



Agenda for Regular City Council Meeting

City Council Chambers, City Hall
Wednesday, September 21, 2016
6:30 P.M.

- 1) Call to Order by the Mayor
- 2) 16-266. Review and Approve Agenda
- 3) 16-267. General Business and Appearances
- 4) 16-268. Consent Agenda:
 - a) Consideration of the Minutes from the September 14, 2016 City Council Meeting.
 - b) French Block Memorandum of Understanding
 - c) Payroll and Bills
- 5) 16-269. Appointments to Montpelier's Historic Preservation Commission
- 6) 16-270. Car Share Update
- 7) 16-271. DID – Montpelier Alive
- 8) 16-272. Montpelier Transportation Advisory Committee Restructuring
- 9) 16-273. CSO Discussion
- 10) 16-274. Stormwater Plan
- 11) 16-275. Housing Task Force
- 12) 16-276. Junkyard Ordinance – 2nd Reading
- 13) 16-277. Goal Review: Clean Environment
- 14) 16-278. Update on 1 Taylor Redevelopment Easements
Possible Executive Session in accordance with Title I, V.S.A. §313,
Executive Sessions, (a)(2).

- 15) 16-279. Other Business
- 16) 16-280. Council Reports
- 17) 16-281. Mayor's Report
- 18) 16-282. City Clerk's Report
- 19) 16-283. City Manager's Report
- 20) *Adjournment*



CITY COUNCIL Agenda Item #__16-270__

Date: September 21, 2016

Consent __ Discussion _X_ Time Sensitive __
(outlined below)

SUBJECT: CarShare Update

SUBMITTING DEPARTMENT: City Manager's Office

RECOMMENDED ACTION: Receive report from CarShare Vermont.

RELATED COUNCIL GOAL/PRIOR ACTION: H: "Maintain a clean and healthy natural environment"

EXPENDITURE REQUIRED: N/A

SOURCE OF FUNDS: N/A

LEGAL REQUIREMENTS: N/A

BACKGROUND INFORMATION: Councilor Olson requested an update from CarShare Vermont on the use of the program in Montpelier. Alicia Taylor, Director of Community Engagement, and Annie Bourdon, Executive Director, will present on the CarShare Vermont program in Montpelier.

SUPPORTING DOCUMENTS: Provided at the meeting.

INTERESTED PARTIES: Montpelier public

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to read "W. J. [unclear]".



CITY COUNCIL Agenda Item #__16-273__

Date: September 21, 2016

Consent __ Discussion X Time Sensitive __
(outlined below)

SUBJECT: Combined Sewer Overflow (CSO) Presentation

SUBMITTING DEPARTMENT: Public Works

RECOMMENDED ACTION: Receive presentation; provide an opportunity for questions from members of the Council & public.

RELATED COUNCIL GOAL/PRIOR ACTION: C: Maintain a Safe Community, H: Maintain a clean and healthy natural environment

EXPENDITURE REQUIRED: See water & sewer master plan, and general fund accounts "storm water management" & "sewer collection system"

SOURCE OF FUNDS: Sewer fund

LEGAL REQUIREMENTS: 10 V.S.A., Section 1272 & Discharge Permit

BACKGROUND INFORMATION: The City Manager & Public Works Director provided a briefing about CSO issues during the Council's regular meeting on September 14th and explained that a more detailed presentation about the history of combined sewer systems, the city's ongoing efforts to control and ultimately eliminate overflows and the evolving and current regulatory process for achieving compliance with the Vermont Water Quality Standards.

SUPPORTING DOCUMENTS: Power point presentation will be available for public access at the meeting. Attached are the new CSO rule and the new reporting rule.

INTERESTED PARTIES: City Council Members, general public, ANR, river & lake advocates & recreational / outdoor enthusiasts

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to read "W. Hoffman", written over a horizontal line.

No. 86. An act relating to public notice of wastewater discharges.

(H.674)

It is hereby enacted by the General Assembly of the State of Vermont:

Sec. 1. 10 V.S.A. chapter 47, subchapter 1A is added to read:

Subchapter 1A. Notification of Sewage and Wastewater Discharges

§ 1295. NOTIFICATION OF SEWAGE AND WASTEWATER

DISCHARGES

(a) Definitions. Notwithstanding the application of the definitions in section 1251 to the chapter as a whole, as used in this subchapter:

(1) “Collection system” means pipelines or conduits, pumping stations, force mains, and all other facilities used to collect or conduct sewage or stormwater, or both sewage and stormwater.

(2) “Combined sewer overflow” means an untreated or partially treated discharge to waters of the State from a combined sewer system outfall that results from a wet weather storm event.

(3) “Combined sewer system” means a collection system that was designed to convey sewage and stormwater through the same network of pipes to a treatment plant.

(4) “Dry weather flow” means flow in a sanitary sewer or combined sewer system during periods of dry weather.

(5) “Sanitary sewer system” means a collection system that conveys sewage and groundwater entering the collection system through inflow and infiltration to a wastewater treatment facility.

(6) “Separate storm sewer system” means a collection system that is designed to discharge stormwater and groundwater entering the collection system through inflow and infiltration to surface waters.

(7) “Sewage” means domestic, commercial, and industrial wastewater conveyed by a collection system.

(8) “Stormwater” means precipitation and snowmelt that does not infiltrate into soil, including material dissolved or suspended in it.

(9) “Untreated discharge” means:

(A) combined sewer overflows from a wastewater treatment facility;

(B) overflows from sanitary sewers and combined sewer systems that are part of a wastewater treatment facility during dry weather flows, which result in a discharge to waters of the State;

(C) upsets or bypasses around or within a wastewater treatment facility during dry or wet weather conditions that are due to factors unrelated to a wet weather storm event and that result in a discharge of sewage that has not been fully treated to waters of the State; and

(D) discharges from a wastewater treatment facility to separate storm sewer systems.

(10) “Wastewater treatment facility” means a treatment plant, collection system, pump station, and attendant facilities permitted by the Secretary for the purpose of treating sewage.

(b) Public alert. An operator of a wastewater treatment facility or the operator’s delegate shall as soon as possible, but no longer than one hour from discovery of an untreated discharge from the wastewater treatment facility, post on a publicly accessible electronic network, mobile application, or other electronic media designated by the Secretary an alert informing the public of the untreated discharge and its location, except that if the operator or his or her delegate does not have telephone or Internet service at the location where he or she is working to control or stop the untreated discharge, the operator or his or her delegate may delay posting the alert until the time that the untreated discharge is controlled or stopped, provided that the alert shall be posted no later than four hours from discovery of the untreated discharge.

(c) Agency notification.

(1) An operator of a wastewater treatment facility shall within 12 hours from discovery of an untreated discharge from the wastewater treatment facility notify the Secretary and the local health officer of the municipality where the facility is located of the untreated discharge. The operator shall notify the Secretary through use of the Department of Environmental Conservation’s online event reporting system. If, for any reason, the online

event reporting system is not operable, the operator shall notify the Secretary via telephone or e-mail.

(2) A notification required by this subsection shall include:

(A) The specific location of each untreated discharge, including the body of water affected. For combined sewer overflows, the specific location of each untreated discharge means each outfall that has discharged during a wet weather storm event.

(B) Except for untreated discharges under subdivision (a)(9)(D) of this section, the date and approximate time the untreated discharge began.

(C) The date and approximate time the untreated discharge ended. If the untreated discharge is still ongoing at the time of reporting, the entity reporting the untreated discharge shall amend the report with the date and approximate time the untreated discharge ended within three business days of the untreated discharge ending.

(D) Except for untreated discharges under subdivision (a)(9)(D) of this section, the approximate total volume of sewage and, if applicable, stormwater that was released. If the approximate total volume is unknown at the time of reporting, the entity reporting the untreated discharge shall amend the report with the approximate total volume within three business days.

(E) The cause of the untreated discharge.

(F) The person reporting the untreated discharge.

(G) Any other information deemed necessary by the Secretary.

(d) Notification of additional discharges. In addition to untreated discharges posted pursuant to subsection (c) of this section, the Secretary shall post a notification of other unpermitted discharges to waters of the State that may pose a threat to human health or the environment and that are identified by the Secretary. The Secretary's notification shall include the information required under subdivision (c)(2) of this section and shall be posted on the Secretary's online event reporting system no later than four hours from the discovery of an unpermitted discharge, except that if the unpermitted discharge is discovered between the hours of 9:00 p.m. and 5:00 a.m., the Secretary shall post the notification no later than 10:00 a.m. of that morning. The Secretary's notification shall identify the potential threat to the public health that may be posed by recreating in the waters where the unpermitted discharge occurred.

(e) Signage.

(1) Each combined sewer overflow outfall shall be marked with a permanent sign that identifies the outfall and warns of the potential threat to public health that may be posed by recreating in the waters at the outfall or downstream of the outfall during or after a wet weather storm event. The Secretary shall provide each municipality with a combined sewer overflow two signs for each outfall within the municipality. A municipality shall periodically inspect and maintain each sign marking a combined sewer overflow outfall and shall replace a sign if it is destroyed, removed, or no longer legible.

(2)(A) A municipality shall, within its jurisdiction or other geographic area specified by the Secretary, post temporary signs at public access areas downstream of:

(i) untreated discharges under subdivisions (a)(9)(B)–(D) of this section; and

(ii) other unpermitted discharges posted by the Secretary under subsection (d) of this section.

(B) The signs shall warn of the potential threat to public health that may be posed by recreating in the waters due to the untreated or unpermitted discharge. The signs shall remain in place for 48 hours after the untreated or unpermitted discharge has stopped.

Sec. 2. 10 V.S.A. § 1278(e) is amended to read:

~~(e) Notice of certain discharges. The secretary of natural resources shall post publicly notice of an illegal discharge that may pose a threat to human health or the environment on its website within 24 hours of the agency's receipt of notification of the discharge. [Repealed.]~~

Sec. 3. 18 V.S.A. § 1222 is added to read:

§ 1222. CYANOBACTERIA MONITORING AND NOTIFICATION

(a) As used in this section:

(1) "Cyanobacteria" means photosynthetic bacteria that have two photosystems, produce molecular oxygen, and use water as an

electron-donating substrate in photosynthesis, including microcystis, anabaena, and aphanizomenon.

(2) "Waters" shall have the same meaning as used in 10 V.S.A. § 1251.

(b) The Commissioner of Health, in consultation with the Secretary of Natural Resources, shall coordinate efforts to monitor the presence of cyanobacteria in the waters of the State.

(c) The Department of Health shall maintain a publicly accessible Internet site that provides information concerning the presence of cyanobacteria in areas known to be used for recreation, including swimming or boating. Within one hour of a determination that the presence of cyanobacteria in a recreation area is a public health hazard, the Commissioner of Health shall conduct public outreach describing the area affected and the nature of the public health hazard in the area.

Sec. 4. EFFECTIVE DATES

This act shall take effect on passage, except that Sec. 3 (cyanobacteria monitoring) shall take effect on July 1, 2016.

Date Governor signed bill: May 4, 2016

ENVIRONMENTAL PROTECTION RULE
CHAPTER 34

COMBINED SEWER OVERFLOW RULE

State of Vermont
Agency of Natural Resources
Department of Environmental Conservation

Adopted August 25, 2016; Effective September 15, 2016

Subchapter 1. GENERAL PROVISIONS

§ 34-101 Effect

As of the effective date of this Rule, this Rule supersedes the state of Vermont's "Combined Sewer Overflow Control Policy," dated June 1990.

§ 34-102 Purpose

The purpose of this Rule is to protect public health and the environment by ensuring that all remaining Combined Sewer Overflows (CSOs) in the State are brought into compliance with the requirements of state and federal law, including the Vermont Water Quality Standards (VWQS). This Rule codifies, updates, and clarifies the technology-based and water quality-based requirements applicable to the CSOs within the State, consistent with state and federal law. Further, this Rule includes the processes through which the Agency of Natural Resources (Agency) will require municipalities to bring CSOs into compliance with the VWQS.

§ 34-103 Policy

CSOs adversely affect the quality of waters of the State and may create short-term public health concerns. Therefore, a primary goal of state and federal pollution control programs is to abate and control CSOs and bring them into compliance with water quality standards. However, the Agency also recognizes that CSO abatement and control is an iterative and costly process and that it will take time to bring CSOs into compliance with the VWQS.

§ 34-104 Authority

This Rule is adopted by the Agency pursuant to 10 V.S.A. §§ 1251a, 1259, 1263, and 1295.

Subchapter 2. DEFINITIONS

§ 34-201 Definitions

As used in this Rule:

(1) "5-year design storm" means a theoretical rainfall event, based on historical records for a given area, having a theoretical 5-year recurrence interval. The 5-year design storm values in Appendix A were calculated with data from Cornell's Northeast Regional Climate Center's (NRCC) Extreme Precipitation Analysis website.

(2) "Agency" means the Vermont Agency of Natural Resources.

(3) "The Clean Water Act" (CWA) means the federal Clean Water Act, as amended (33 U.S.C. § 1251, *et seq.*).

(4) "Collection system" means pipelines or conduits, pumping stations, force mains, and all other attendant facilities used to collect or conduct sewage or stormwater, or both sewage and stormwater.

(5) "Combined sewer system" (CSS) means a collection system that was designed to convey sewage and stormwater through the same network of pipes to a treatment plant.

(6) “Combined sewer overflow” (CSO) means a discharge to waters of the State from a CSS outfall that results from a wet weather storm event. Such discharges include raw sewage and stormwater that may contain untreated human waste and pollutants from residential, commercial, and industrial establishments as well as solids, metals, bacteria, viruses, and other pollutants washed from streets and parking lots.

(7) “Combined sewer overflow (CSO) outfall” means an overflow point from a CSS that allows for combined sewage and stormwater to discharge directly to surface waters prior to treatment.

(8) “Discharge” means the placing, depositing, or emission of any wastes, directly or indirectly, into an injection well or into the waters of the State.

(9) “Dry weather flow” means flow in a CSS during periods of dry weather.

(10) “Green stormwater infrastructure” means a wide range of multifunctional natural and semi-natural landscape elements that are located within, around, and between developed areas, that are applicable at all spatial scales, and that are designed to control or collect stormwater runoff through detention or soil absorption.

(11) “Long Term Control Plan” (LTCP) means a comprehensive plan, including site-specific measures, to abate and control CSOs and bring them into compliance with the VWQS.

(12) “Municipality” means a city, town, village, borough, county, parish, district, association, or other public body created by or pursuant to state law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA.

(13) “National Pollutant Discharge Elimination System” (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements under sections 307, 402, 318 and 405 of the CWA. The term includes an “approved program.” The U.S. Environmental Protection Agency authorized Vermont as an “approved program” in 1974.

(14) “Preliminary Engineering Report (PER) format” means the format required by the Secretary of Natural Resources for a planning document required by the State as part of the process of obtaining financial assistance for planning and development of water pollution control infrastructure.

(15) “Sewage” means domestic, commercial, and industrial wastewater conveyed by a collection system.

(16) “Stormwater” means precipitation and snowmelt that does not infiltrate into the soil, including material dissolved or suspended in it.

(17) “Vermont Water Quality Standards” (VWQS) means the rules adopted by the Agency to achieve the goals of the Vermont Water Quality Policy (10 V.S.A § 1250) as well as the objectives of the CWA.

(18) “Wet weather flow” means dry weather flow combined with stormwater in a CSS.

(19) “Wastewater treatment facility” means a pollution abatement facility, including the treatment plant, collection system, pump stations, and attendant facilities permitted by the

Agency for the purpose of treating sewage.

Subchapter 3. APPLICABILITY

§ 34-301 Applicability

(a) This Rule applies to all municipalities with CSO outfalls that discharge as a result of wet weather flows and to all discharges from CSO outfalls that are generated as a result of wet weather flows.

(b) This Rule does not apply to:

(1) overflows from a collection system during dry weather flows, or

(2) upsets or bypasses within a wastewater treatment facility during dry weather or wet weather conditions, which are due primarily to factors not related to wet weather flows, such as a blockage in a sewer line or a malfunction of a pump station.

(c) Overflows, upsets, and bypasses, which are not the result of wet weather flows, are subject to the enforcement provisions of 10 V.S.A. §§ 1274 and 1275 and 10 V.S.A. Chapter 201, unless the permittee applies for and obtains an Emergency Pollution Permit pursuant to 10 V.S.A. § 1268.

Subchapter 4. REQUIREMENTS

§ 34-401 General Requirements

(a) During the NPDES discharge permit application and renewal process, municipalities with CSSs shall identify their CSO outfalls.

(b) All NPDES discharge permits issued to municipalities with CSO outfalls shall contain conditions, including the conditions required by this Rule, requiring compliance with the technology-based and water quality-based requirements of state and federal law, including the VWQS.

(c) CSO controls shall be implemented in a two-phased process.

(1) During Phase I, as a condition of a NPDES discharge permit, a municipality shall be required to:

(A) Implement the technology-based minimum controls and document that these requirements have been met. The technology-based requirements of this Policy are the “Minimum Controls”, which incorporate the Nine Minimum Controls outlined in the U.S. Environmental Protection Agency’s 1994 Combined Sewer Overflow Control Policy and include best management practices prescribed by the Agency. The Minimum Controls are set forth in § 34-402 of this Rule.

(B) Comply with the water quality-based requirements of state law, including the VWQS. If a municipality is not in compliance, the Agency shall, concurrent with issuance of the NPDES discharge permit, issue an order pursuant to 10 V.S.A. § 1272, or another legally enforceable mechanism, requiring the municipality to develop or update a Long Term Control Plan (LTCP), subject to review and approval by the Agency, to abate and control its CSOs and

provide for the attainment of the VWQS. The minimum requirements for LTCPs are set forth in § 34-403 of this Rule. The Agency encourages municipalities to evaluate and implement green stormwater infrastructure for stormwater runoff and sewer overflow management to the greatest extent possible when developing their LTCPs.

(2) During Phase II:

(A) As a condition of a NPDES discharge permit, a municipality shall continue implementing the Minimum Controls.

(B) Once the Agency has approved a municipality's LTCP, the Agency shall issue an order pursuant to 10 V.S.A. § 1272, or another legally enforceable mechanism, containing a compliance schedule by which the municipality shall implement the CSO controls identified in its Agency-approved LTCP. Compliance schedules shall reflect the shortest reasonable time to bring the CSO(s) into compliance.

(3) Phase II may span several NPDES permit cycles until all CSO controls in the LTCP have been constructed and implemented.

(d) The Agency, outside of the typical NPDES discharge permit renewal process, may issue an order pursuant to 10 V.S.A. § 1272, or use another legally enforceable mechanism, containing conditions, including the conditions required by this Rule, requiring CSOs to come into compliance with the technology-based and water-quality based requirements of state and federal law, including the VWQS. If an accurate estimate of the scope of work necessary to bring the CSOs into compliance is not known, then the order or other legally enforceable mechanism shall require a preliminary engineering report and the Agency shall issue a compliance schedule, in an order issued under 10 V.S.A. § 1272 or another legally enforceable mechanism, once the true extent of the correction work is known.

