology and recommendations for future stormwater retrofits. Geographic Information Systems (GIS) data was made available in Google Earth compatible (.kml) format to allow non-GIS users to query and make use of the newly created database.



Retrofit concept design for the Berlin shopping center, which has 8.4 acres of impervious cover. Private, State and municipal runoff commingles with runoff from the site prior to direct discharge to Stevens Branch.



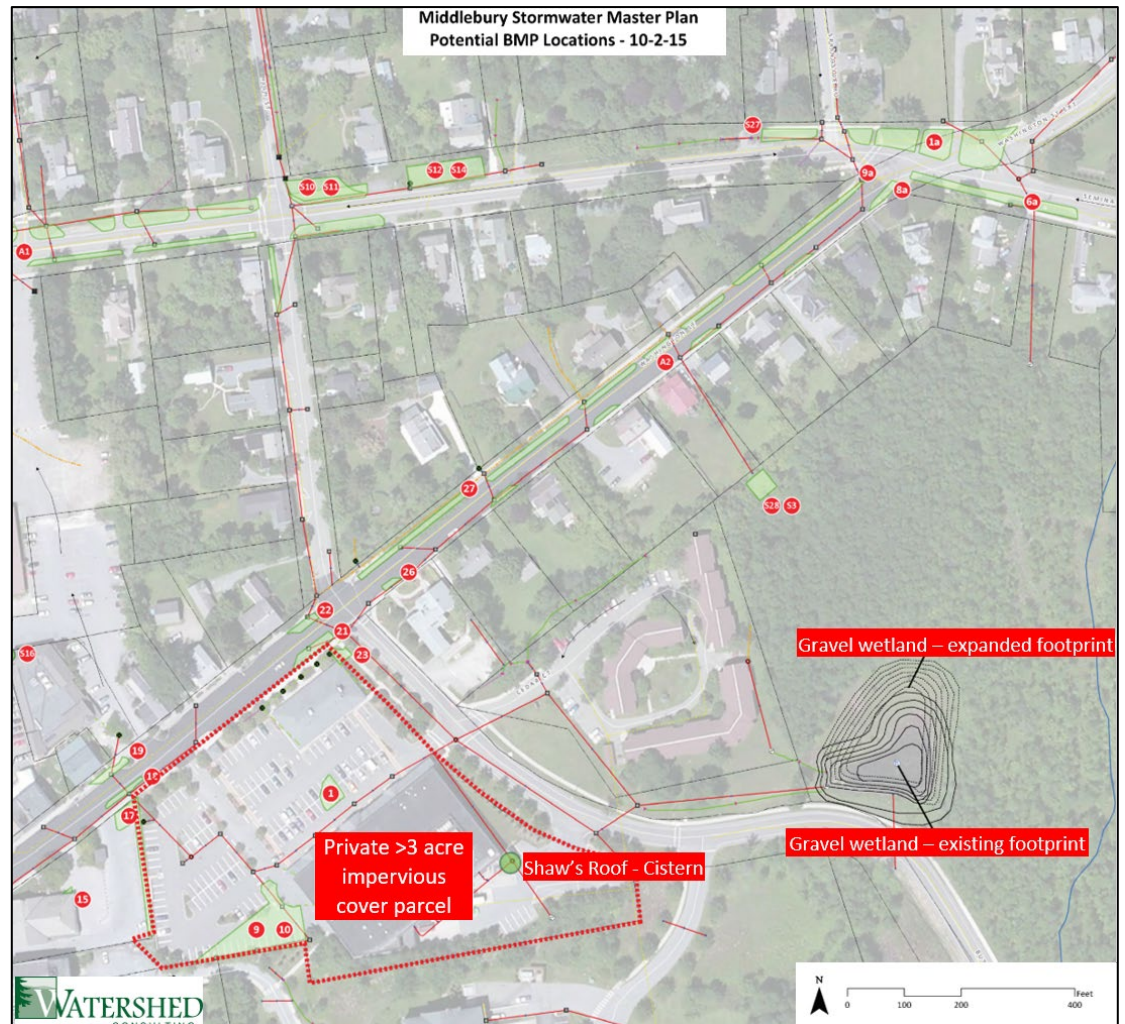
Middlebury Downtown – Stormwater Master Plan Middlebury, VT- 2014-2015