§ 34-402 Minimum Controls

As a condition of a NPDES discharge permit or a legally enforceable mechanism issued pursuant to subsection (d) of § 34-401 of this Rule, a municipality shall implement the minimum technology-based requirements described below, which are designed to maximize pollutant capture and minimize impacts to water quality:

(1) Proper operation and regular maintenance programs for collection systems and CSO outfalls;

(2) Maximum use of the collection system for storage without endangering public health or property, or causing solids deposition problems;

(3) Review and modification of pretreatment requirements to assure that CSO impacts are minimized;

(4) Maximization of flow to the treatment plant for treatment consistent with an evaluation of alternative treatment options;

(5) Prohibition of CSOs during dry weather;

(6) Control of solid and floatable materials in CSOs;

(7) Establishment of pollution prevention programs to minimize contaminants in CSOs;

(8) Public notification to ensure that the public receives adequate notification of CSOs and CSO impacts, which shall, at a minimum, comply with § 34-404 of this Rule;

(9) Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls, which shall include at a minimum:

(A) The municipality shall define through monitoring, modeling, and other means, as appropriate, the sewer system, the response of the system to a range of precipitation events that encompasses the 5-year design storm, the characteristics of the overflows, and the water quality impacts that result from CSOs. To comply with the foregoing requirement, the municipality shall, at a minimum:

(i) Establish and maintain a precipitation monitoring system. The system must provide unique precipitation amounts specific to individual CSO subcatchments. Such a system does not necessarily demand a precipitation recording device for each CSO outfall. Precipitation measurements shall be to the nearest 0.01 inches, continuous at a five-minute interval over the duration of a storm event, and indexed to time and date. If establishing a physical precipitation monitoring system, the municipality shall work to minimize impacts of wind and surrounding trees and buildings that may hinder the accuracy of precipitation recording devices. If a municipality proposes to use a system other than a physical precipitation monitoring system, the municipality shall get prior approval from the Agency.

(ii) Establish a CSO flow monitoring system. At a minimum, the municipality shall install a tell-tale block in each overflow structure and check the block after every precipitation/runoff event.

(B) The municipality shall submit to the Agency, by no later than January 31st of each year, a report on CSO control project(s) of the previous calendar year. The Agency will use the information from the report to monitor the progress on implementation of CSO control project(s). Municipalities shall report progress on:

(i) Compliance with the Minimum Controls;

(ii) The condition and operation of the CSS;

(iii) The frequency, duration, and magnitude of the precipitation events leading to CSOs from the system in the past year and a comparison to prior years;

(iv) The frequency, duration, and magnitude of all CSOs from the system in the past year and a comparison to prior years;

(v) The overall status of the LTCP; and

(vi) Key CSO control accomplishments, highlighting those that reduced the frequency and magnitude of CSOs; projects under design; and construction that occurred in the previous year;

§ 34-403 Long Term Control Plan (LTCP)

As a condition of a legally enforceable mechanism issued pursuant to subsection (c)(1)(B) or (d) of § 34-401 of this Rule, a municipality shall create a LTCP according to the following requirements:

(1) If the municipality wishes to apply for funding from the State to assist in the creation or implementation of its LTCP, the municipality shall draft all reports, including associated planning documents, according to the PER format.

(2) In developing a LTCP, the municipality shall employ a public participation process that actively involves the affected public in the decision-making to develop and select the long-term CSO controls. The affected public includes rate payers, industrial users of the sewer system, persons who reside downstream from the CSO outfalls, persons who use and enjoy the downstream waters, and any other interested persons.

(3) The LTCP shall include an alternatives analysis that shall evaluate the costs and performance of multiple CSO control alternatives, such as:

- (A) installing a flow metering system for each CSO outfall;
- (B) reducing stormwater flows through the separation of combined stormwater and sanitary sewer lines;
- (C) adding storage tanks or retention basins to hold overflow during storm events;
- (D) expanding the treatment plant capacity;
- (E) adding screening and disinfection facilities for the overflow;
- (F) incorporating green stormwater infrastructure to reduce stormwater flow into CSSs to the greatest extent feasible and practical; and
- (G) providing for disinfection of CSOs at the outfall.

(4) The LTCP shall include a detailed list of the selected CSO control projects necessary to bring the CSOs into compliance with the VWQS and a timeline for implementing the projects. The projects shall be prioritized based on the relative importance of adverse impacts upon water quality, including impacts on designated uses. When prioritizing projects, the municipality shall give the highest priority to bringing overflows to sensitive areas into compliance with the VWQS. For purposes of this section, “sensitive areas” means designated Outstanding Resource Waters, designated National Marine Sanctuaries, waters with threatened or endangered species and their habitat, waters where primary contact recreation occurs, public drinking water intakes or their designated protection areas, and shellfish beds.

(5) The LTCP shall ensure that new sources of stormwater and wastewater to the CSS do not increase the volume, frequency, or duration of CSO events through implementation of control measures, such as making reductions in existing sources of stormwater or wastewater to the CSS, creating or increasing storage capacity within the collection system, or other measures approved by the Secretary. The municipality shall report annually in the report required by § 34-402(9)(B) of this Rule on the steps it has taken in the prior year to address this requirement.

(6) If there are documented, recurrent instances of sewage backups or discharges of raw sewage onto the ground surface, the LTCP shall include measures to address these occurrences and prevent them from happening in the future.

(7) The LTCP shall include a financing plan to design and implement the CSO control projects.

(8) The Agency recognizes that financial capability is a significant factor in abating and controlling CSOs and meeting water quality standards. Therefore, a LTCP's implementation schedule may include interim CSO controls as a step in the process of bringing CSOs into compliance with the VWQS. The Agency recommends that interim CSO controls are evaluated and designed based on storms with a theoretical 5-year recurrence interval, also known as the 5-year design storm. The Agency recognizes the significant spatial variability of precipitation across Vermont and has identified the 24-hour and 1-hour extreme precipitation depths at the 5-year recurrence interval for each CSO municipality (Appendix A).

§ 34-404 Notification Requirements

(a) Public alert. An operator of a wastewater treatment facility or the operator's delegate shall as soon as possible, but no longer than one hour from discovery of a CSO, post on a publicly accessible electronic network, mobile application, or other electronic media designated by the Secretary an alert informing the public of the CSO and its location, except that if the operator or his or her delegate does not have telephone or Internet service at the location where he or she is working to control or stop the CSO, the operator or his or her delegate may delay posting the alert until the time that the CSO is controlled or stopped, provided that the alert shall be posted no later than four hours from discovery of the CSO.

(b) Agency notification.

(1) An operator of a wastewater treatment facility shall within 12 hours from discovery of a CSO notify the Secretary and the local health officer of the municipality where the facility is located of the CSO. The operator shall notify the Secretary through use of the Department of Environmental Conservation's online event reporting system. If, for any reason, the online event reporting system is not operable, the operator shall notify the Secretary via telephone or e-mail.

(2) A notification required by this subsection shall include:

(A) The specific location of each CSO outfall that has discharged during a wet weather storm event, including the body of water affected.

(B) The date and approximate time the CSO began.

(C) The date and approximate time the CSO ended. If the CSO is still ongoing at the time of reporting, the entity reporting the CSO shall amend the report with the date and approximate time the CSO ended within three business days of the CSO ending.

(D) The approximate total volume of sewage and stormwater that was released. If the approximate total volume is unknown at the time of reporting, the entity reporting the CSO shall amend the report with the approximate total volume within three business days.

(E) The cause of the CSO.

(F) The person reporting the CSO.

(G) Any other information deemed necessary by the Secretary.

(c) Signage. Each CSO outfall shall be marked with a permanent sign that identifies the outfall and warns of the potential threat to public health that may be posed by recreating in the waters at the outfall or downstream of the outfall during or after a wet weather storm event. The Secretary shall provide each municipality with a CSO two signs for each outfall within the municipality. A municipality shall periodically inspect and maintain each sign marking a CSO outfall and shall replace a sign if it is destroyed, removed, or no longer legible.

APPENDIX A

Extreme precipitation depths¹ (inches) for 24 -hour and 1-hour durations with a 5-year return frequency calculated in GIS for each Vermont CSO municipality.

Town	24 hr	1 hr
Barton	2.7	1.1
Burlington	2.7	1.2
Enosburg	2.7	1.2
Fair Haven	3.0	1.3
Hartford	3.1	1.2
Middlebury	2.9	1.2
Montpelier	2.8	1.2
Newport City	2.6	1.1
Northfield	2.8	1.2
Richford	2.7	1.2
Rutland City	3.1	1.2
Springfield	3.3	1.2
St. Albans City	2.6	1.2
St. Johnsbury	2.8	1.1
Vergennes	2.8	1.2
Woodstock	3.1	1.2
1990 state-wide design standard ²	2.5	1.07
<i>(based on a 2-year design return frequency)</i>		

¹ Extreme Precipitation data were downloaded from Cornell's Northeast Regional Climate Center's (NRCC) Extreme Precipitation Analysis website (<http://precip.eas.cornell.edu/>). This dataset provides depth-duration-frequency raster products for New York and the New England states. Town boundaries were downloaded from the State GIS server, and re-projected from NAD 1983 VT State Plane projected coordinate system into the geographic coordinate system of the NRCC's precipitation rasters (WGS 1972) for use in the analysis.

² The 1990 Policy established a wet weather design precipitation event criteria to be used in designing CSO control systems as follows: design flows for all minimum technology-based limitations were characterized as those flows generated by a 24 hour, 2.5 inch rainfall, and a peak flow derived from a precipitation event of greater than 1.07 inches in one hour. This design criteria approximated a 2-year storm.



CITY COUNCIL Agenda Item #__16-271__

Date: September 21, 2016

Consent __ Discussion _X_ Time Sensitive __
(outlined below)

SUBJECT: Downtown Improvement District – Montpelier Alive

SUBMITTING DEPARTMENT: City Manager's Office

RECOMMENDED ACTION: Receive FY17 DID budget from Montpelier Alive. Provide feedback and approval FY17 budget.

RELATED COUNCIL GOAL/PRIOR ACTION: F: "Maintain a vibrant downtown"

EXPENDITURE REQUIRED: \$57,000

SOURCE OF FUNDS: Downtown Improvement District

LEGAL REQUIREMENTS: N/A

BACKGROUND INFORMATION: Montpelier Alive will present the proposed FY17 DID budget.

SUPPORTING DOCUMENTS: Documents will be circulated on Monday

INTERESTED PARTIES: Montpelier Alive

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to read "W. Hoffman", written over the City Manager's Approval line.



CITY COUNCIL Agenda Item #__16-268__

Date: September 21, 2016

Consent __ Discussion _X_ **Time Sensitive __**
(outlined below)

SUBJECT: Memorandum of Understanding with Downstreet, Inc. for development of Housing in the French Block

SUBMITTING DEPARTMENT: City Manager, Planning Department

RECOMMENDED ACTION: Approve the MOU as presented.

RELATED COUNCIL GOAL/PRIOR ACTION: D: Create and Maintain a healthy environment for housing and economic growth.

EXPENDITURE REQUIRED: \$175,000 as approved on April 13, 2016 as city match for CDBG application. Funding can be paid over multiple years.

SOURCE OF FUNDS: Housing Trust Fund – contingent on approval by the Housing Trust Fund Board who are meeting on Friday after the agenda is prepared.

LEGAL REQUIREMENTS: This MOU outlines agreements necessary for Downstreet to proceed with project development. All points have been reviewed by staff and agreed upon with Downstreet.

BACKGROUND INFORMATION: The French (or Dickie) Block upper floors have been vacant for nearly 80 years. It has long been a city goal to bring new life into that space. Downstreet is securing funding and commitments to proceed with creation of 18 housing units which is a specifically stated FY17 action in our goals document. The City previously committed \$175,000 to this effort as part of the grant application. This MOU formalizes that commitment.

SUPPORTING DOCUMENTS: Proposed MOU with Downstreet

INTERESTED PARTIES: Downstreet, Funding Sources, Aubuchon's, Housing Task Force

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to be "W. Hoffman", written over a horizontal line.

Memorandum of Understanding between Downstreet Housing and Community Development and The City of Montpelier

The purpose of this Memorandum of Understanding is to confirm the mutual understanding of the parties with respect to the potential development of the French Block into permanently affordable rental housing.

Downstreet Housing and Community Development (Downstreet), in partnership with Housing Vermont, will acquire and rehabilitate the upper two floors of the French Block located at 32-42 Main Street in downtown Montpelier, to create 18 units of affordable rental housing

This project has two main goals: 1) redevelopment of vital downtown real estate and 2) increase the availability of affordable rental units. The French Block project will provide new affordable units, construction jobs, and revitalization of a significant downtown building.

In order to access favorable financing for the affordable housing, Downstreet & Housing Vermont will create a limited partnership to own the residential units; Downstreet & Housing Vermont will serve as general partners in the limited partnership and will be responsible for the day-to-day management of the apartments.

Downstreet & Housing Vermont have been working closely with the owner of the building, Aubuchon Realty; if the redevelopment plan is successful, Aubuchon Realty will create a condominium association, will continue to own the first floor retail space and basement, and will sell the second and third floor to Downstreet/Housing Vermont.

The City of Montpelier fully supports the project.

In order to assist the French Block redevelopment efforts:

Downstreet agrees to continue to investigate the feasibility of connecting to the district heating system, while the need for air conditioning and the cost of connection continue to be limiting factors.

The City agrees to the following:

1. Two (2) handicap spots will be designated for French Block tenants in the City-leased "North Branch" lot via a sublease from the City to the French Block.
2. Parking permits for the remaining 16 tenants, to be used in City lots, will be provided. The cost of parking permits will be negotiated between the City and Downstreet. Downstreet will be responsible for managing the spaces and compliance with parking regulations.
3. A location for the tenant dumpster will be identified and provided; the location will be within close proximity of residential entrance at the rear of the building.

4. The City will cooperate and assist the project during construction, including the provision of necessary construction easements for a construction trailer, dumpster, materials staging and scaffolding.
5. The City will provide financial support in the amount of \$175,000 to the project through the Montpelier Housing Trust Fund.

City of Montpelier

By: _____

Date: _____

Name: William Fraser

Title: City Manager

Downstreet Housing and Community Development

By: _____

Date: _____

Name: Eileen Peltier

Title: Executive Director



CITY COUNCIL Agenda Item #__16-277__

Date: September 21, 2016

Consent __ **Discussion** **X**

SUBJECT: Goal Review: H: Maintain a Clean and Healthy Natural Environment

SUBMITTING DEPARTMENT: City Manager

RECOMMENDED ACTION: Receive Report

RELATED COUNCIL GOAL/PRIOR ACTION: Adoption of 2016-17 Goals.

EXPENDITURE REQUIRED: None

SOURCE OF FUNDS: N/A

LEGAL REQUIREMENTS: None

BACKGROUND INFORMATION: The City Council adopted Goals, Strategies and Actions on April 27th. Staff has scheduled regular updates throughout the year.

SUPPORTING DOCUMENTS: Summary memo from City Manager

INTERESTED PARTIES: City Council, City Staff

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to read "W. Hoffman", written over the City Manager's Approval line.



America's Small Town Capital

Mayor John Hollar

William Fraser
City Manager

City Council Members:

Dona Bate
Jessica Edgerly Walsh
Tom Golonka
Jean Olson
Justin Turcotte
Anne Watson

Jessie Baker
Assistant City Manager

MEMORANDUM

To: Mayor Hollar & City Council Members
From: William Fraser, City Manager
Re: Goal Update: Maintain a Clean and Healthy Natural Environment
Date: September 16, 2016

This is the sixth of regular updates on goals.

The topic for this agenda is Maintain a Healthy Environment for Housing and Economic Growth. An excerpt from the Overall Goals document is included. Color Code – White = completed. Green = proceeding as planned Yellow = proceeding but slower than planned. Red = Started but not proceeding well. Purple = Not started yet.

Reference Letter	Policy Goal	Strategies	FY17 Actions
H	Maintain a clean and healthy natural environment	Move toward Net Zero	Create a Net Zero implementation plan
		Provide Effective Storm Water management	Complete Storm water Plan Implement recommendations
		Assure Clean rivers and waterways	Implement CSO rules
			Identify needs, projects. Develop cost estimates.
		Be as Energy Efficient as possible	Continue review of all city facilities with MEAC
		Provide Clean Drinking water	Implement Charter change if approved
			Investigate Protective measures
		Implement Greening America's Capitals	Evaluate concepts and selection for advancement

Steady progress is being made on environmental issues this year.

Tonight's other agenda items will cover the Stormwater Master Plan and CSO issues very extensively. I have shown "implementation of the stormwater plan" in purple only because we are just getting the draft plan and it will not be approved until October 26th to allow for public comment. However we have begun using many of the suggested strategies.

You will be receiving a full report on the Water Source Protection Plan on October 12th which will describe protective measures. In addition, we are discussing the relative merits of a health board hearing.

I am showing the charter change as a completed item. The city passed the item and the legislature did not approve it. Obviously it is possible that the article could be reintroduced during the next session.

MEAC provided an excellent update last week about the Net Zero work.

Greening America's Capitals recommended five projects. Three of them are being pursued in some measure this year. Taylor Street reconstruction is an active project, grant application has been made to study/evaluate the merits of reconstructing the Barre/Main intersection and the Barre Street corridor is included in the complete streets plan being developed. The remaining two recommended projects (reconstruction of the State/Main intersection and converting 60 State St into a street with festival capacity) have not been pursued yet.



CITY COUNCIL Agenda Item #__16-269__

Date: September 21, 2016

Consent __ Discussion _X_ Time Sensitive __
(outlined below)

SUBJECT: Appointments to Montpelier's Historic Preservation Commission

SUBMITTING DEPARTMENT: City Manager

RECOMMENDED ACTION: Consider the four candidates for the four open seats on the Historic Preservation Commission. Make appointments.

RELATED COUNCIL GOAL/PRIOR ACTION: N/A

EXPENDITURE REQUIRED: N/A

SOURCE OF FUNDS: N/A

LEGAL REQUIREMENTS: City Council appoints and guides City boards and commissions.

BACKGROUND INFORMATION: There are four open seats on the Historic Preservation Commission. The City advertised to fill these vacancies. James Duggan and Eric Gilbertson have requested to be reappointed. Elizabeth Peebles and David Carris have submitted applications for appointment.

SUPPORTING DOCUMENTS: Application materials from all four candidates are attached.

INTERESTED PARTIES: Historic Preservation Commission

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to read "W. J. [unclear]".



America's Small Town Capital

The Times-Argus

Please include this ad with City of Montpelier notices on Thursday, August 25th and Monday, September 5th, 2016. Thank you!

MONTPELIER HISTORIC PRESERVATION COMMISSION VACANCIES

The City of Montpelier is seeking individuals interested in filling four expired terms on this Commission; three are 2-year terms; the fourth is a 3-year term. Please submit a letter of interest with a brief resume by noon on Wednesday, September 14th, to the City Manager's Office, City Hall - 39 Main Street, Montpelier, Vermont 05602, or via e-mail to spitonyak@montpelier-vt.org. City Council will make these appointments at their September 22nd meeting; applicants will be notified and encouraged to attend. All municipal meetings are accessible to people with disabilities and are held in accordance with the public meeting and public records laws.

William J. Fraser
City Manager

WJF:sg

September 14, 2016

Montpelier City Council
39 Main Street
Montpelier, VT 05602

RE: Historic Preservation Commission appointment

Dear City Council Members,

Please accept this letter showing my interest in continuing to serve the City of Montpelier as a Historic Preservation Commission member. I respectfully request re-appointment for another term on the HP Commission.

For a number of reasons, the Historic Preservation Commission has struggled over the past few years to fully function and meet our obligations as a Certified Local Government under the National Park Service program, however, I do believe that we will be able to gain momentum and achieve our goals in the coming years.

Among other goals, I have great interest in seeing the National Register District update completed, and hope to continue providing recommendations to various parties related to the zoning ordinance changes and updates currently under consideration, especially those that will affect our historic built environment.

I request reappointment so that I may have an opportunity to continue working on these important projects and help realize these goals for the City, our citizens and our historic built environment.

Sincerely,

A handwritten signature in dark ink, appearing to read 'JD', with a long horizontal flourish extending to the right.

Jamie Duggan
49 Terrace Street
Montpelier

C: 249-7231

James P. Duggan

P.O. Box 164, Montpelier, VT 05601

(802) 249-7231

jpdudds@gmail.com

PROFESSIONAL EXPERIENCE

Jan 2013-Present

Senior Historic Preservation Review Coordinator

Vermont Division for Historic Preservation, Montpelier VT

Working within the Department of Housing & Community Development, conduct professional and administrative work. Supervise the Environmental Review Team, and coordinate the historic preservation review of development projects requiring federal and state agency approval. Assess the impacts of development projects on historic, architectural, and archeological resources in accordance with the National and Vermont Historic Preservation Acts and other environmental legislation. Assess state and/or national register eligibility of structures and districts and determine effects of projects on historic resources by applying the *Sec. Interior's Standards for Treatments to Historic Structures*

Jan 1998-Present

Principal/ Historic Preservation Contractor

Preservation Unlimited LLC, Montpelier, VT

I am a self-employed, historic preservation Contractor, Consultant and Educator specializing in architectural conservation and building restoration. I am responsible for the design, management and execution of hands-on treatments to historic structures and have considerable knowledge and expertise in historic masonry and plaster preservation. Consulting services including analytical investigation, documentation, archival research, conditions assessment & treatment recommendations, materials analysis and testing, creation of technical documents, specifications, scope of work descriptions and budgetary projections, grant reporting and project management. Many of these projects were funded by federal, state and/or local grants and charitable foundations. Most projects meet or exceed the *Sec. Interior's Standards for Treatments to Historic Structures*

Jan. 2005-Dec. 2010

Principal/ Historic Buildings Specialist

New England Preservation Collaborative, Inc., Montpelier, VT

Principal Investigator for a private, member-owned historic preservation consulting firm. Responsible for the design and execution of protocol for on-site, multi-disciplinary, investigative teams. Activities focused on building survey & documentation, conditions assessment & treatment recommendations, archival research and materials analysis

EDUCATION

Master of Science - Historic Preservation- degree conferred May 2008

University of Vermont, Burlington, VT

Awards: Research Fellowship (2005); Research Assistantship (2004)

Internship: UVM/NPS Field Program, Las Flores National Historic Landmark, Oceanside, CA (2004).

Bachelor of Arts – Anthropology- degree conferred May 1995

Syracuse University, Syracuse, NY

Concentration – ***Archaeology***, Maxwell School of Citizenship and Public Affairs

Minor – ***Architecture***, School of Architecture

Certificate in Preservation Skills and Technology- certificate issued March 2000
Preservation Education Institute, Windsor, VT

ACADEMIC EXPERIENCE/ APPOINTMENTS

Boston Architectural College, MS in Design Studies

2016 *Adjunct Faculty* – Sustainable Design and Preservation

**University of Massachusetts Amherst, MS in Design + Historic Preservation Joint Program w/
Hancock Shaker Village, Pittsfield, MA**

2011-2015 *Adjunct Faculty* – Architectural Materials Testing I & II

University of Vermont, MS in Historic Preservation Program, Burlington, VT

Fall 2009 *Lecturer* – History of American Architecture

Fall 2008 *Guest Lecturer* - Architectural Conservation I & II, Topics presented: Historic
Masonry Preservation, Green Preservation. Project Management

2005–2008 *Field School Instructor* - UVM/National Park Service's Vanishing Treasures
Program, Fort Davis National Historic Site, Fort Davis, TX, training graduate
interns in adobe, stone, fired clay, lime plaster, limewashes and roofing
conservation

2005–2009 *Field School Instructor* - UVM/NPS Field Program at Las Flores Adobe NHL,
Oceanside, CA, training graduate interns in adobe, earthen plaster, lime
plaster, paint and limewash conservation, seismic retrofit installation,
carpentry and roofing

Yestermorrow Design/Build School, Warren, VT

Fall 2005-present *Instructor, Hands-on Historic Preservation, Traditional Trades for Historic Houses,*
Green Rehabilitation, Slate Roofing

PROFESSIONAL VOLUNTEER ACTIVITIES

Sep. 2008-present **Historic Preservation Commission member, Department of Planning & Community
Service, City of Montpelier, VT.** Appointed by City Council to participate in meetings and
activities focused on the preservation of Montpelier's architectural heritage. I was a
major contributor to Historic Preservation Week activities in 2009 creating the "How to"
night programming that brought contractors and historic building owners/enthusiasts
together for lectures and hands-on demonstrations. I helped edit and review our recent
National Register District update in 2010. I was fundamentally involved in the creation of
a series of handouts focusing on best practices and appropriate treatments to buildings
requiring Design Review Committee approval.

Jan. 2008-2014 **Design Review Committee member, Department of Planning & Community Service,
City of Montpelier, VT** (Appointed to Vice Chair - Feb.2009) Appointed by City Council
to attend and participate in bi-weekly meetings focusing on the review of proposed
treatments and alterations to buildings located within the Montpelier Design Control
District, consult with property owners and applicants to ensure project compliance with
local design review ordinance. Serve as expert witness and provide testimony in legal
proceedings at the district environmental court level.

Sandy Pitonyak

From: eric <eric@ptvermont.org>
Sent: Wednesday, September 14, 2016 4:11 PM
To: Sandy Pitonyak
Subject: Historic Preservation Commission.

To the Montpelier City Council,

I would like to renew my membership on the Historic Preservation Commission.

My career in historic preservation has stretched to over 44 years. I have lived in Montpelier for the last 40 years, worked in various positions at the State of Vermont Division for Historic Preservation, for 32 years including terms as Director and State Historic Preservation Officer and now work for the Preservation Trust of Vermont, a statewide historic preservation organization. This has given me a working knowledge of both Federal and State Historic Preservation programs and guidelines.

One of the responsibilities of the Historic Preservation Commission is to serve as part of the reviews required as part of the Certified Local Government program. Among those is to review the revised National Register District nomination that is being revised with a grant to from the Vermont Division for Historic Preservation. That needs to be done in the near future. The Commission also needs to be more active.

I have served on the Historic Preservation Commission for a number of years and also on the Design Review Committee.

Preserving the historic character is important to the economic viability of the City. That character has impressed historic preservation professionals from across the country as well as many other visitors to Montpelier. It provides satisfaction to many residents as well.

Thank you for considering my request to be appointed to the Historic Preservation Commission.

Sincerely,

Eric Gilbertson

7 Richardson Street

Eric Gilbertson

Field Service Representative
Preservation Trust of Vermont
104 Church Street
Burlington, VT 05401
(in partnership with the
National Trust for Historic Preservation)

eric@ptvermont.org
or 802-272-8543
7 Richardson Street
Montpelier, VT 05602

Did you know the Preservation Trust of Vermont publishes a free monthly electronic newsletter about historic preservation issues in Vermont? Historic Vermont has information about project funding, education, training, news, events and much more. Visit our web site to see our newsletter archives and to subscribe!

Elizabeth Grace Peebles

171 Main Street #4, Montpelier, Vermont 05602

elizabethgpeebles@gmail.com

703.927.8578

September 13, 2016

Dear Montpelier City Council Members,

I would like to apply for a position on the Montpelier Historic Preservation Commission and ask that you consider me for one of the current open seats. As an interested member of our community and a professional historic preservationist, I would like to volunteer my time and skills to assist historic preservation efforts in Montpelier.

Living in Montpelier and working as a Historic Resources Specialist for the Vermont Division for Historic Preservation has reinforced my desire to serve my local Vermont community and help engage the community with the City's significant historic and architectural resources through planning, education, and advocacy. I also believe strongly in citizen participation and would like to contribute to the thriving Montpelier community which has fast become my home.

I have extensive academic and work experience with cultural resource management and historic preservation policy and practice. As an architectural historian and historic preservationist I have gained valuable experience with preservation project management, community engagement, historic structure surveys, documentation, and treatment recommendations.

I respectfully request your support in being appointed to the Montpelier Historic Preservation Commission.

Attached is my resume and I would be happy to answer any questions you may have.

Thank you for considering my application.

Sincerely,

Elizabeth Peebles

Elizabeth Grace Peebles

171 Main Street #4, Montpelier, Vermont 05602

elizabethgpeebles@gmail.com

703.927.8578

EDUCATION

- M.A. Historic Preservation – Urban Affairs & Public Policy
Directors Citation, School of Urban Affairs & Public Policy
University of Delaware, Newark, Delaware: May 2010.
- Museum Studies Certificate
University of Delaware, Newark, Delaware: May 2010.
- B.A. cum Laude, Art with Departmental Honors
Areas of Focus: B&W Photography and Architectural History
College of Wooster, Wooster, Ohio: May 2005.

WORK EXPERIENCE

Historic Preservation

- 2015–present **Historic Resources Specialist**, Vermont Division for Historic Preservation
- 2012–2015 **Historic Preservation Specialist**, Fairfax County Park Authority
- 2011– 2012 **Preservation Manager**, Tudor Place Historic House and Garden
- 2010–2011 **Architectural Historian**, National Capital Region, National Park Service
- 2008–2010 **Research Assistant**, Center for Historic Architecture and Design
- 2009 **Historic Preservation Intern**, Fairfax County Park Authority

Exhibits & Collections

- 2006–2007 **Exhibit Specialist**, Maryland–National Capital Park & Planning Commission
- 2001–2005 **Special Collections Assistant**, College of Wooster Libraries

Nonprofit Outreach & Education

- 2007–2008 **Faith Relations Outreach Coordinator**, Habitat for Humanity of Northern Virginia
- 2006 **Historic Interpreter**, George Washington's Mount Vernon Estate & Gardens
- 2005 **Teaching Assistant**, Studio Art Independent Study, College of Wooster
- 2003 **Education and Administration Intern**, Free Arts for Abused Children – NYC
- 2001–2003 **Teaching and Administration Assistant**, Frog Pond Early Learning Center

Elizabeth Grace Peebles

171 Main Street #4, Montpelier, Vermont 05602

elizabethgpeebles@gmail.com

703.927.8578

SPECIAL PROJECTS, TRAINING & PUBLICATIONS

Online Preservation Portfolio: <http://elizabethgpeebles.wordpress.com>

<http://tudorplace.blogspot.com/2012/01/what-lies-beneath-peek-behind-physical.html>

<http://tudorplace.blogspot.com/2012/03/what-lies-beneath-part-ii-closer-look.html>

Peebles, Elizabeth. The Moderate and the Modern: Aladdin Buildings in Delaware: 1914–1920. Thesis (M.A.)--University of Delaware, 2010. <http://dspace.udel.edu:8080/dspace/handle/19716/5714>

Advisory Council on Historic Preservation Course: The Section 106 Essentials, November 2015.

National Preservation Institute Seminar: Historic Structures Reports: A Management Tool for Historic Properties, March 2012.

National Preservation Institute Seminar: Preservation Maintenance: Understanding and Preserving Historic Buildings, March 2012.

Vernacular Architecture Forum Fieldwork Grant to document historic structures in Mineral Point, Wisconsin for upcoming conference, June 2010.

Montana Heritage Commission Fieldwork Grant to document historic structures in Virginia City and Nevada City, Montana, August 2009.

Planning, Publicity, and Paper Selection Committees, Material Culture Symposium for Emerging Scholars, Winterthur, DE, 2009–2010.

Member and Chair, Building & Grounds Committee, Mount Vernon Unitarian Church & Hollin Hall Mansion, Alexandria, VA, 2011–2015.

Preservation Skills Trainee, Historic Preservation Training Center, National Park Service, 2010–2011.

Jessie C. Baker

From: David Carris <dcarris@gmail.com>
Sent: Wednesday, September 14, 2016 10:09 PM
To: Jessie C. Baker
Cc: eric@ptvermont.org
Subject: Fwd: Historic Preservation Commission

Begin forwarded message:

From: David Carris <dcarris@gmail.com>
Subject: Historic Preservation Commission
Date: September 14, 2016 at 10:08:23 PM EDT
To: spitonyak@montpelier-vt.org
Cc: eric@ptvermont.org

Dear Ms. Pitonyak,

My name is David Carris and I've lived on Liberty Street in Montpelier for the past 8 years. I would like to I would like to submit my name for consideration as a member of the Montpelier Historic Preservation Commission.

Professionally I am a financial advisor and wealth manager with UBS in South Burlington. Prior to my 22 year career in finance I spent 13 years working in historic preservation and and community development. I hold a B.A. in the History of Art from the University of Pennsylvania and an M.S. in Historic Preservation from the University of Vermont. My work in historic preservation included serving as Education Director of the New Haven (CT) Preservation Trust where I oversaw public education and awareness programs and worked with private developers and neighborhood development corporations to create affordable housing and historic preservation projects using the then-newly-created federal tax credit programs. I also served as staff to the New Haven Historic Preservation Commission where I worked with the Commission to develop criteria and guidelines to foster clear, consistent review of development in designated historic design review districts. I returned to Vermont soon after the passage of Act 200, a major piece of comprehensive community planning legislation, to develop community planning and design education programs through the Vermont Arts Council. There I founded the Vermont Design Institute, a program to educate volunteer community planning commission members on the fundamentals of successful town and city design. I also served as Adjunct Faculty in the UVM Graduate Historic Preservation Program from 1990-1994 where I taught courses in Preservation Law and in Contemporary Preservation Practice.

One of Montpelier's signature strengths is its rich architectural and urban design heritage. It would be an honor and pleasure to put my interests in economics, community development, and architectural history to work for the Montpelier community.

Sincerely,

David Carris
33 Liberty Street
Montpelier
dcarris@gmail.com



CITY COUNCIL Agenda Item #_16-275_____

Date: September 21, 2016

Consent __ Discussion _X__

SUBJECT: Housing Task Force recommendation on Housing Trust Fund

SUBMITTING DEPARTMENT: Department of Planning and Community Development

RECOMMENDED ACTION: Discuss Housing Task Force recommendation

RELATED COUNCIL GOAL/PRIOR ACTION:

GOAL A Keep Montpelier Affordable for Residents

Strategy: Approve and Implement EDSP

GOAL D Create and Maintain a healthy Environment for Housing and Economic Growth

Strategy: Facilitate Housing Projects

GOAL F Maintain a Vibrant Downtown

Strategy: increase downtown housing

EXPENDITURE REQUIRED:

SOURCE OF FUNDS: Housing Trust Fund

LEGAL REQUIREMENTS:

BACKGROUND INFORMATION:

When the Trust Fund was a ballot item, beginning in 2007, it was presented to the voters and adopted as 1 cent for housing or \$52,000 annually. It received broad community support when it was a ballot item, passing each time with a substantial majority. When it became part of the city budget because of budget pressures it was cut to \$26,000, then \$41,000 and then \$21,000 for the past two years. During that time the need for housing in the city has only grown. Level funding would have generated an additional \$154,000. If the 1cent for housing had been maintained this year's contribution to the Trust Fund would be \$85,751 based on the current grand list. Housing continues to be a priority in the city's Master Plan, a goal of the City Council and a key recommendation in the Economic Development Plan

SUPPORTING DOCUMENTS: HTF Memo to Council September 19, 2016

INTERESTED PARTIES: City Council, Housing Task Force, Housing Trust Fund

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to read "W. Hoffman", written over the City Manager's Approval line.

To: Montpelier City Council
From: Housing Task Force
Re: Montpelier Housing Trust Fund FY 18
Date: Friday, September, 2016

The following Memo outlines the Housing Task Force recommendation related to programs, projects, and future funding scenarios. This memo will outline the funding history, benefits, and outcomes of the City's investment in the Housing Trust fund and its recommendation for future funding of this program.

Funding History

When the Trust Fund was a ballot item, beginning in 2007, it was presented to the voters and adopted as 1 cent for housing or \$52,000 annually. It received broad community support when it was a ballot item, passing each time with a substantial majority. When it became part of the city budget because of budget pressures it was cut to \$26,000, then \$41,000 and then \$21,000 for the past two years. During that time the need for housing in the city has only grown. Level funding would have generated an additional \$154,000. If the 1cent for housing had been maintained this year's contribution to the Trust Fund would be \$85,751 based on the current grand list. Housing continues to be a priority in the city's Master Plan, a goal of the City Council and a key recommendation in the Economic Development Plan. A community meeting this past spring attended by approximately 100 people emphasized the importance of affordable housing to the citizens of Montpelier.

Housing Trust Fund Funding Level History		
Year	Funding Level	Line Item vs. Ballot Item
2006	\$52,000	Ballot Approval
2007	\$52,000	Ballot Approval
2008	\$52,000	Ballot Approval
2009	\$52,000	Ballot Approval
2010	\$26,000	*Line Item
2011	\$26,000	*Line Item
2012	\$41,000	*Line Item
2013	\$41,000	*Line Item
2014	\$41,000	*Line Item
2015	\$41,000	*Line Item
2016	\$21,000	*Line Item
2017	\$21,000	*Line Item
2018	\$100,000- \$140,000	
2019	\$85,751*	
2020	\$85,751*	
	*\$0.01 per \$100	

Investment History

Trust Fund investments have totaled \$379,000 to date. In most cases these investments have been in new or renovated properties resulting in substantial additions to the Grand List. Investments have included River Station Apartments and Condominiums (direct MHTF investment only in 6 condos), the Bianchi/Hebert development (direct MHTF investment in Bianchi only), and 58 Barre St. More recently, the Trust Fund invested \$125,000 in 9 homes through the first time homebuyers program. Units directly subsidized by the Trust Fund on Barre St. alone have leveraged more than \$4 million in additional funding for those same units. Historically, leverage has ranged from 10-1 for an inexpensive single family home to 30-1 for the 58 Barre St. Apartments.

Additions to the Grand List

MHTF investments have added \$4.321 million to Montpelier's grand list to date. That's an additional \$118,659 in taxes is FY'17 alone. The City has been making Trust Fund investments since 2007.

First Time Homebuyers Program

A few years ago the City Council gave permission for Trust Fund dollars to be used to help first time homebuyers purchase existing homes in Montpelier. \$125,000 has been invested to date. Assistance is in the form of a deferred loan of up to \$15,000. One third of the loan is forgivable if the homeowner remains in the home for 5 years, 2/3 if s(he) remains for 10 years and all if the homeowner doesn't move for 15 years. Because Montpelier is an aging community that has seen a decrease in population the major goal of the program is to enable young families to purchase homes in the city. To date 9 deferred loans have been made under this program. The participating families have a total of 9 children.

One of the major financial benefits of this program is that each new child in the Montpelier schools increases the amount of aid for education that the city gets from the state. Given the current value of the grand list each new school child generates approximately \$9,701 annually in fy17.

Pending Requests

There is currently \$162,056.63 in the Trust Fund (we anticipate this balance to be \$177,056.63 subsequent to a closing on September 19, 2016). Downstreet Housing requested \$175, 000 for the French Block, effectively depleting the entire Trust Fund.

The First Time Homebuyers Program needs at least \$60,000 this fiscal year and \$90,000 next fiscal year. It is important that there be enough funding in that program that home seekers have a reasonable expectation that the money will be there by the time they identify a home that meets their needs. These requests total \$325,000 needed through the end of FY'18 assuming there are no other major multi-family housing opportunities in addition to French Block during this time period.