Contact: Claire Tebbs, Addison County Regional Planning Commission
Email: ctebbs@acrpc.org Phone: (802) 388-3141

The Addison County Regional Planning Commission was awarded an Ecosystem Restoration Program grant to develop a stormwater master plan (SWMP) for a section of downtown Middlebury, Vermont. There is a large outfall for the drainage area that is directed to an older stormwater pond permitted to treat both public and private impervious cover. However, this pond offers little stormwater treatment as there is no controlled outlet structure to provide flow or nutrient control. Watershed Consulting Associates, LLC (Watershed) developed a comprehensive SWMP with potential retrofits on public and private property for the drainage area. The two largest segments of impervious cover are those associated with roads controlled by the Town of Middlebury and rooftop and parking associated with the Shaw's Supermarket (>3 acres of impervious cover; see map below).

Using extensive desktop and field assessment, including modeling in HydroCAD (for Best Management Practice (BMP) sizing), WinSLAMM (for pollutant load modeling and reduction estimation), and PCSWMM (for hydrologic comparison with HydroCAD and hydraulic modeling of specific structures within the drainage area to account for localized flooding during high-flow events), 30 potential BMPs were identified for the drainage area. Each was then

assessed for costs and benefits (BMP construction cost, pollutant load reduction including phosphorus reduction in lbs/year, aesthetic enhancement, traffic calming, etc.) to determine the optimal retrofit scenario for the area. These criteria were then scored to create a priority list for concept design. One concept included converting the existing shared stormwater pond into a gravel wetland to provide stormwater flow control and maximize phosphorus removal for both the managed public and private impervious cover.

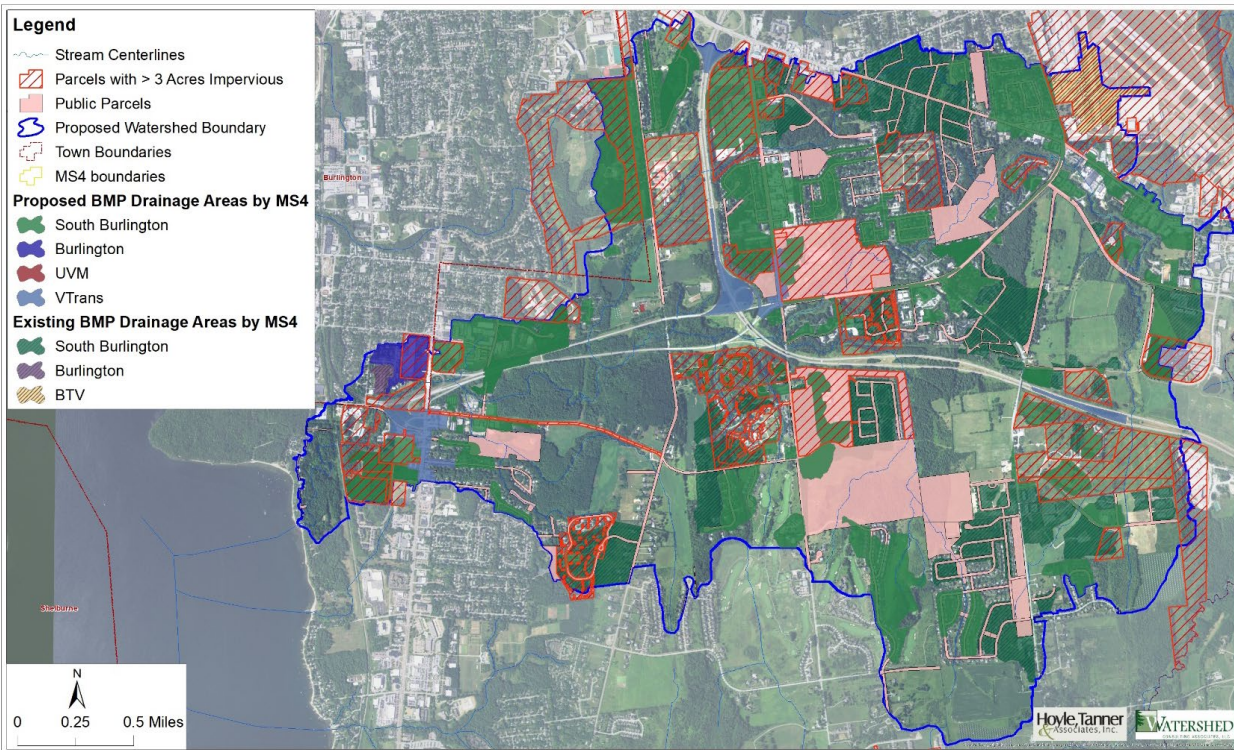




Potash Brook Flow Restoration Plan South Burlington, VT- 2014-2017

Contact: Tom DiPietro, Stormwater Superintendent, City of South Burlington
Email: tdipietro@s Burlington.com Phone: (802) 658-7961 x6108