Fiscal Year	Purpose	Amount Needed	Amount Available
FY'17	1 st Time Homebuyer	\$60,000	\$173,214
	French Block	\$175,000	
FY'18	1 st Time Homebuyer	\$90,000	
	French Block carryover	\$61,786	
FY'19	1 st Time Homebuyer	\$90,000	
FY'20	1 st Time Homebuyer	\$90,000	
Total FY'17-FY'20 need		\$505,000*	

*without any new multi-family projects after French Block

Recommendation:

The Housing Task Force anticipates it will recommend that the City Council propose a special ballot item in 2017 (FY'18) that would raise \$100,000 - \$140,000 for the Trust Fund. These funds will support the First Time Homebuyers Programs as well as an annual reserve to be dedicated to future multi-family housing projects. This will not result in a tax increase because it would equal this year's Trust Fund allocation plus the one time appropriation for the North Branch Nature Center. In addition, the Housing Task Force recommends that the city return to the 1 cent per \$100 of grand list funding level in FY'19 and beyond. (This is approximately \$85,000 on the current Grand List.)

To: Montpelier City Council
From: Housing Trust Fund Committee
Re: Montpelier Housing Trust Fund Minutes and Recommendation
Date: Friday, September 16, 2016

Members Present:

Tom Golonka, City Council
Jean Olson, City Council
Jack McCullough, Member
Polly Nichol, Member
Charlie Dickerson, Member
Richard Amore, Member

Kevin S. Casey, Staff

Eileen Peltier, Downstreet Housing and Community Development

Current Balance: \$177,056.63*

Summary

The Montpelier Housing Trust Fund Guidelines requires that *"As long as there are sufficient monies in the Fund, competitive grant rounds shall be held at least once a year with application deadlines set by the City staff provided that a Request for Proposals ("RFP") is published on or before October 31st of each year". (Section 104 a.).*

The City published an RFP on August 19, 2016 and requested that responses be submitted by September 9, 2016. Two proposals were received by staff and a meeting of the Housing Trust Fund Committee was scheduled.

The Housing Trust Fund Committee met on Friday September 16, 2016 at 2:00 pm in Montpelier City Hall Council chambers to evaluate two proposals from Downstreet Housing and Community Development (DHCD). The Committee is guided by the Housing Trust Fund Guidelines <http://www.montpelier-vt.org/DocumentCenter/View/1547>).

Proposal 1: First Time Homebuyers and Equity Building Program Extension

Applicant: Downstreet Housing and Community Development

Amount requested: \$91,500 (\$90,000 program funds/\$1,500 Administrative)

Summary: With \$91,500 in funding provided by the City of Montpelier's Housing Trust Fund, DOWNSTREET would provide down payment assistance to home buyers up to \$15,000 to help qualified households purchase a single family house or condo. In exchange for the award, the purchaser agrees to enter into an agreement regarding the use and agrees to occupy the property. The loan shall be forgiven on a progressive schedule Assistance is in the form of a deferred loan of up to \$15,000. One third of the loan is forgivable if the homeowner remains in the home for 5 years, 2/3 if s(he) remains for 10 years and all if the homeowner doesn't move

for 15 years. . To date 9 deferred loans have been made under this program. The participating families have a total of 9 children.

Proposal 2: French Block Redevelopment

Applicant: Downstreet Housing and Community Development

Amount Requested: \$175, 000

Summary: Downstreet Housing and Community Development and Housing Vermont are collaborating on the redevelopment of Montpelier's French Block. Vacant since the late 1940's the redevelopment of this building into 18 units (15 1-bedroom and 3 efficiency apartments) and will help to bring life to the downtown. This project has two main goals: 1) redevelopment of vital downtown real estate and 2) increase the availability of affordable rental units. Downstreet's waitlist and Montpelier's vacancy rate demonstrate the need for new units. Additionally a \$4 million dollar construction project in downtown will boost employment in the area and economic vitality.

Recommendation:

The Housing Trust Fund Advisory Committee recommends the following actions be taken by City Council:

1. The Committee recommends that City Council approves Downstreet Housing and Community Development's request from \$175,000 from the Housing Trust Fund.
Approved by Housing Trust Fund Committee 6-0
2. Future repayments or unallocated funds of the Housing Trust Fund, up to \$90,000, will be made available to the First Time Homebuyers Down payment Assistance and Equity Building Program. ***Approved by Housing Trust Fund Committee 6-0***
3. City Council continues a waiver to the Housing Trust Fund Guidelines which allow the 1st Time Home Buyer program to be eligible to those with incomes up to 120% AMI (current guidelines cap eligibility at 100% AMI) ***Approved by Housing Trust Fund Committee 5-1***

(*pending repayment anticipated 09.19.2016)



CITY COUNCIL Agenda Item #__16-276__

Date: September 21, 2016

Consent __ Discussion _X_ **Time Sensitive __**
(outlined below)

SUBJECT: Second Reading for Proposed Junkyard Ordinance

SUBMITTING DEPARTMENT: City Manager

RECOMMENDED ACTION: Conduct public hearing, approve ordinance.

RELATED COUNCIL GOAL/PRIOR ACTION: C: Maintain a safe community, E: Maintain a healthy community for people. H: Maintain a clean and healthy natural environment.

EXPENDITURE REQUIRED: None

SOURCE OF FUNDS: N/A

LEGAL REQUIREMENTS: Ordinance adoption requires two public hearings (readings). Authority for this action comes from general statute and city charter.

BACKGROUND INFORMATION: The Mayor raised concern about the need for junk yard regulations. This draft ordinance is based upon the Vermont League of Cities and Towns model junkyard ordinance and processes used by the City of Barre. The ordinance passed first reading on September 14, 2016.

SUPPORTING DOCUMENTS: Draft ordinance.

INTERESTED PARTIES: Property owners who store junk on their property, abutters to said property owners.

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to read "W. Hoffman", written over the City Manager's Approval line.

REGULATING OUTDOOR STORAGE OF JUNK AND JUNK VEHICLES

WHEREAS, the City of Montpelier has, _____ by authority granted in 24 V.S.A. §§ 1971 et seq., 2246 and 2291, and §702 of the City Charter, the powers to adopt, amend, repeal, and enforce ordinances, and to manage and regulate outdoor storage of junk and junk motor vehicles within its boundaries;

NOW, THEREFORE, to protect the public health, safety and well being, and to promote the responsible use of resources and protection of the environment, the City Council of the City of Montpelier _____ hereby adopts this ordinance to regulate outdoor storage of junk and junk motor vehicles.

ARTICLE I. Definitions.

- a. “Abandon” means to leave without claimed ownership for 30 days or more.
- b. “Abutting property owner” means any person or persons, corporation or other entity that owns, leases, or in any other way uses or controls the real property abutting any portion of the property of another.
- c. “Enforcement Officer” means any health officer, deputy health officer, building inspector or fire chief appointed by the City Manager to enforce the provisions of this ordinance.
- d. “Highway” means any highway, road, street or other public way, regardless of classification.
- e. “Household appliance” means any range, stove, refrigerator, washing machine, clothes dryer, water pump, power tool and the like.
- f. “Junk” means old or discarded scrap copper, brass, iron, steel or other metals, or materials including but not limited to tires, household appliances, furniture, rope, rags, batteries, glass, rubber debris, waste, trash, construction debris, plumbing fixtures, or any discarded, dismantled, wrecked, scrapped, or ruined motor vehicle or parts thereof. Any of the above items used in a bona fide agricultural operation are excluded from this definition.
- g. “Junkyard” means any place of outdoor storage or deposit that is maintained, operated or used in connection with a business for storing, keeping, processing, buying or selling junk or as a scrap metal processing facility. “Junkyard” also means any place of outdoor storage or deposit, not in connection with a business, which is maintained or used for the storing or keeping of one or more junk motor vehicles which are visible from any portion of a public highway. However, the term does not include a private garbage dump or a sanitary landfill that is in compliance with 24 V.S.A. §§ 2201 et seq. and any applicable state regulations. It does not mean a garage where wrecked or disabled motor vehicles are stored for less than 90 days for inspection or repairs.
- h. “Junk motor vehicle” means a discarded, dismantled, wrecked, scrapped or ruined motor vehicle or parts thereof, an unregistered motor home not connected to water and/or sewer, or

a vehicle other than an on-premise utility vehicle which is allowed to remain unregistered for a period of 90 days from the date of discovery.

- i. “Motor vehicle” means any vehicle propelled or drawn by power other than muscular power, including trailers. Functional vehicles and equipment used for agricultural and construction operations are excluded from this definition.
- j. “Traveled way” means that portion of a public highway designed for the movement of a motor vehicle, shoulders, and roadside parking, rest, observation areas, and other areas immediately adjacent and contiguous to the traveled portion of the roadway.

ARTICLE 2. Requirements.

- a. It shall be unlawful to place, discard or abandon junk or junk motor vehicles in a place where any such item is visible from the traveled way of a highway or town road, or visible to an abutting landowner from that portion of the abutter’s land used on a regular basis. Any such item so placed, discarded or abandoned is hereby declared to be a public nuisance.
- b. It shall be unlawful to place, discard or abandon junk or junk motor vehicles upon the land of another with or without the consent of the owner, when any such item is visible from the traveled way of a highway or town road, or visible to an abutting landowner from that portion of the abutter’s land used on a regular basis. Any such item so placed, discarded or abandoned is hereby declared to be a public nuisance.
- c. A person who wishes to operate a junkyard within the City of Montpelier _____ is required to:
 - obtain a certificate of approval for the location of the junkyard, and
 - obtain a license to operate, establish or maintain a junkyard from the State of Vermont.
- 1. **Certificate of Approved Location.** Application for a certificate of approved location shall be made in writing to the City Council of the City of Montpelier through the City Manager. The application shall contain a description of the land to be included within the junkyard, which description shall be by reference to so-called permanent boundary markers. The procedures to be followed after an application has been made are those specified in 24 V.S.A. §§ 2252-2256, as from time to time amended. The application shall be accompanied by a certificate from the Zoning Administrator that the proposed location is not within an established district restricted against such uses or otherwise contrary to such zoning ordinance
- 2. **State Junkyard License.** The procedures for obtaining a junkyard license from the State of Vermont are those specified in 24 V.S.A. §§ 2261-2264, as from time to time amended.

- d. All junkyards, scrap yards, and places of outdoor storage of junk shall be effectively screened from public view by a fence or vegetation at least eight feet in height. Any fence shall be of sound construction and of solid vertical board or 'stockade' type construction, and shall be maintained neatly and in good repair. Such a fence shall not be used for advertising signs or other displays which are visible from the traveled way of a highway. Any vegetation used for screening shall be of sufficient density so that it effectively screens the area from view. Failure to provide screening as required herein shall be considered a violation of this ordinance.

ARTICLE 3. Enforcement and Penalties.

- a. Upon receiving written notice from the Enforcement Officer to do so, the owner of any junk or junk motor vehicle discovered in violation of Article 2 of this ordinance shall remove or screen the item(s) or vehicle(s) from the view of the traveled way of the highway or town road to cure the violation. Such items shall also be screened from the view of an abutting landowner as seen from that portion of the abutter's land used on a regular basis. If the owner of the junk or junk motor vehicle(s) does not remove or screen the items from view within 30 days from the date of mailing of the written notice by the Enforcement Officer, the Officer may notify the appropriate state agency or may issue a ticket as prescribed in subsection c below.
- b. Additional Provisions for Junk Motor Vehicles.
 1. If the owner of the land on which a junk motor vehicle is discovered in violation of Article 2 of this ordinance does not hold title or disclaims title to the vehicle, and the true owner of the vehicle is known or can be ascertained, the true owner shall move, screen or dispose of the vehicle upon receiving written notice from the Enforcement Officer.
 2. If the last known registered owner fails or refuses to reclaim the vehicle upon receiving said written notice, or if after an investigation the owner of the vehicle cannot be ascertained, the Enforcement Officer may notify the appropriate state agency or may issue a ticket as prescribed in subsection c below.
 3. Further procedures by the state agency are specified in 24 V.S.A. § 2272.
- c. A violation of this ordinance shall be a civil matter which may be enforced in the Vermont Judicial Bureau or in the _____ Washington County Superior Court, at the election of the legislative body.
 1. Violations enforced in the Judicial Bureau shall be in accordance with the provisions of 24 V.S.A. §§ 1974a and 1977 et seq. A civil penalty of not more than \$500 _____ per violation may be imposed for violation of this ordinance.
 - A. A municipal ticket will be issued 30 days after written notification of violation is mailed by the City Council if the violation has not been corrected in accordance with this ordinance. Each day that the violation continues shall constitute a separate violation of this ordinance.

B. For purposes of enforcement in the Judicial Bureau, the City Enforcement Officers shall be the designated enforcement officer(s). Said designee(s) shall issue tickets and may be the appearing officer at any hearing.

2. Violations enforced in the Superior Court shall be in accordance with the Vermont Rules of Civil Procedure. The legislative body may pursue all appropriate injunctive relief. In addition, a civil penalty of not more than _ _____ \$500 per violation may be imposed for violation of this ordinance. A civil action may be initiated within [30 days] after written notification of violation is mailed by the City Council if the violation has not been corrected in accordance with this ordinance. Each day that the violation continues shall constitute a separate violation of this ordinance.

ARTICLE 4. Severability. If any section of this ordinance is held by a court of competent jurisdiction to be invalid, such finding shall not invalidate any other part of this ordinance.

ARTICLE 5. Effective Date. This ordinance shall become effective 15 days after its adoption by the City Council as per § 702 (c) of the City Charter. A petition may be filed under § 702 (c), which shall govern the taking effect of this ordinance.

MEMORANDUM

To: Montpelier City Council

From: Montpelier Bicycle Advisory Committee and Montpelier Pedestrian Advisory Committee

Date: September 8, 2016

Re: Restructuring of Bike, Pedestrian, and Transportation Committees

In response to the City Council's request, the Montpelier Bicycle Advisory Committee (MBAC) and Montpelier Pedestrian Advisory Committee (MPAC) held a joint meeting on August 17, 2016, to discuss the possibility of restructuring their two committees and the Montpelier Transportation Advisory Committee. At the meeting, the group voted to propose the following new structure:

Create two separate Bike-Ped committees: one infrastructure committee and one events committee. Staff from the Departments of Public Works and Planning will attend infrastructure meetings. Each committee will have approximately 8 members. The Montpelier Transportation Advisory Committee will be dissolved.

This proposal was then discussed by the MBAC and MPAC separately at their own meetings. The Bike Committee voted unanimously to approve the recommendation to create two committees as described above. The Pedestrian Committee approved the proposal by a majority vote: 3 in favor, 2 opposed, 1 abstaining (with 3 absent).

As a result, we request that the City Council restructure the committees as suggested above.



CITY COUNCIL Agenda Item #_ 16-272____

Date: September 21, 2016

Consent __ **Discussion** **X** **Time Sensitive** ____
(outlined below)

SUBJECT: Montpelier Transportation Advisory Committee Restructuring

SUBMITTING DEPARTMENT: Public Works and Planning & Community Development

RECOMMENDED ACTION: Consider the two recommendations outlined below.

RELATED COUNCIL GOAL/PRIOR ACTION: N/A

EXPENDITURE REQUIRED: N/A

SOURCE OF FUNDS: N/A

LEGAL REQUIREMENTS: N/A

BACKGROUND INFORMATION:

MTAC Recommendation

The Montpelier Transportation Advisory Committee (MTAC) asked the City Council to consider its reorganizing proposal, which was voted on at its regular Sept 13th meeting. MTAC proposes two separate broad based committees.

1. A Transportation Committee that will deal with infrastructure and policy. It will take into account bike, pedestrian, transit, energy, conservation, business and parking interests. Planning, Public Works and City Councilor will participate in this committee.
2. An Events and Education Committee will deal with public outreach to support the interests of account bike, pedestrian, transit, energy, conservation, business and parking interests.
3. We suggest 8-10 members for each committee.

Bike and Pedestrian Recommendation

On 8/17/16, John Snell moved to propose two separate Bike-Ped committees: one infrastructure committee and one events committee. Staff from DPW, and Planning will attend infrastructure meetings. Each committee will have approximately 8 members. TAC will be dissolved and replaced. The bike committee voted unanimously to approve the recommendation to create two

committees as described above. There were 6 members of the MBAC and two were absent.

The Pedestrian Committee considered the proposal to dissolve our current committee structure and create two new committees - one dealing with infrastructure and policies, the other dealing with events, education, enforcement, and encouragement. The committee approved the proposal on a vote of 3 in favor, 2 against, and 1 abstaining. There were also 3 members absent from the meeting. The concerns of the dissenting members focused mainly on the events/education committee. Everyone was in favor of a joint infrastructure committee, but some did not want to see the bike and pedestrian event/education planning combined into one committee.

SUPPORTING DOCUMENTS: September MTAC Draft Minutes, August MBAC Draft Minutes, August PAC Draft Minutes

INTERESTED PARTIES: MTAC, MBAC, MEAC, Public Works, Planning & Community Development, Montpelier Alive.

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to read 'W. Hoffman', is written over the City Manager's Approval line.

Montpelier Transportation Advisory Committee Meeting 6-8:30pm Minutes
Includes Complete Streets Steering Committee 6-7:25pm
Sept 13, 2016 City Council Chambers

Members Present: Jessica Neary, John Snell, Jennifer Gordon, Mark Provost, Mike Miller, Anthony Mennona, Dan Costin, Chris Loyer, Dona Bate, Jackie Cassino, Heather Voisin, Dan Jones, Corey Line, Rebecca Harris

1. Dona called the meeting to order at 6pm.
2. John makes a motion to modified the agenda to include the one presented by Alta for the Complete Streets portion of the meeting. Chris makes motion to second. All in favor.
3. Public Comment: Jessica Neary proposed a Bike Safety Ride event to be led by police officer Phil Brick. The ride could be scheduled for a Sunday morning and include safety instructions as well as explain the purpose of the painted chevrons.

Dona then invited the Alta team -Tom & Daniel to facilitate the Complete Streets steering committee meeting.

Daniel reviewed the need for data collection from city staff and various transportation committees. They were referred to the Montpelier in Motion Plan. They asked attendees to write down five words to describe their vision and goals for this project. They posted ideas from attendees and shared some previously written statements on vision and goals.

Tom described a ideal tool-kit to included street typologies such as street level separated bike lanes, median separated bike lanes, buffered bike lanes, share rows, green infrastructure, flush medians, crossing island, landscaped medians, wide sidewalk, bio swales, angled parking with trees and dedicated bus and bike lanes.

Tom and Daniel asked committee members for their concerns and ideas, which were posted. Alta took poster sheets and poster details will be shared by them. Such concerns as aging infrastructure, lacking N-S/E-W non-motorized corridors, non-urban streets, limited street space and many demands, many transportation modes, want to see no-car centric city, want street typology to enhance value of neighborhoods, safety, calm & friendly streets, increase bus ridership, reduce cars

Mentioned of previous MTAC discussion of upcoming paving projects on Northfield and route 12. Corey will give information to Alta consultants.

Alts laid city maps on table for attendees to mark where are the assets and challenges. They review meeting schedule, will plan on 2nd Tues 6pm and likely to meet 2-3 months in person then through emails and staff. Until ideas and concepts are more developed for in person meetings again.

At 7:28pm Dona officially opens MTAC meeting.

The agenda was already accepted and there were no public comments offered.

Motion to accept prior meeting minutes: Dan C motions to accept. Dan J seconded and motion passed.

Dona opened discussion on agenda item to get input from Alta on options for transportation committee structure. Tom recommended a Transportation Committee that had created a cohesive body to bring different modes together to find common goals, cooperation and collaboration. Subcommittees would advocate and work on specific mode projects: bike, pedestrian, parking, etc. (He did not know that's what we have now.) Alta left meeting.

Dona asked group to decide what it wanted to be and if it wanted to make a recommendation to City Council on Sept 14th

She asked if everyone has seen the Bike-Ped proposal sent to city council for its Sept 14th agenda. Most hadn't seen it, when Dona shared that the Bike-Ped proposal was for two Bike-Ped Committees. One infrastructure and one event there was some disagreement. Using her iPad Dona read directly from the email sent by Jen (Bike) & Eve (Ped).

"Create two separate Bike-Ped committees: one infrastructure committee and one events committee. Staff from the Departments of Public Works and Planning will attend infrastructure meetings. Each committee will have approximately 8 members. The Montpelier Transportation Advisory Committee will be dissolved. "

John and Jenn discuss bicycle/pedestrian's proposal for two separate committees--one events and one technical infrastructure committee. Many were concerned that energy and parking were missing.

Dan J raises concern that events arise out of infrastructure proposals and didn't need to be a full standing committee. John states need of separate committee for transportation education and events – need capacity and full time members for events.

Kevin felt business interests would become more involved when there is a project such as complete streets going on, and parking is a concern for businesses. Consensus was that core committees need to be broader, more inclusive, especially energy, transit and business parking interests.

Kevin suggested that one transportation committee is cohesive, will make the difficult decisions and bring one voice to city council. There can be subcommittees for events and other interests not related to policy and infrastructure. We want representatives that have interests in bike, ped, green infrastructure, conservation, energy, business, and parking. Proposes that working events group will not need city council approval and can have outside volunteers.

Dona worked the group to get the following wording for a motion to propose two separate committees. Individual committees should decide for themselves whether they want to propose any changes for their committee to city council. Motion seconded by John Snell.

MTAC proposes two separate core transportation committees.

A Transportation Committee that will deal with infrastructure and policy. It will take into account bike, pedestrian, transit, energy, conservation, business and parking interests. Planning, Public Works and City Councilor will participate in this committee.

An Events and Education Committee will deal with public outreach to support the interests of account bike, pedestrian, transit, energy, conservation, business and parking interests.

We suggest 8-10 members for each committee.

The motion passed with Dan C and Dan J voting no. Dan C explained that he was very concerned that the MTAC was never talked to about the Bike-Ped Committee proposal to disband the MTAC before Bike-Ped made their proposal to city council.

Some discussion about whether to plan next meeting since we don't know what will happen on Sept 21 Council meeting. Dan C proposed that we continue until told otherwise. Six of the seven attending MTAC members said they plan to continue. Anthony stated that we'll continue our good work no matter the committee's name.

Hence, next meeting was set for Oct 11th at 6pm Manager's Conference Room.

DRAFT
MPED/MBAC Meeting (Bike and Pedestrian Committees)
Agenda
17 August 2016
5:30-6:30PM
Montpelier City Hall

Members Present: John Snell, Eve Jacobs-Carnahan, Jenn Gordon, Heather Voisin,
Erica Garfin, Harris Webster, Jon Budreski, Jonathan Harries, Cory Live, Mark
Provost, Dona Bate, Anthony Mennona, Suzanne Eikenberry, Rebecca Harris
(AmeriCorps VISTA)

1. Select Secretary: Rebecca Harris volunteers

2. Motion to approve agenda by Jon B. All approve.

a. Actions Suggested: No actions suggested.

3. Brief Introductions

4. Public Comments: No public comments

5. Review previous meeting item(s) as needed. Background info on this meeting
(Jenn Gordon: 2 minutes)

This meeting is a result of overlap in MBAC and PED goals. We hope to create a more efficient and effective structure. We looked at formats in other cities and it is a norm for Bike and Ped committees to be combined for joint goals. Jen presents info graphic to explain goals. Idea came out of interest of some people to be involved in event planning and education versus infrastructure and policy. Both committees will report to city council and we will encourage DPW and Planning to attend the infrastructure and policy meeting. There will be information exchange between all committees.

6. Discussed idea of an integrated and more cohesive pedestrian and bike committee will lead to more efficient meetings, improved decision making, planning and communication. Additional benefits include fewer meetings and a higher level of meaningful and substantial involvement from DPW and the Planning Department.

- Eve wants new committees to be official city committees.
- Corey sees how public works falls into infrastructure and questions if it makes sense for any city departments to be involved in events, such as a police or planning member?
 - Eve doesn't think that is necessary, we don't need city staff to attend the events meeting.

- Erica discusses if we will create bike and pedestrian subcommittees and thus not cut down on meetings. Suggests pedestrians might lose their presence. Jon thinks the committees can work together well.

7. One option: Create two Bike-Ped committees. One focused on infrastructure and policy the second on event planning, education and enforcement. Each committee will report directly to City Council. The infrastructure policy committee will require attendance of DPW and Planning Department representative.

8. Other proposed options:

- Harris thinks we are more efficient in smaller group/committee and we will lose efficiency if we form new groups. We can create a complete streets committee.
- Eve proposes the pedestrian and bicycle events committees can be separate but not meet every month.
 - Jen states, in order to be considered bike friendly city, we must hold a certain number of events. Wishes that the bike committee could be involved in open streets from beginning. In a small city it is possible to combine events groups. John S agrees due to experience with tree board. Suzanne doesn't feel the bicycle would be at odds with pedestrian interests.
- Jen proposes approximately 8 people per committee.
- Mark discusses that an infrastructure committee needs to address parking needs. Others pointed out that there is no one on the parking committee right now.
- Suzanne proposes to test out events committee for a year in a pilot program.
- Heather states if there is complete streets it leaves out bike and pedestrian interests that aren't on streets.
- Harris proposes alternative pilot to not abolish anything and make an active effort to improve communication. Jon mentions effectiveness of combined efforts of Local Motion.
- Eve suggests we have three committees: infrastructure committee, bike events, and pedestrian events. The two events committees could actively communicate with each other when needed.

MOTION: John Snell moved to propose two separate Bike-Ped committees: one infrastructure committee and one events committee. Staff from DPW, and Planning will attend infrastructure meetings. Each committee will have approximately 8 members. TAC will be dissolved and replaced. We will take this notion back to both PED and Bike Committees for their approval. If approved it will go to city council. Jen seconds motion.

One abstention

Motion passes.

BIKE COMMITTEE MOTION: Susanne moves that bike committee vote to approve the recommendation to create two Bike-Ped committees as described above.

Heather seconds motion.

Motion passes with all in favor.

Jon calls for adjournment. Meeting adjourned at 6:44PM

DRAFT
Pedestrian Committee Meeting Minutes
August 23, 2016

Members Present: Eve Jacobs-Carnahan, Erica Garfin, Harris Webster, Guy Tapper, Erin Aguayo, Tom Aloisi

Others present: Anthony Mennona

Meeting at 5:15 p.m.

July minutes – the former VISTA took notes but did not leave the minutes for us, so we could not approve.

Open Streets event planning for Oct. 8

- Signs and educational materials – Guy and Erica are making cards to attach to the reflective armbands giving people information about pedestrian safety. They will make a sign for the Pedestrian Committee info table. We need to have We Walk Week flyers at this table.
- Set-up logistics – Eve reported on items she and Mark need for set-up. We discussed the following and identified these sources and follow-ups:
 - o Tables and chairs – Erin to ask Union Elementary School if we can borrow
 - o Ping-Pong Tables – Erin to ask UES if we can borrow
 - o Rain tent, water coolers, trash barrels, recycling barrels – find out if DPW can supply
 - o Water – if DPW does not have coolers to lend, then we can purchase bottled water
 - o Bathrooms – we will direct people to library
 - o Snacks – Mark and Eve to purchase snacks or fruit
 - o Barriers to block off street – Eve to check with John to confirm that city will do this
 - o Signs notifying residents of street closure - Eve to check with John to confirm that city will do this
 - o More volunteers – Harris will help Eve and Mark with set-up
- Budget – Erin will keep track of the budget, we have \$ 100 for activities, \$100 for food/water/cups, and \$315 for publicity
- Activities
 - o Storywalk – Guy will borrow from library
 - o Bike maintenance clinic – Erin will ask Onion River Sports if they want to set one up
 - o Slow bike race – bike committee will help with this
 - o CarShare Vt – Harris will ask them if they want to set up table
 - o Energy Committee – Eve reported they are planning a tour of energy efficient buildings that day, she will ask if they need table
 - o Boy Scouts – Erin said they are interested and working on plan
 - o Parents Group at Union School – Erin will contact
 - o North Branch Nature Center – Harris will contact

- o Sidewalk chalk for hopscotch, etc. – we need to purchase chalk

We Walk Week AND Open Streets publicity

Guy, John, and Mark are doing the publicity for both events and will put out combined publicity.

We Walk Week schedule

John has compiled the schedule. Erin will send him a template from last year and ask our new VISTA Becca if she can use it to create a schedule.

Restructuring Bike, Pedestrian, and Transportation Committees

Motion made by Erica, seconded by Erin to approve proposal to disband Ped Committee, Bike Committee, and Transportation Committee and re-organize into two new committees: an infrastructure/policy committee to deal with both bike and ped issues with regular attendance and participation of someone from DPW, and an events/encouragement/enforcement committee for both bike and ped.

Discussion: general consensus that restructuring will be good for infrastructure issues and increasing our communication with DPW; however there were concerns raised about events committee combining with bikes. Some members do not want to spend time talking about bike events/encouragement, and want to focus on pedestrian issues. Discussion of use of sub-committees, but also concern about how frequently committees will meet.

Motion passed on vote of 3 in favor, 2 against, and 1 abstention

Report from Harris on Request Tracker and other DPW conversations

For future meetings: discussion of DPW's planning for sidewalk improvements put off to later meeting for lack of time. Harris would like a report on trip hazards.

Next meeting MOVED to Sept. 19 – Monday – so that we have ample time to finish planning for Open Streets.

Adjourned 6:40 p.m.

Minutes of the Montpelier City Council Meeting
September 14, 2016, 6:30 PM
City Council Chambers

In attendance: Mayor John Hollar (Chair), Councilors Justin Turcotte, Dona Bate, Tom Golonka, Jean Olson, Jessica Edgerly Walsh and Anne Watson. City Manager William Fraser was in attendance. City Clerk John Odum served as Secretary of the meeting.

The meeting was called to order by the Mayor at 6:30PM.

- 16-247. Without objection, the proposed agenda was approved with the addition of a 1st class liquor license application from the Vermont College of Fine Arts (at the City Clerk's request) to the consent agenda, by unanimous consent.
- 16-249. Councilor Bate moved approval of the amended consent agenda, and was seconded by Councilor Turcotte. The motion carried unanimously at 6:34.
- 16-250. The Council considered appointments to the Development Review Board. Councilor Watson moved the Council appoint William Schebaum and Ryan Kane (alternate) to the DRB, and was seconded by Councilor Bate. After a brief discussion, the motion carried unanimously at 6:36.
- 16-251. The Council considered appointments to the Housing Trust Fund Committee. Councilor Olson moved the Council appoint Jack McCullough and Richard Amore to the Housing Trust Fund Committee. Councilor Edgerly Walsh seconded and the motion carried unanimously at 6:37. Some discussion followed. Councilor Edgerly Walsh moved the Council confirm the prior appointments of Councilors Olson and Golonka to the Housing trust Fund Committee. Councilor Watson seconded the motion, which carried unanimously at 6:40.
- 16-252. City Manager Fraser introduced a Goal Review discussion (Housing, Economic Development). A discussion followed.
- 16-253. Board members of the Montpelier Community Fund (Judith Stermer, Michael Sherman, and Christine Zachai) addressed the Council on proposed grant criteria changes (see agenda). Discussion followed. Councilor Bate moved that the Council pass the recommended modifications to the Community Fund grant award criteria with the amendment of looking at how the Fund uses funds to match or leverage others. Councilor Watson seconded. Motion carried unanimously at 7:14.
- 16-254. Page & Jed Guertin addressed the Council on a proposal for a new strategy to pursue in order to preserve Berlin Pond, in which the Council acts as the Board of Health. Discussion followed.
- Ryan Kane introduced himself to the Council.
- 16-255. City Manager Fraser introduced a preview of the comprehensive discussion planned for

the next meeting regarding Combined Sewer Overflows (CSO). Public Works Director Tom McArdle joined the discussion.

- 16-257. Montpelier Energy Advisory Committee Fund members Scott Muller, Geoff Fitzgerald and Kate Stephenson addressed the Council on their efforts and a proposal for a revolving loan fund. Page Guertin participated in the discussion.

Councilor Edgerly Walsh moved the Council approve \$5000 from the reserve for the establishment of the net zero revolving loan fund. Councilor Watson seconded. After further discussion, the motion carried unanimously at 8:57.

- 16-256. The Mayor opened the first reading/public hearing for the proposed Junkyard Ordinance at 8:58. Vicki Lane came forward with questions. The hearing closed at 9:03. Discussion followed. Councilor Edgerly Walsh moved the Council pass 1st reading and schedule the 2nd reading for the next Council meeting on the 21st. Councilor Bate seconded. After some brief further discussion, the motion carried unanimously at 9:06.

- 16-258. Mr. Fraser introduced the revised Street Closure Policy proposal. There was a brief discussion. Assistant City Manager Jessie Baker participated in the discussion. Councilor Bate moved approval of the policy, Councilor Olson seconded. The motion carried unanimously at 9:12.

- 16-259. Assistant City Manager Baker introduced the Local Development Corporation (LDC) follow-up, introducing the proposed LDC founding documents. Discussion followed. Councilor Bate proposed the Council approve the proposed LDC Articles of Incorporation. Councilor Turcotte seconded. The motion carried unanimously at 9:20.

- 16-260. It was agreed that Councilor Watson would be the voting representative to the VLCT Town Fair on October 5th.

- 16-262. Councilor Bate shared a Transportation Advisory Committee meeting report.

Councilor Olson reported on an email from a 12 year old girl on Marvin Street asking that Halloween be celebrated on the last Saturday of October. Discussion followed.

Councilor Turcotte thanked Jessie Baker for her departmental consolidation work.

Councilor Watson reported on the Friends of the Winooski river cleanup, the October 8 energy home tour, the reduction in greenhouse emissions by the city, and her interest in looking at the city flag design.

Councilor Edgerly Walsh offered a happy birthday to Anne Watson, and then asked questions about refugees, put forward a request for a One Taylor Street update, and called attention to possible solar power incentive money.

- 16-263. The Mayor's reported that he had met with the Central Vermont Refugee Network about Bhutanese refugees. He also indicated he would not be present at the next meeting.

16-264. The City Clerk reminded listeners that Water/Sewer bills were due the next day, and noted that General Election ballots will be available at the latest next Wednesday.

16-265. The Assistant City Manager reported on a meeting regarding a downtown gym or fitness studio. Mr. Fraser gave an update on the Finance Director search.

Councilor Bate moved that in the anticipation that the entire discussions of easements and lease relating to 60 State Street, as well as the discussion relating to the negotiation of a contract should be conducted in accordance with Title I, V.S.A. §313, Executive Sessions, (a)(2)., the Council should enter executive session. Councilor Watson seconded and the motion carried unanimously.

Councilor Golonka indicated for the record, that he would recuse himself from discussions of the easements and lease relating to 60 State Street.

Hearing no objection, the Mayor declared the Council returned to open session, and the meeting subsequently adjourned, by unanimous consent.

DRAFT Stormwater Master Plan City of Montpelier, Vermont



PROJECT NO. PREPARED FOR:

15-097

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DRAFT Stormwater Master Plan

City of Montpelier, Vermont

Cover:
Illustrative
concept designs
for National Life
Drive intersection
(top) and College
Street (bottom).

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Acknowledgements

This project was performed by Stone Environmental, Inc. and Greenman-Pedersen, Inc. (GPI) for the Montpelier Departments of Planning and Community Development and Public Works with funding provided by the Vermont Department of Environmental Conservation - Ecosystem Restoration Program.

1. Introduction

Water knows no political boundaries, and thus evaluations of water quality tend to be undertaken within watershed boundaries and involve land areas in multiple towns. From a water quality perspective, it would be ideal to manage water resources along watershed lines—but the reality is that many decisions, particularly those about land use, are made at the level of towns or individual sites.

A City-wide Stormwater Master Plan is responsive to existing landscape characteristics across all watersheds within local political bounds. It connects land use, stormwater management, floodplain management, river management, and public infrastructure needs to more effectively address all of the issues which contribute to water quality impairment or improvement. Within this Plan, localized stormwater problems are examined at a larger scale (e.g., city-wide) to determine their relative contributions and aid in setting priorities for addressing challenges related to stormwater runoff. As adjoining municipalities also take increasingly comprehensive views of stormwater management issues and planning, these plans are one-stop resources that can improve coordination and increase opportunities for collaboration in meeting watershed-related needs across political boundaries.

1.1. Project Background

As precipitation falls on an undisturbed, natural landscape and moves through the hydrologic cycle, it flows through a complex system of vegetation, soil, groundwater, and surface water. Natural events have shaped these components over time to create a system that can efficiently handle stormwater through evaporation, transpiration, infiltration, and runoff. Alterations to the landscape change the way it responds to precipitation events. Management of land use, rainfall, storm runoff, and surface water (streams and lakes) are interrelated, and the management practices chosen all influence water quality and stream health.

Watersheds are interconnected networks in which a change at any location can carry throughout the system. There are many factors that influence exactly how stormwater runoff from a particular site will affect other areas of the watershed. The degree and type of impact varies from location to location, but it can be significant relative to other sources of pollution. Stormwater runoff affects water quality, water quantity, habitat and biological resources, public health, and the aesthetic appearance of the receiving water. Stormwater controls, in contrast, are typically conceived and implemented on a project-by-project basis. These projects are analyzed for their individual stormwater impacts, not in the context of their impact on an interconnected hydrologic and hydraulic system. It is well documented, however, that the cumulative effects of individual land surface changes dramatically influence flooding conditions and contribute to water quality degradation (NRC 2009).

What is a watershed? A watershed is any area of land in which all water runoff from its surface flows to the same drainage point. Watersheds are sometimes referred to as drainage areas. Watersheds are important because they are the basic unit of analysis for all surface water management. They come in all shapes and sizes, and are defined based on the intended study area.



Watershed management practices have direct impacts on water quality in local creeks and streams (such as Blanchard Brook or the North Branch), as well as downstream waterbodies (the Winooski River and, ultimately, Lake Champlain). Any decisions that affect land use have stormwater management ramifications and, in turn, impact all downstream water resources. The findings of one recent study (Troy et al. 2007) suggest that “land-use changes in the Basin have increased phosphorus levels in Lake Champlain, especially conversion of agricultural areas and forests to developed uses.”

Vermont’s streams, rivers and lakes are vital economic resources. The quality of local receiving waters affects both economic interests and quality of life in the surrounding areas. Throughout the Champlain basin, the local economy depends, in part, on the revenue gained from outdoor activities enjoyed in and on the water. Protecting the quality of surface waters is one of the most important commitments communities can make to protect the economic interests of residents.

Taken together, these elements emphasize the need for a holistic planning effort that considers the interconnected nature of land use, stormwater management, and river management in order to achieve overall watershed goals.