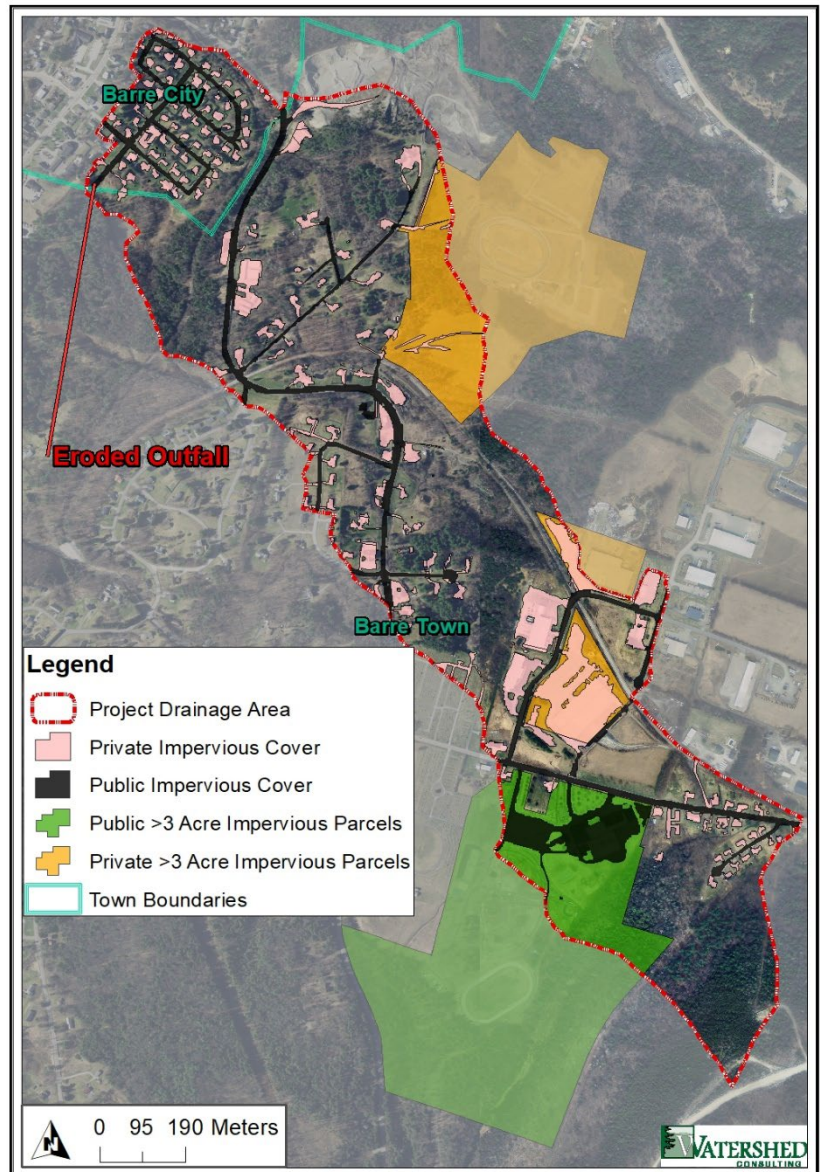
Watershed Consulting Associates, LLC (Watershed), in partnership with Hoyle, Tanner & Associates, Inc., was contracted by the City of South Burlington to complete a Flow Restoration Plan (FRP) of the stormwater impaired Potash Brook. Potash Brook and its watershed are located in Chittenden County, primarily in the City of South Burlington, and encompass an area of 7.13 square miles. The main stem of Potash Brook originates in the southeast portion of South Burlington, south of Interstate 89 and east of Route 116, and flows to its mouth at Shelburne Bay in Lake Champlain. The watershed includes significant public and private impervious cover including many sites with ≥ 3 acres of impervious cover. The Potash Brook FRP will act as a guidance document for the five Municipal Separate Storm Sewer System entities (South Burlington, Burlington, Vermont Agency of Transportation, Burlington International Airport, and the University of Vermont) in the watershed as they implement the stormwater Best Management Practices necessary to attain the flow restoration targets established by the Potash Brook Total Maximum Daily Load (TMDL) requiring a 16.5% reduction in stream high flow. Existing BMPs that did not meet current stormwater management standards were evaluated to determine if they could be retrofitted to provide improved stormwater treatment. These new BMPs were then evaluated using the Best Management Practice Decision Support System model. To meet targets, Watershed determined optimal locations for proposed BMPs, completed BMP designs, and assessed the watershed-wide impact of the proposed retrofits. These BMPs were added to the model until the required stream flow reduction target of 16.5%, established in the TMDL, was achieved. The final model run included 107 BMPs, which were ranked using a project-specific, comprehensive matrix that included cost estimations and scheduled for construction over a 17-year period. A final FRP was developed including a financial and implementation plan.