1.2. Project Goals

The ultimate objective of this stormwater master planning project is to support the City in improving stormwater management, by providing a list of high priority water resource concerns and conceptual solutions that will support the development and implementation of future restoration projects in an efficient and targeted manner.

This Stormwater Master Plan first incorporates information from existing plans and datasets to create a single, town-specific resource to guide future stormwater management activities. The resulting Stormwater Management Planning Library, included as Appendix B, is a valuable resource for water quality-related work in the City.

This Stormwater Master Plan also:

- Reviews and documents existing Department of Public Works practices such as street sweeping and catch basin cleaning;
- Provides a means for comparing information about different neighborhoods and the anticipated benefits of individual stormwater improvements projects, both within a particular neighborhood and across the City;
- Provides recommendations to address stormwater problems, including:
 - A prioritized list of problem areas that can assist the City in directing resources to high priority projects; and
 - Options for potential revisions to City regulations or ordinances needed to encourage location-specific management activities;
- Highlights opportunities to implement stormwater treatment in areas currently served by combined sewers;
- Presents conceptual solutions for stormwater management measures in select high priority problem areas; and
- Reviews existing, available funding sources that are available to support better stormwater management.

2. General Description of Montpelier's Watersheds

The City of Montpelier is located in Washington County in central Vermont. The City has a total area of 10.3 square miles, and as of the 2010 census, the population of Montpelier was 7,855. The Winooski River runs through the heart of downtown Montpelier, and confluences with three significant waterways within the City boundaries: the Dog River, the North Branch, and the Stevens Branch. In addition, there are a number of smaller drainages in the City including, most notably, Blanchard Brook. Each of these watersheds is described below, and watershed boundaries are shown on Figure 1 in Appendix A.

2.1. Winooski River

The Winooski River flows into the southeast corner of Montpelier from the Town of Berlin, and confluences with the North Branch in the center of downtown before flowing east into Middlesex and ultimately to Lake Champlain. The Upper Winooski watershed encompasses the area of land that drains into the Winooski River from its headwaters in Cabot downstream to Montpelier. The river thus defines a significant valley shared by many landowners, encompassing a watershed area of 316 square miles upstream of its confluence with the North Branch (Round River Design 2010, see Appendix B). Within Montpelier, the Winooski River above the City's wastewater treatment facility discharge point is considered to be impaired by *E. coli* bacteria, due to the wastewater collection system passing combined sewer overflows (VTDEC 2014).

While land uses and management practices in Montpelier contribute to the water quality impacts observed in the Winooski River, those impacts begin well upstream of the City and cannot not be treated or solved entirely within the City's boundaries (see Appendix B). For instance, patterns of elevated *E. coli* observed in Montpelier's stretch of the Winooski also occur in the Winooski mainstem far up in the watershed (upstream of the Cabot WWTP).

It is worth noting that historically, the majority of concerns related to resilience and flooding along the mainstem of the Winooski in Montpelier have been related to ice jams and the attendant flooding. Significant storm events in May 2011, however, served to broaden the City's focus to include the growing number of high intensity rainfall events and the damage caused by unmanaged stormwater runoff. This master planning effort helps to address this concern by supporting City efforts to be more comprehensive in managing runoff from the developed landscape

2.2. Winooski River North Branch

The North Branch is a large tributary of the Winooski River which drains approximately 78 square miles. The watershed extends from its confluence with the Winooski in downtown Montpelier north to the town of Elmore and is roughly bordered to the east by the Woodbury Mountain Range and to the west by the Worcester Mountain Range (Johnson Company 2009, see Appendix B). The North Branch flows through the towns of Elmore, Calais, Worcester, East Montpelier, and Middlesex before entering Montpelier. As with the Winooski River in Montpelier, the North Branch from its confluence with the Winooski to approximately one

mile upstream is considered to be impaired by *E. coli* bacteria, due to the wastewater collection system passing combined sewer overflows (VTDEC 2014).

2.3. Blanchard Brook

The Blanchard Brook watershed includes approximately 1.2 square miles in Montpelier and East Montpelier. The river originates along Main Street as it leads north towards East Montpelier, and flows south through Sabin's Pasture and out into the Winooski River. In contrast with other Montpelier watersheds, land uses in the Blanchard Brook watershed area are primarily low- to medium-density residential development and undeveloped land.

2.4. Other Watersheds in Montpelier

A relatively small area in the southwest corner of the City lies within the Dog River watershed, and a similarly small area in the southeast corner of the City lies within the Stevens Branch watershed. Both of these areas drain to the Winooski River and ultimately to Lake Champlain.

3. Existing Plans and Data

Numerous and varied groups and individuals have invested considerable effort in evaluating different components of Montpelier's water, wastewater, and stormwater infrastructure; water resources; and the important interface between water resources and local land use decisions. At times these evaluations followed watershed boundaries, and at other times they have followed political boundaries. The following sections identify these evaluations and highlight information most relevant to Montpelier and most relevant to developing a list of strategic, prioritized projects that could be undertaken to improve water quality and increase resilience to future flooding. A detailed review of each assessment is included as Appendix B of this report.

3.1. Watershed-Based Assessments

The ongoing assessments described below are generally led by the State of Vermont's Agency of Natural Resources (ANR). These include:

- Basin planning efforts, whose main purpose is to guide ANR in its own work and in collaborative projects with the public, municipalities, and other state and federal agencies. The basin plans have a five-year scope. The City of Montpelier is located in the Winooski River Basin (Basin #8), where a draft plan was approved in May 2012 by the Agency of Natural Resources.
- Stream geomorphic assessment work, undertaken to understand the natural tendencies of a particular reach of stream or river, its current condition, and what changes may be anticipated in the future. To date, stream geomorphic assessments have been completed for the Dog River, the Stevens Branch, the North Branch, and the mainstem of the Winooski River in Montpelier.
- In-stream water quality assessment work, including water chemistry and biological assessments.
- Total Maximum Daily Load (TMDL) development, to establish the maximum amount of a pollutant (e.g., bacteria, nutrients, excess stormwater flows) that a waterbody can assimilate and still meet state-established water quality standards. TMDLs are based on the relationship between pollution sources and in-stream or in-lake water quality conditions. A TMDL addresses a single pollutant or stressor for a waterbody, so more than one TMDL may need to be developed for a particular receiving water. On June 17, 2016, EPA established new phosphorus TMDLs for the twelve Vermont segments of Lake Champlain. The state's Phase 1 Implementation Plan for this TMDL provides the framework for how these phosphorus pollution limits will be met, and is still in draft form, though the public comment period closed on September 7, 2016. The implementation plan ultimately will require the application of additional best management practices (BMPs) throughout the Lake Champlain watershed.

3.2. City-Wide Assessments and Programs

In addition to the watershed-based assessments, a number of assessments and datasets are developed on a municipality-by-municipality basis. These are important to fold into any effort to develop a list of strategic,

prioritized projects that could be undertaken to improve water quality in and around Montpelier. These include direct feedback from the City, work by the Vermont Agency of Transportation and Vermont Department of Environmental Conservation, and past and current planning initiatives.

- In meetings with Stone Environmental, City Public Works officials identified more than 20 areas of concern and priority projects throughout Montpelier, many of which are areas that sustained damage during the May 2011 flood event. The City has implemented a significant number of corrective measures and controls in many of the most impacted areas over the past four years; these projects were also reviewed during the field evaluation (Section Stormwater Problem Areas5). See Figure 7 and Table 4 in Appendix B for a map and table of areas of concern and priority projects, as well as a map of the locations of concerns identified.
- VTrans-sponsored programs, including both routine inspections of bridges and culverts and grant opportunities provided by the Better Backroads Program, have identified a few potential projects to protect existing infrastructure whose implementation would also improve stormwater management. However, the information in the agency's online bridge and culvert inventory is known to be out-of-date and incomplete for the City of Montpelier.
- Vermont DEC-sponsored programs, including detailed stormwater infrastructure mapping completed in support of Illicit Discharge Detection and Elimination (IDDE) efforts and state-issued post-construction stormwater permitting records, were examined in order to identify additional stormwater management opportunities. The infrastructure mapping data represent an important supplement to VTrans' online bridge and culvert inventory and were invaluable during evaluations of existing problem areas and retrofit opportunities (Section 5). In addition, the age, style, size, and upkeep of existing facilities permitted by DEC – particularly facilities constructed prior to 2002 – may make them candidates for improvement to enhance stormwater management capabilities.
- The City's Code of Ordinances, most recently updated in 2012, has two key sections that related to stormwater management: Natural Resources (Chapter 13); and Zoning and Subdivision Regulations (Chapter 15). The Natural Resources chapter has an article specific to river and streams, which prohibits encroachment upon the channels of the City's major rivers and prohibits dumping on the banks of either river. The Zoning Regulations contain sections dedicated to Floodplain Development (Section 309) and Storm Drainage (Section 723). The City is currently engaged in an effort to substantially overhaul its zoning regulations. As part of overhaul, the City anticipates that a stand-alone chapter on River Hazard Areas – which includes both river corridors and flood hazard areas – will be added to the zoning regulations. Part 3 of the proposed draft Montpelier Unified Development Regulations adds requirements for implementing low-impact development and green stormwater infrastructure in new development and redevelopment situations, including but not limited to management of "one inch of rainfall from all impervious surfaces on the lot".
- The City's Flood Hazard Mitigation Plan makes many recommendations related to management of ice jams, and includes two important considerations for stormwater management: preserving existing open space within the floodplain, and seeking alternate locations for snow dumping and storage. In addition, a 2002 plan for management of riverbank vegetation makes specific planting and vegetation management recommendations for various segments of the mainstem of the Winooski as it flows through Montpelier.

4. Current Department of Public Works “Good Housekeeping” Practices

Roadways are a major component of impervious cover in most Vermont communities. From a stormwater management perspective, streets are often directly connected impervious cover – meaning stormwater runoff from roads flows largely untreated via gutters and storm sewers to the nearest waterbody. Paved roads can also sometimes be pollutant hotspots - accumulating trace metals, oil, grease, and hydrocarbons as a result of vehicular traffic, as well as debris attributed to pavement degradation and littering. Street sweeping and catch basin cleaning programs are both “good housekeeping” activities that play an important role in helping to physically reduce the amount of dirt present on a street surfaces and thereby limit pollutant loads delivered to local receiving waters.

The City of Montpelier tracks the volume (cubic yards) of material swept from streets and the volume removed from catch basins on a daily basis. Department of Public Works staff reported that they sweep every paved street at least once per year, and that many have been swept multiple times. In addition, the City is working to clean all catch basins at least once every other year. A monthly summary of cleaning activities over the past six months is presented in Table 1.

Table 1. Volume of Material Removed via Street Sweeping and Catch Cleaning, March-August, 2016

Month	Volume of Material Removed via Street Sweeping (cu. yd.)	# of Catch Basins Cleaned	Volume of Material Collected from Catch Basins (cu. yd)
March	136	not recorded	8
April	71	132	37
May	14	39	4
June	10	40	12
July	7	81	29.5
August	18	78	22.5

It is important to continue to track these activities over time, in order to be able to document and take credit for the volume of material kept out of local waterways. It is also important to track additional metrics, such as the number of catch-basins cleaned or the lane-miles swept. Over time, as road maintenance crews become more efficient with sanding material and citizens become more knowledgeable about fixing sources of driveway erosion, for example, the volume of material collected from streets and catch-basins is likely to decrease—even though the number of catch-basins cleaned or lane miles swept may actually be increasing.

5. Stormwater Problem Areas

One of the goals of this plan is to “develop a prioritized list of stormwater problem areas that can assist the City in directing resources to high priority projects.” To achieve this goal, a thorough effort was made to identify existing problem areas, and then to evaluate existing conditions and potential solutions.

5.1. Identification and Initial Evaluation of Problem Areas

The first task was to identify the location and nature of existing drainage problems and stormwater management concerns, and to gather field data for further analysis where appropriate. The approach to identifying potential problem areas included the following elements:

- Reviewing existing plans and data, as described in Section 3, and noting the location of any concerns related to stormwater
- Engagement with local officials, including regular meetings with the City Planner, Public Works Director, and key DPW staff, as well as presentations to City Council
- Targeted site visits to verify problem areas during fall 2015 and spring 2016
- Documentation (with photos) of existing problem areas

A “problem area data sheet” was developed and used as a guide to ensure that consistent information was collected as site visits were completed. A total of 53 potential problem areas were identified and geo-located (Figure 2). The data sheets for all of the problem areas identified in Montpelier are provided in Appendix C of this report.

5.2. Initial Screening Evaluation of Problem Areas

Working from the list of potential problem areas, the Consultant Team visited each potential problem area to directly observe the site. Where an unresolved problem was found, photos were taken of any areas of active erosion, and observations were recorded about the source or cause.

Each problem area was given an initial score with the intent of generally assessing the severity of existing problems, removing low priority problem areas from the dataset, and providing general guidance on the relative order in which the problems should be addressed when considered city-wide (Appendix C). Scores were assigned as described in Table 2.

The problem areas identified during this initial evaluation were carried forward through a more detailed examination and prioritization process that considered possible regulatory changes, future growth, and the suitability of different types of best management practices to each identified problem area, as described in Sections 6 and 7).

Table 2. Scoring Criteria for Preliminary Evaluation of Stormwater Problem Areas.

Level	Classification
1	Outside of project scope, or infeasible to remedy due to project size.
2	Stable, but problem could escalate with future change in surrounding land use.
3	Limited erosion and/or drainage problems are present; issues may be readily addressed.
4	Moderate erosion and/or drainage problems are present; issues may be readily addressed.
5	Significant erosion and/or drainage problems are present; issues may be readily addressed
6	Strategic retrofit opportunity

6. Criteria for Prioritizing Stormwater Management Opportunities

In coordination with the identification and characterization of existing stormwater-related problems, an effort was undertaken to identify and anticipate the potential impacts of the future on the City's stormwater management activities and priorities. These fell into two broad categories: projected growth and known capital projects, and anticipated regulatory requirements.

6.1. Projected Growth and Anticipated Capital Projects

The Stone team worked with the City to identify areas likely to see significant growth as well as planned or potential capital projects with significant City involvement. These areas are indicated on Figure 3 and are discussed in more detail below.

6.1.1. Future Growth Areas

The City Planning and Community Development Department identified three specific areas of the City where future growth is likely to be concentrated. These are Sabin's Pasture, Crestview, and Isabel Circle. Parcel boundaries for all three locations are displayed in Figure 3. Should it occur, development in all three of these areas is likely to be subject to both construction and post-construction State Stormwater Permit Program requirements, as it almost certainly will involve more than one acre of land disturbance and/or the creation of more than one acre of new impervious surface. Evaluation of current stormwater-related challenges and opportunities completed during earlier phases of this stormwater master planning effort did not identify specific issues in the immediate down-slope vicinity of Sabin's Pasture or the Crestview area that might be exacerbated by concentrated future development of these two parcels. At least two current stormwater 'problem areas' were identified in the drainage areas down-slope of the Isabel Circle parcel (Figure 3). While construction and post-construction stormwater management permitting and resulting best management practices will be required for development activities on this parcel, it is much less likely that designs on this parcel will be required by state permitting programs to take down-stream impacts into account. For most post-construction BMPs in the current (2002) Vermont Stormwater Management Manual, practice outlet velocities are required to be non-erosive, but impacts down-stream of the permitted site are not required to be assessed unless the site is subject to the Overbank Flood Protection Treatment Standard (e.g., the project site to be permitted is greater than 5 acres in size). The Isabel Circle parcel is roughly 77 acres in total, but substantial portions of it are steeply sloping and unlikely to be included in major development proposals.

6.1.2. Infill and Expansions of Existing Development

In addition to the three areas where there is significant development potential, there are substantial high- and medium-density developed areas in the City where anticipated changes to City zoning may encourage infill development or redevelopment projects. This "intensification" within already built areas is likely to result in more modest land disturbance and impervious surface creation, which is often referred to as sub-jurisdictional as it is unlikely to trigger State Stormwater permitting requirements. Left unchecked, the cumulative impact of such series of small projects on local drainages can be significant.

The City's current Zoning and Subdivision Regulations require submittal of a stormwater management plan for review and approval by the Development Review Board (Section 723). Stormwater control facilities must accommodate the 25 year storm event frequency, and within the plan, existing treatment and conveyance facilities which may be affected or impacted by the development must be identified and analyzed. The use of "best available technology" to minimize stormwater runoff is required (examples provided include retention basins, recharge trenches, swales and minimal use of impervious surfaces) but a performance standard for these measures (e.g., "must capture and treat the 90th percentile storm") is not provided.

The City's substantially updated Land Development Regulations are not yet adopted, and so specific areas where infill development and redevelopment are most likely to occur are not identified on Figure 3. The current draft of the Land Development Regulations (Section 3009, Stormwater Management) includes strong but sensibly tiered requirements for incorporating low-impact development (LID) concepts and green stormwater infrastructure (GSI) practices into future development projects where those projects will not trigger state requirements; as written, the current draft Land Development Regulations are likely to largely offset any potential impacts. New development and redevelopment exceeding the exemption thresholds in this section will be required, at minimum, to manage the first inch of runoff from site impervious surfaces (Sections 3009.H-I), with a strong preference for the use of LID/GSI practices where possible. Disturbed areas on the site not covered by impervious surface, incorporated into a structural stormwater treatment practice, or engineered as structural fill or slope will be required to be covered with topsoil that meets specified minimum depth and quality requirements once development is complete (Section 3009.J), consistent with the anticipated draft Vermont Stormwater Management Manual's Post-Construction Soil Depth and Quality Standard.

6.1.3. Anticipated Capital Projects

Beyond these areas of potential future growth, infill, and re-development, Stone obtained information from the Department of Public Works relative to planned capital projects slated for the next five years. It is often possible to incorporate stormwater treatment practices as part of significant capital projects at little additional cost. In reviewing existing datasets (Section 3) and especially in the initial evaluation of stormwater problem areas (Section 5), particular attention was given to opportunities that coincide with full-depth road reconstruction projects, as well as sidewalk projects adjacent to an existing green space. These areas are also highlighted in Figure 3, and concept designs for two of these opportunities (Northfield St. and Harrison Ave.) were ultimately developed (Section 8).

6.2. Anticipated Regulatory and Pollutant Reduction Requirements

There are currently several state-level rulemaking and other regulatory initiatives – most stemming from the passage of Vermont's Clean Water Act (Act 64) in June of 2015 – that have important implications for the City of Montpelier. Rulemaking is underway or was recently completed related to stormwater runoff from municipal roads and management of combined sewer overflows. While changes in post-construction stormwater permitting for existing properties with over 3 acres of unpermitted impervious surface are a few years away, the DEC Stormwater Program recently recommended to the Legislature that the state's post-construction permitting threshold for new impervious cover be lowered to 0.5 acres (from the current 1 acre or more of impervious cover for new construction).

The suite of state-level rulemaking and other regulatory initiatives that may have implications for the City of Montpelier includes:

- Municipal roads

-
- Developed land and post-construction stormwater management
 - Combined sewer overflows
 - Water quality criteria for chlorides
 - Integrated water quality planning

The status of and key points for each of these efforts are described in detail in Appendix D—but it is important to be aware that some of this information is still evolving and may not be fully resolved for some time to come.

Several criteria specific to these anticipated regulatory requirements were developed, in order to be able to factor these initiatives into decisions regarding the relative priority that might be assigned to the implementation of different projects and practices. These criteria are discussed below. These additional criteria are not included in the prioritization and implementation matrix (Section 7)—however, they constitute part of the decision making process that narrowed the group of over 50 initially identified problem areas to the suite of high-priority projects that advanced to concept design (Section 8).

- Promote stable conveyance? (Y/N)
 - The stated purpose of the Municipal Roads General Permit will be to implement a customized, multi-year plan to stabilize existing road drainage systems. Projects that are intended promote stable conveyance within the right-of-way are not yet required, but in the future, they will be required as part of compliance with the permit.
- Total impervious cover? (<1 acre, 1-3 acres, >3 acres)
 - Requirements for stormwater management are based on a “common plan of development.” A common plan of development or sale means a contiguous area where multiple separate and distinct land disturbing activities may be taking place at different times, on different schedules, but under one proposed plan. That said, a public entity (like a municipality or state agency) need not consider all construction projects within their entire jurisdiction to be part of an overall “common plan.” Only the interconnected parts of a project would be considered to be a “common plan” (for example, a building and its associated parking lot and driveways). Evaluations of total impervious cover will be made based on “common plan.”
 - As part of Vermont’s Lake Champlain Phosphorus TMDL Phase 1 Implementation Plan, Vermont DEC will issue a general permit for existing development to address stormwater management for parcels that currently have no stormwater management permits, but which contain more than 3 acres of impervious surface. Parcels subject to this permit will ultimately be required to install retrofits, and thus retrofits to such properties, especially if they are not controlled by the City, may be a lower priority for the time being.
 - Proposed revisions to the Vermont Stormwater Management Manual expand treatment requirements for parcels undergoing redevelopment. Redeveloped sites (with more than an acre of impervious surface) will be required to capture and treat 50% of the first inch of rain on the redeveloped impervious areas, or to reduce existing impervious surfaces by 25% and restore these areas to meet the new post-construction soil depth and quality standard. Parcels with more than an acre of impervious surface with planned redevelopment will be required to install retrofits, and may therefore be a lower priority for the City in the short term.

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- Type of treatment (D/I)
 - Reducing peak flows within the combined sewer system is essential to reducing the volume and frequency of overflows. Stormwater management practices can accomplish this by either temporarily storing and detaining stormwater runoff (while ultimately returning that runoff to the system), or by infiltrating and thereby eliminating the stormwater from the combined sewer system. Therefore, and depending on other characteristics of the drainage area or sewershed, it may be important to consider whether practices detain (D) or infiltrate (I) storm flows in areas served by combined sewers.
 - Potential chloride concern? (Y/N)
 - Salt used to de-ice parking lots, sidewalks, streets and highways is a significant source of chloride to the environment; in Vermont salt usage tends to be highest in privately-held parking lots. Unfortunately, our ability to remove chloride from stormwater once it has dissolved is very limited. Further, infiltrating stormwater runoff with high concentrations of stormwater can contaminate groundwater and result in elevated chloride concentrations, particularly in smaller streams like Blanchard Brook; elevated concentrations of chlorides can be harmful to aquatic plants and animals. Contributing drainage areas for infiltration-based stormwater management practices should be evaluated for salt use and alternative practices considered for heavy use areas.

6.3. Range of Alternatives for Practice Implementation

There are a wide array of best management practices (BMPs) and green stormwater infrastructure (GSI) practices available for retrofit applications in developed areas like the City of Montpelier. BMP selection involves consideration of many factors including physical site characteristics, treatment objectives, and aesthetics. Typically, there is not a single answer to the question of which BMP (or BMPs) should be selected for a site; there are usually multiple solutions ranging from standalone BMPs to treatment trains that combine multiple BMPs to achieve the water quality objectives. Table 3 is a simple matrix that, for a range of BMPs, summarizes factors that should be considered when selecting a BMP for a particular application.

In the matrix, BMPs are evaluated based on a range of criteria, including community factors, pollutant removal, and physical feasibility considerations. Each of the criteria are discussed briefly below:

- Safety concerns: although well-designed stormwater features can be community amenities, storm water ponds, wetlands and bioretention areas can also pose hazards including strong currents during storm events, steep drop-offs, unsafe winter ice and contaminated water and sediment. With care taken in siting and design, many of these safety concerns can be mitigated, if not eliminated.
- Aesthetically pleasing: many well-designed stormwater practices can be designed as landscape features, creating a development focal point, recreational area and/or wildlife habitat. This criteria indicates the ability of each practice to be adapted to serve as an amenity for its surrounding environ.
- Flow attenuation: development (clearing, grading and construction) can remove surface depressions and limit opportunities for stormwater to soak away into the ground below leading to higher peak flows. This criteria indicates the ability of each practice temporarily detain flows in order to reduce the peaks.
- Volume reduction: as described above, development can limit opportunities for stormwater to soak away into the ground below leading to increased volumes of stormwater runoff. This criteria indicates

the ability of each practice retain stormwater runoff, by either promoting infiltration and/or evapotranspiration.

- Total suspended solids (TSS) removal: as stormwater runoff washes across the ground surface it often picks up sediment particles and other debris. This criterion indicates the ability of each practice to remove solid particles, typically via settling or filtration.
- Total phosphorus (TP) removal: phosphorus is a fundamental component of organic matter, including grass clippings and leaf litter. As stormwater washes across the ground surface it often picks up organic materials, delivering them to local receiving waters. This criterion indicates the ability of each practice to reduce phosphorus concentration, typically via settling, filtration and, to a lesser extent, plant uptake.
- Suitable for hotspot: there are areas within the developed landscape where pollutant concentrations are likely to be higher, such as vehicle fueling or maintenance areas. Practices that promote infiltration are not suitable for these locations; rather, stormwater from hotspots should be filtered or run through an appropriate treatment device prior to discharge.
- Drainage area: this criterion indicates the amount of land area that is recommended to drain to a single BMP installation.
- Soils: soils that are well-drained are able to readily accept stormwater for infiltration, and tend to be sandy; poorly-drained soils have a limited capacity to infiltrate stormwater, and tend to be comprised largely of clay or silt particles.
- Suitability on sloping sites: for practices that promote infiltration, it can be challenging to sufficiently encourage stormwater runoff to soak away into the ground below on sites with steeper slopes. There are modifications that can be made to certain types of practices, such as swales, to overcome this limitation.

Table 3. Stormwater Practice Implementation Alternatives - BMP Selection Matrix

BMP Type	Community Factors		Targeted Pollutants					Physical Feasibility Considerations		
	Safety Concerns?	Aesthetically Pleasing?	Flow Attenuation	Volume Reduction	Total Suspended Solids (TSS) Removal ¹	Total Phosphorus (TP) Removal ¹	Suitable for Hotspot?	Drainage Area	Soils	Suitability on Sloping Sites
Treatment Swale	N	MODERATE	LOW	LOW	65%	25%	S	5 Acre Max.	NR	Suitable
Wet Pond / Constructed Wetland	S	MODERATE	HIGH	LOW	70%	45%	S	10 Acre Min.	Well drained soils may require liner	Not suitable
Gravel Wetland	S	HIGH	HIGH	MODERATE	90%	65%	S	1 Acre Min.	Well drained soils may require liner	Not suitable
Rain Garden / Bioretention	S	HIGH	MODERATE	MODERATE	90% ²	65% ²	N	5 Acre Max.	Poorly drained soil may require underdrain	Adaptable
Infiltration Trench / Basin	S	MODERATE	HIGH	HIGH	90%	60-65%	N	5/10 Acre Max.	Well-drained soils only	Not suitable
Sand Filter	N	LOW	LOW	LOW	90%	65%	Y	10 Acre Max.	NR	Adaptable
Permeable Pavement	N	MODERATE	MODERATE	MODERATE	90%	45%	N	NR	Poorly drained soil may require underdrain	Not suitable
Disconnection	N	LOW	MODERATE	MODERATE	75%	45%	N	1,000 ft ² to a single point, or max contributing impervious width of 75 ft	NR	Suitable
Level Spreader/Turnout	N	LOW	MODERATE	LOW	10%	0%	N	1 Acre Max.	NR	Suitable
Swirl Concentrator/ Vortex Separator	S	LOW	LOW	LOW	30%	40%	Y	NR	NR	Suitable
Treebox Filter	N	HIGH	MODERATE	LOW	90%	50-80%	Y	¼ Acre Max.	NR	Adaptable

Y = Yes, Applicable
N = Not Applicable
S = Sometimes Applicable
NR = Not Restricted

¹ TSS and TP removal rates from NHDES Stormwater Manual, Appendix E, BMP Pollutant Removal Efficiency (http://des.nh.gov/organization/divisions/water/stormwater/documents/wd-08-20b_apxb.pdf)

² Assumes Rain Garden/Bioretention facilities are not underdrained. If facilities are underdrained, reduced phosphorus removal would be expected.

7. Prioritization of Stormwater Management Opportunities and Implementation Matrix

Stone completed a field screening that identified more than 50 stormwater management opportunities in the City of Montpelier during fall 2015 and spring 2016 (Section 5). The locations of the opportunities are shown on Figure 2, and the nature of each identified problem and potential opportunity is summarized in Table 4. The types of BMPs selected to address each problem area were generally selected using the matrix presented in Section 6.3 and Table 3.

During and following the field screening, Stone recorded observations about each site which are used in the implementation matrix (Table 4) to develop a score for each opportunity relative to several criteria:

- **Existing environmental concerns** – score was assigned based on the type(s) of problems present, with 1 point added for each of the following concerns presented by the site’s current condition: water quality concerns; infrastructure vulnerability; localized drainage issues/flooding; streambank or in-stream erosion; and overbank flooding. Although sites were generally anticipated to receive between 1 and 3 points, the maximum score a site could receive was 5.
- **Environmental priority** – relative environmental impact on nearest receiving water (e.g., proximity, location) and how “active” the problem area was during the site visit, with 1 being the smallest impact and 5 being the greatest impact.
- **Constructability** – relative ease with which a project could be implemented, including whether the recommended practice(s) could be constructed on City-owned land or with a willing landowner-partner, existing access to the site, and the amount of additional assessment and engineering design work that would be required to move the project to implementation. The maximum score a site could receive was 3, indicating a project that should move quickly and easily to implementation.
- **Ease of operation** – including the amount and frequency of maintenance likely to be required and whether maintenance activities would be straightforward to complete. The maximum score a site can receive is 3, indicating a project with infrequent maintenance needs that are easily completed.

In addition, 1 extra point was awarded to projects identified in the three areas the City identified as having the most potential for additional development (e.g., Sabin’s pasture, Crestview, and Stonewall Meadows, see Section 6.1.1). The type of ownership of each project location, whether the project is located in an area currently connected to the combined sewer system, and an initial indication of project cost are also presented in the matrix (Table 4). These measures are more qualitative and thus are not included in the score tabulated for each potential project.

Table 4. Stormwater Opportunity Prioritization and Implementation Matrix

Site ID	Site Name	Need	Proposed Approach	Soil Survey Mapped HSG	Existing Environmental Concerns (scale 1-5)	Environmental Priority (scale 1-5)	Constructability (scale 1-3)	Ease of Operation (scale 1-3)	Area of Anticipated Growth (yes = 1; no = 0)	Implementation Score	Project Type	CSO Area? (Y or N)	Estimated Implementation Cost
WR-01	DOL Parking Lot	Edge of parking lot is not properly stabilized, and concentrated flow along the edge is causing modest erosion	Level shoulder to ensure sheetflow from parking lot; establish robust vegetation	C	2	1	3	3	0	9	B	N	L
WR-02	GMP Parking Lot	Stormwater from the parking lot is directed into a V-shaped swale with evidence of erosion	Bioswale	C	3	2	2	2	0	9	A	N	L
WR-03	Green Mountain Dr.	Retrofit opportunity	Existing catch basins on Green Mountain Dr could be capped and runoff redirected into existing green space.	C	1	1	2	2	0	6	A	N	L
WR-04	National Life Dr & Memorial Dr/Route 2	Existing culvert that conveys some stormwater runoff from swale along National Life Drive down to Memorial Dr is failing and stormwater is flowing around the pipe.	Subsurface gravel wetland	C	3	3	2	2	0	10	D	N	MH
WR-05	30 National Life Dr	Retrofit opportunity	"Daylight" stormwater runoff currently conveyed through closed pipe system to existing grassed channel to the southeast of 30 National Life Dr. Swale would likely need to be improved with check dams added.	C	2	2	2	2	0	8	D	N	M
WR-06	Econo Lodge/Route 12/Northfield St	Retrofit opportunity	The City has indicated planned full-depth reconstruction of Northfield St between Memorial Dr and Freedom Dr will take place in 2017. As part of this project, a stormwater swale could be installed along the western side of Northfield St. adjacent to the curbed lawn island in front of the Econo Lodge motel building. Also along the western side of Northfield St, a stormwater swale could be installed in front of the four houses immediately to the south of the Lutheran Church.	C	2	2	2	2	0	8	D	N	M
WR-07	Taplin St	Management of stormwater runoff along this steep, narrow street is challenging	Stabilization measures have been installed at the top (south) end of the street and the situation appears relatively stable.	D	2	1	1	2	0	6	C	N	M
WR-08a	Old Country Club Rd	Erosion and bank slumping evident in roadside ditches	Reshape existing drainage to extent possible given site constraints; stabilize sideslopes with stone or vegetation, as appropriate.	B	3	3	3	2	0	11	C	N	M
WR-08b	Old Country Club Rd	Culvert at the east end of old Country Club Rd was severely damaged during the May 2011 flood event and has not been removed or repaired	Culvert should be removed or replaced; if culvert is removed, reshape and stabilize sideslopes.	B	4	5	2	3	0	14	C	N	H
WR-10	2 Main St/Show's	Dumpsters and bagged garbage stored on edge of parking lot immediately adjacent to the river.	Alternative locations for garbage storage should be evaluated; site constraints may make relocating materials challenging.	fill	2	2	1	3	0	8	A	N	L
WR-11	Gov. Davis Ave Parking Lot	Retrofit opportunity	Install porous pavement when lot is resurfaced.	fill	1	1	2	1	0	5	B	Y	H
WR-12	60 State St Parking Lot	Retrofit opportunity	Utilize existing green space/islands for bioretention treatment	fill	2	2	2	2	0	8	B	N	M
WR-13	Wheelock Street	Retrofit opportunity	Existing swale provides conveyance without much treatment; add appropriately spaced check dams	D	2	1	3	2	1	11	C	N	L
WR-14	Dunpatrick Circle	Retrofit opportunity	Construct subsurface gravel wetland in the cul-de-sac green space	C	2	1	2	2	1	8	C	N	M
WR-15a	Bailey Ave	Significant stormwater runoff along the west-side shoulder of Bailey Ave accesses and erodes off-street parking areas	Build small berm along parking lot entrance to prevent stormwater runoff from entering	fill	3	3	3	1	0	10	C	Y	L
WR-15b	Bailey Ave	Retrofit opportunity	Bioretention, possibly underdrained, in existing green space along the east-side of Bailey Ave between the sidewalk and the street.	fill	3	3	2	2	0	10	D	Y	MH
WR-16	Montpelier High School	Significant sediment mobilization from "overflow parking" area in front of the school	Renovate informal parking area with geogrid or other reinforcement	C	3	3	2	3	0	11	C	N	M

Site ID	Site Name	Need	Proposed Approach	Soil Survey Mapped HSG	Existing Environmental Concerns (scale 1-5)	Environmental Priority (scale 1-5)	Constructability (scale 1-3)	Ease of Operation (scale 1-3)	Area of Anticipated Growth (yes = 1; no = 0)	Implementation Score	Project Type	CSO Area? (Y or N)	Estimated Implementation Cost
WR-17	VSECU Parking Lot	Retrofit opportunity	Bioretention, possibly underdrained, in existing green space between the edge of the parking lot and the bike path	C	2	2	2	2	0	8	A	N	M
WR-18	Hackamore Rd	Erosion along road shoulder	Replace gravel shoulder with grass channel to convey flow; rock-line drainage ditch where Hackamore Dr comes into Towne Hill Rd.	C	3	2	2	3	1	11	C	N	L
WR-19	VT NEA & Leahy Press, Wheelock St	Retrofit opportunity	Improve existing drainage swale along the north edge of parking areas to slow runoff and promote infiltration	D	2	1	2	2	0	7	A	N	L
WR-20	State Office Parking Lots	Retrofit opportunity	Bioretention, possibly underdrained, in existing green space behind 116 State St	fill	1	2	2	2	0	7	B	N	M
WR-21	State Street	Retrofit opportunity	Bioretention, possibly underdrained, in existing green space along the south-side of State St between the sidewalk and the street.	fill	2	2	2	2	0	8	C	Y	M
WR-22	A Quilter's Garden, Barre- Montpelier Rd	Culvert conveying hillside runoff between 338 and 342 River St to Stevens Branch has failed and there is significant erosion	Remove culvert to daylight drainage and create suitable drainage feature, such as step-pool conveyance	C	3	4	2	2	1	12	A	N	MH
SB-01	Crossway Saab / Cody Chevrolet	Undersized culvert on Crossway Saab property captures intermittent stream and conveys under Route 302 through the Cody Chevrolet property to Stevens Branch. Significant sediment deposits at observed at culvert outlet. .	Complete detailed evaluation of hillside drainage; replace or remove outright undersized culvert adjacent to Crossway Saab	fill	4	5	2	2	2	14	D	N	H
SB-02	Moonlight Terrace	Erosion and sediment transport along road shoulder	Reshape and rock line existing drainage swale; add appropriately spaced check dams	fill	2	3	3	2	1	11	C	N	L
NB-01	Parking Lots west of Main Street	Existing overbank drainage from parking lot is causing streambank erosion and compromising integrity of edge of parking lot	Bioretention, possibly underdrained, in existing green space / parking islands.	fill	3	3	2	2	0	10	C	N	M
NB-02	Union Elementary School	Existing stormwater system is poorly sited given current use of the school's outdoor areas; several catch basins are buried, ones that are visible show significant sediment accumulation	Planned improvements to the school's outdoor areas present opportunity for stormwater renovation; numerous opportunities for GSI retrofits on both upper and lower playgrounds	B	3	3	2	2	0	10	C	N	H
NB-03a	Marvin & Bingham Sts	Retrofit opportunity	Install bioretention treatment area at the southeast corner of intersection to capture road runoff	B	1	1	2	2	0	6	C	N	M
NB-03b	Marvin Street	Erosion along road shoulder	Reshape and rock line existing drainage swale; add appropriately spaced check dams; consider making street one-way in order to provide sufficient room for swale	B	2	2	1	2	0	7	C	N	L
NB-04	College & Marvin Sts	Retrofit opportunity	"Green Street" retrofit could take advantage of the fact that there are no curbs separating the road edge from the adjoining green space to manage road runoff	C/D	1	1	3	2	0	7	C	N	M
NB-05	College St & Woodrow Ave	Retrofit opportunity	"Green Street" retrofit could take advantage of the fact that there are no curbs separating the road edge from the adjoining green space to manage road runoff	C/D	2	1	3	2	0	8	C	N	M
NB-06	Heaton Woods	Retrofit opportunity	Bioretention or other treatment could be installed at the intersection of access drive and Heaton St.	C/D	1	1	2	2	0	6	C	N	M
NB-07	Washington County Mental Health Services	Retrofit opportunity	Bioretention or other treatment could be installed in the green space between the building and Heaton St.	C/D	1	1	2	2	0	6	A	N	M
NB-08	Emmons St	Retrofit opportunity	Limiting parking to the west-side of Emmons St would for "Green Street" retrofit	C/D	1	1	2	2	0	6	A	N	M
NB-09	Hubbard Park road system	There are approximately 2 miles of gravel road in the park and there is active erosion along many of them.	Develop a comprehensive inventory of road related erosion problems in Hubbard Park, including a capital budget plan to correct these problems over a specific period of time.	C	3	4	3	2	0	13	C	Y	M