Pouliot Avenue –Regenerative Stormwater Conveyance Design and Stormwater Master Plan Barre Town & Barre City, VT- 2015-2018

Contact: Ann Smith, Former Executive Director, Friends of the Winooski
Email: aesconsultingvt@gmail.com Phone: (802) 881-4409

The State of Vermont Stormwater Section staff identified the Pouliot Ave drainage area and outfall as a high priority retrofit area in the Upper Winooski Basin Stormwater Infrastructure Mapping Project Report (2013). The drainage area for this outfall is primarily steep, underlain with erosive soils, and is fairly heavily developed. Below the outfall is a large eroded gully caused by significant stormwater flows. The untreated stormwater and erosion below the outfall is predicted to export 7,548 pounds of sediment and 21 pounds of phosphorus annually to the Stevens Branch. The majority of the drainage area for this eroding outfall is in Barre Town, but a portion falls within Barre City. Impervious coverage in the area is a mix of public and private, and there are portions of four parcels with ≥ 3 acres of impervious cover within the drainage area. Of these four parcels, one is public (Barre Town Elementary and Middle School) and three are private. Watershed Consulting Associates, LLC (Watershed) was hired by The Friends of the Winooski to evaluate and design an erosion control practice below the eroded outfall. A regenerative stormwater conveyance step pool system composed of a series of filtration and infiltration step pools separated by gabion walls was designed to retrofit this outfall. The retrofit itself is located partially on private property in Barre City and partially on public land in Barre Town. Ultimately, the retrofit design and funding required public and private cooperation as well as support from the two municipalities. In addition to this outfall retrofit, a stormwater master plan (SWMP) was carried out for the drainage area to this outfall, and a neighboring drainage area with similar issues, with the goal of reducing phosphorus and sediment loading as well as stormwater volume draining to surface waters. 30% designs were advanced for the top five projects of this SWMP.





VI. Project Schedule

The project team is committed to completing all deliverables by September 30, 2020. Please see the table below for a complete proposed project schedule.

Project Task	2018		2019												2020									
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
1 Project Startup Meetings and Coordination																								
1.1: Project kickoff																								
1.2: Vermont DEC planning session #1																								
1.3: Vermont DEC planning session #2																								
2 Site Selection																								
2.1: Tier 1 priority ranking assessment: selection of municipalities																								
2.2: Tier 2 priority ranking assessment: selection of priority drainage areas																								
2.3: Vermont DEC and municipal meetings																								
3 Stormwater Assessment of Selected Areas																								
3.1: Desktop assessment																								
3.2: Digital map and app preparation																								
3.3: Field data collection and feasibility assessment #1																								
3.4: Update project list and maps																								
3.5: Initial stakeholder outreach																								
3.6: Project ranking																								
4 30% Engineering Designs																								
4.1: Site surveys and baseplans																								
4.2: Modeling and sizing of retrofit practices																								
4.3: Proposed condition plan development																								
4.4: Feasibility assessments #2																								
4.5: Vermont DEC, municipal, and private landowner meetings																								
5 Final Report																								
5.1: Final summary report with all supporting documentation																								
5.2: Presentation of project to local boards and DEC																								
Additional task: story map																								