Site ID	Site Name	Need	Proposed Approach	Soil Survey Mapped HSG	Existing Environmental Concerns (scale 1-5)	Environmental Priority (scale 1-5)	Constructability (scale 1-3)	Ease of Operation (scale 1-3)	Area of Anticipated Growth (yes = 1, no = 0)	Implementation Score	Project Type	CSO Area? (Y or N)	Estimated Implementation Cost
NB-10	Gould Hill Rd	Erosion and sediment transport along road shoulder	Reshape and rock line existing drainage swale; add appropriately spaced check dams	B/C	3	3	2	2	1	11	C	N	L
NB-11	Trillium Hill Rd	Private road is poorly crowned with insufficient ditching, causing water to run down the road surface	Roadway should be graded so water does not remain on the road surface (2-4% crown); may be an opportunity to construct bioretention or other treatment at the north-west corner of the intersection with Route 2.	D	3	3	2	2	1	11	A	N	MH
NB-12	Hubbard Park “frog pond”	Significant sediment has been allowed to accumulate in the pond the existing outlet structure is in a state of disrepair.	The pond should be renovated to increase residence time; the outlet structure should be redesigned and emergency spillway improved	C/D	3	3	2	2	0	10	C	Y	M
NB-13	Summer Street	Retrofit opportunity	A bump-out was added in front of the pocket park at 12 Summer St to slow traffic in this area; the bump-out would be recessed to serve as stormwater infiltration area	fill	1	1	3	2	0	7	C	Y	L
NB-14	Finch St / stump dump	Erosion and pile creep from sand and gravel storage at the site is causing sediment to reach adjacent drainage features	Develop and implement a site-specific pollution prevention plan for the site, anticipated to include a mix of good housekeeping (e.g., proper material storage) and best management (e.g., diversions, regarding, etc.) measures	A	2	4	3	2	0	11	C	N	M
NB-15	58 E State St	Catch basins in parking lot appear to be connected to the combined sewer system	Area is mapped as having soils reasonably well-suited for infiltration; install bioretention in existing green space between building/parking lot and East State St	B	2	2	2	2	0	8	A	Y	M
NB-16	Harrison Ave	Retrofit opportunity	The City has indicated planned water main replacement and road paving in 2018. As part of this construction stormwater could be redirected to an existing swale that surrounds small recreational field and the swale improved to enhance treatment.	B	2	1	3	2	0	8	C	N	M
NB-17	60 State St Parking Lot	Retrofit opportunity	Utilize existing green space/islands for bioretention treatment	fill	2	2	2	2	0	8	B	N	M
BB-01	Arsenal Dr	Road runoff is turned out over a steep section of hillside, in an area where lawn clippings are also being composted	“Green Street” retrofit could take advantage of the fact that there are no curbs separating the road edge from the adjoining green space to manage road runoff	C/D	2	2	2	2	1	9	D	N	L
BB-02	8 McKinley St	Small pond constructed to managed runoff; erosion visible below the pond	The pond should be renovated to increase residence time and spillway improved; step-pool conveyance would be well suited for conveying flows down the slope below the pond	C/D	3	4	1	1	1	10	A	N	MH
BB-03	Hinkley St	Retrofit opportunity	“Green Street” retrofit could take advantage of the fact that there are no curbs separating the road edge from the adjoining green space to manage road runoff	C/D	1	1	3	2	1	8	C	N	L
BB-04	Towne Hill Rd & Main St	Erosion evident in roadside drainage	Reshape and rock line existing drainage swale; add appropriately spaced check dams	C	3	3	2	2	1	11	C	N	M
BB-05	Easy St	Significant erosion of both the road surface and in the adjacent roadside drainage	Roadway should be graded so water does not remain on the road surface (2-4% crown); reshape and rock line existing drainage swale; add appropriately spaced check dams	D	3	3	2	2	1	11	A	N	M
BB-07	Grandview Terr	Grandview Terr was put on a “road diet” when it was repaved in 2015 and the overall width reduced ~4 ft; erosion is occurring along the gravel road shoulders installed in areas formerly treatment with pavement	At a minimum, topsoil should be added to road shoulders in an effort to establish robust vegetation; mailboxes will need to be relocated to the pavement edge. A design detail should be developed for road shoulders on newly-narrowed streets	C	3	3	2	3	1	12	C	N	M
BB-08	28 Spring Hollow Rd	Drainage was recently maintained, but not stabilized; ditch banks are over-steepened and ditch has V-shape	Reshape existing drainage swale and establish robust vegetation	C	2	3	1	2	1	9	A	N	L

Site ID	Site Name	Need	Proposed Approach	Soil Survey Mapped HSG	Existing Environmental Concerns (scale 1-5)	Environmental Priority (scale 1-5)	Constructability (scale 1-3)	Ease of Operation (scale 1-3)	Area of Anticipated Growth (yes = 1; no = 0)	Implementation Score	Project Type	CSO Area? (Y or N)	Estimated Implementation Cost
BB-09a	Woodcrest Rd	Retrofit opportunity	Replace existing drainage swale with bioswale; establish robust vegetation	C	1	1	3	2	1	8	C	N	M
BB-09b	Woodcrest & Towne Hill Rds	Retrofit opportunity	Install bioretention treatment area at the north-east corner of intersection to capture road runoff	C	1	1	2	2	1	7	C	N	M
BB-10	438 Towne Hill Rd	Erosion evident in roadside drainage	Reshape existing drainage swale and establish robust vegetation	C	2	2	2	2	1	9	D	N	L
BB-11	Dover & Phillips Rds	Sediment transport evident in roadside drainage along Dover Rd to the north of the intersection with Phillips Rd	Replace existing drainage swale with bioswale; establish robust vegetation	C	2	2	2	2	1	9	D	N	M
BB-12	Chestnut Hill Rd	The old concrete culvert to the east of 60 Chestnut Hill Rd appears to be undersized	Ultimately, the culvert should be replaced; in the interim a splash pad beneath the outfall would reduce localized erosion	D	2	2	3	2	0	9	D	N	L/MH
BB-13	Chestnut Hill Rd	Retrofit opportunity	Removing the curb along the east side of the street, below 135 Phillips Rd, would allow for a swale to be installed to manage stormwater runoff	D	2	1	3	2	0	8	C	N	M

Project Type “key”:

- A Private property
- B State property or right-of-way
- C Public property (town-owned land or right-of-way)
- D Hybrid; part public land, part private land

Estimated Implementation Cost “key”:

- L less than \$20,000
- M \$20-\$50,000
- MH \$50-\$100,000
- H more than \$100,000

8. Conceptual Solutions for High Priority Stormwater Problems and Opportunities

Initially, the prioritization of all of the identified problem areas and opportunities (Section 7) resulted in 22 of the identified problem areas being assigned an implementation score of 10 or higher. In consultation with City staff, this short list (Table 5) was narrowed to ten highest-priority projects, seven of which were advanced to concept design. In addition to the seven concept designs, three sites were chosen as models for illustrative concepts for integrating green stormwater management practices into other City infrastructure (such as roadways and parking lots) in the future (Section 8.1).

During this process, two potential opportunities (Northfield Street/Route 12 and Harrison Avenue) were added from the list of upcoming capital projects (Section 6.1.3). Other retrofit projects were ultimately assigned a lower priority because improvements are anticipated to be captured in other upcoming projects (for example, issues along Old Country Club Road will be managed as part of planned bike path improvements), or because roadway improvements have recently been completed (for example, along Bailey Avenue).

Table 5. Summary of Priority Stormwater Retrofit Projects and Opportunities

Site ID	Site Name	Project Type	Implementation Score ≥ 10 ?	Priority Location?	Notes on Planned Improvements, if any
WR-04	National Life Dr. & Memorial Dr./Route 2	D	Y	Y	Nat. Life Drive is City street, Memorial Drive is VTrans. Potential future pedestrian crossing. Develop illustrative concept as case example of a centralized green infrastructure practice.
WR-06	Northfield St./Route 12	D	N	Y	Full-depth reconstruction planned – opportunity to incorporate green infrastructure
WR-08a	Old Country Club Road	C	Y		Will be addressed as part of bike path project
WR-08b	Old Country Club Road	C	Y		
WR-12	Wheelock Street	C	Y	Y	Consider including NEA inlet improvement
WR-15a	Bailey Ave.	C	Y		Road recently repaved, lower priority
WR-15b	Bailey Ave.	D	Y		
WR-16	Montpelier High School	C	Y		
WR-18	Hackamore Rd.	C	Y		Recently repaved
SB-01	Crossway Saab / Cody Chevrolet	D	Y		Ecosystem Restoration Program grant application submitted
SB-02	Moonlight Terrace	C	Y		
SB-04	A Quilter's Garden, Barre-Montpelier Rd.	A	Y		Partner with WNRCD? On private property.
NB-01	Parking lots west of Main St.	C	Y	Y	Illustrative concept as a case example for integrating green infrastructure in City parking lots

Site ID	Site Name	Project Type	Implementation Score ≥ 10 ?	Priority Location?	Notes on Planned Improvements, if any
NB-02	Union Elementary School	C	Y		
NB-04	College & Marvin Streets	C	N	Y	Illustrative concept as a case example for integrating green infrastructure in City streets
NB-09	Hubbard Park road system	C	Y	Y	
NB-10	Gould Hill Road	C	Y		Submitted for repair using Better Roads funding
NB-11	Trillium Hill Road	A	Y		
NB-12	Hubbard Park 'frog pond'	C	Y	Y	Phase construction to be completed during or after after improvements to Hubbard Park road system implemented
NB-14	Finch Street / 'stump dump'	C	Y	Y	
NB-16	Harrison Ave.	C	N	Y	
BB-02	8 McKinley Street	A	Y		
BB-04	Towne Hill Rd. & Main St.	C	Y		
BB-05	Easy St.	A	Y		
BB-07	Grandview Terrace	C	Y	Y	Use to present typical road shoulder restoration options for use in future repaving and 'road diet' projects

Ultimately, the three locations chosen for development of green stormwater management concept illustrations (Section 8.1) were:

- WR-04, National Life Drive & Memorial Drive
- NB-04, College and Marvin Streets
- NB-01, Parking lots west of Main Street

The seven opportunities advanced to concept design were (Appendix E):

- WR-06, Northfield Street / Route 12
- WR-12, Wheelock Street
- NB-09, Hubbard Park road system
- NB-12, Hubbard Park 'frog pond'
- NB-14, Finch Street / 'stump dump'
- NB-16, Harrison Avenue
- BB-07, Grandview Terrace

Green Stormwater Management Opportunities

The following section describes opportunities to incorporate green infrastructure systems into specific locations in Montpelier to reduce the volume and improve the quality of stormwater runoff. These opportunity sites have been identified through the master plan process and represent areas where runoff issues can be addressed through green stormwater practices. There are other opportunities in the city as well; these examples are intended to be illustrative of a range of stormwater management issues and opportunities for responses that incorporate green practices. For each site there is a summary of the existing conditions; an explanation of applicable green stormwater management practice(s) that would be appropriate in this location. An example of the practice is shown, using Vermont examples where possible, and a graphic illustration of existing conditions (current photo) and a rendering illustrating the applied stormwater practice. Examples of green stormwater management practices applicable in Montpelier are described below:



Gravel Wetland. Gravel wetlands are created wetlands that collect, store and infiltrate stormwater through treatment basins with subsurface gravel layers. Plantings associated with these projects are typically native grasses and woody plants and appear informal and natural.



Stormwater Planters. These are urban rain gardens with vertical walls and open or closed bottoms that collect and absorb runoff from sidewalks, parking lots, and streets. Planter boxes are ideal for space-limited sites in dense urban areas and as a streetscaping element.



Stormwater Swales. Stormwater swales are depressed graded linear landscape features that can be natural or created and are designed to detain, treat and infiltrate stormwater through both grading and absorbent soils. The planting character can be naturalistic, manicured or mowed grass.



Stormwater Curb Extensions. Stormwater curb extensions combine elements of curbing inlets, rain gardens, porous pavers, and stormwater planters to remove runoff from the roadside and provide improved stormwater management. Frequently they are combined with safer pedestrian walkways and crosswalks.



Permeable Paving. Permeable pavements are paved surfaces of concrete, asphalt or unit pavers with permeable pores or spaces that allow stormwater to infiltrate from the paved surface to a deep crushed stone subsurface bed where it is treated and stored. These pavements are particularly appropriate where there is limited landscape space, where land values are high and where flooding or icing is a problem.

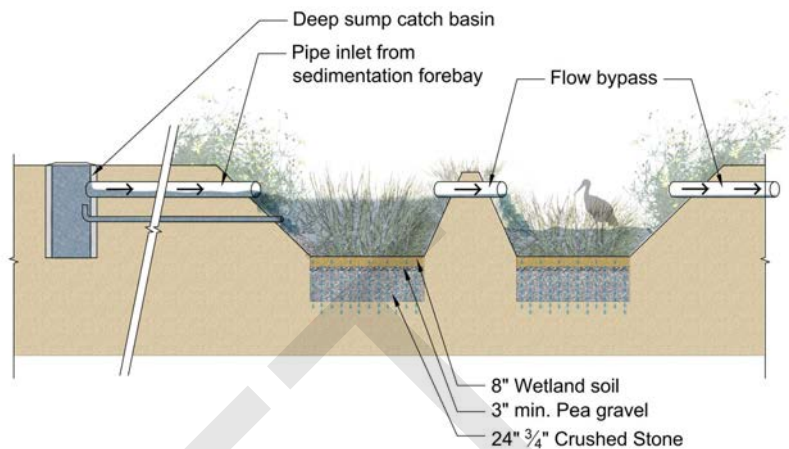


Trees. Trees reduce and slow stormwater by intercepting precipitation in their leaves and branches and they absorb water through their root systems. Subsurface structures (such as tree root cells) provide for lightly compacted soil that stores stormwater and greatly improves street tree health. Coupled with porous pavers, these structures also allow for stormwater infiltration and treatment.

National Life - Gravel Wetland

Overview

A gravel wetland is a created landscape feature that is designed to mimic the look and function of a natural wetland. The constructed wetland captures stormwater and removes sediment and other pollutants through a system of vegetated treatment basins with subsurface gravel layers. In this system, stormwater flows into a forebay, where large objects are caught and large particles are allowed to settle. From the forebay, stormwater enters vegetated treatment basins where stormwater is retained and treated through filtration, uptake of pollutants by vegetation, and associated natural processes. This system is effective at reducing peak flows and improving water quality.



Gravel Wetland Section

Benefits

- Large treatment capacity
- Reduces peak flow
- Improves water quality
- Strong performance in cold climates
- Attractive landscape feature
- Low maintenance

Constraints

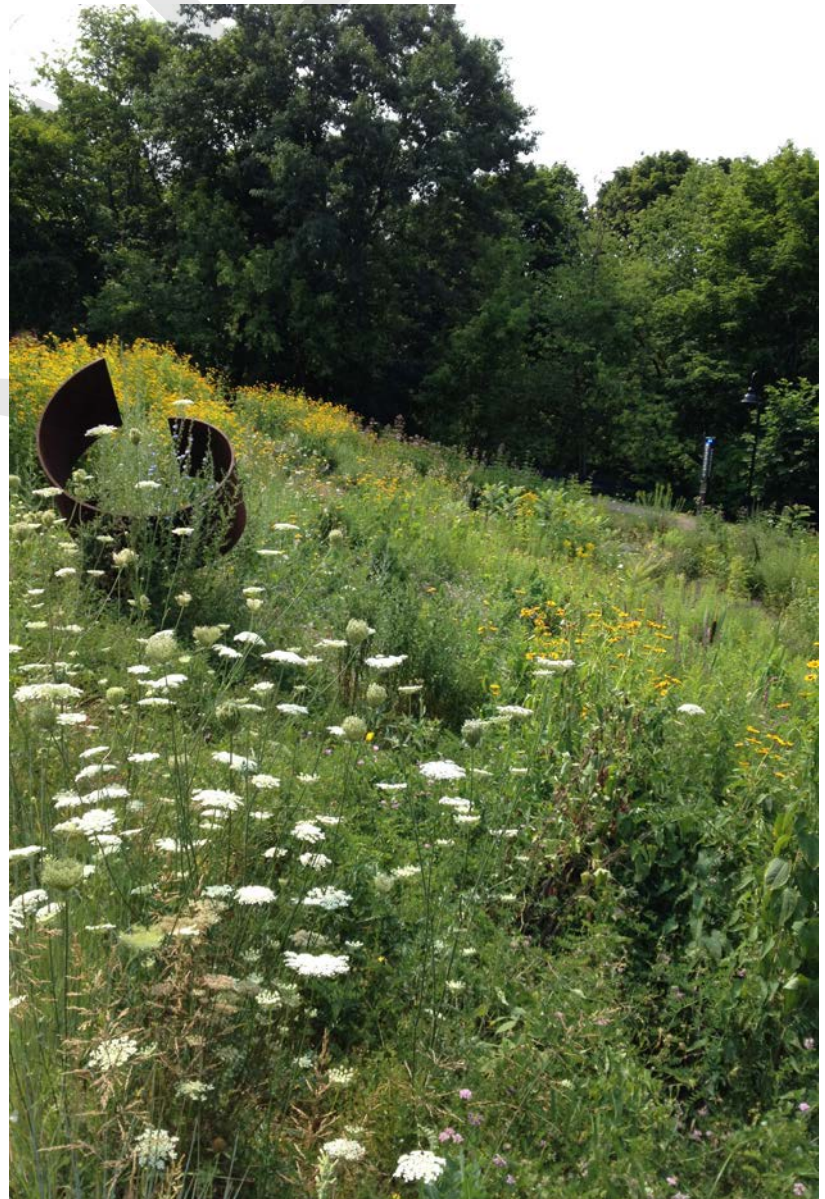
- Requires large area

Maintenance Considerations

- Periodic landscape maintenance
- Periodic removal of trash and debris

Example

Created gravel wetland (right) at Champlain College, in Burlington. This wetland includes walking paths, interpretative signage and public art within a meadow of wildflowers and perennials.





Existing Condition

Currently stormwater from National Life Drive sheet flows into the landscaped area at National Life and Route 2 where it flows along a grassed swale and enters a piped drainage system and it is conveyed to the river and discharged via a culvert under Route 2.



Gravel Wetland

The above rendering re-imagines this location with a created gravel wetland. A gravel wetland at this location could capture and infiltrate stormwater and improve the quality of water flowing to the river. The landscaping could add an attractive aesthetic to this gateway location.

College Street Stormwater Swales

Overview

Currently there is excess paved width in College Street which can be converted to landscaped stormwater swales. A stormwater swale is a shallow depression that accepts and infiltrates stormwater runoff. Stormwater is absorbed through the ground and by the landscaping. The swale can be enhanced with a sub-base of crushed stone to provide additional stormwater storage capacity and a perforated pipe under-drain can carry excess stormwater to existing storm drains. Landscaping associated with the swales also improves the aesthetics of the streetscape.

Benefits

- Requires less infrastructure to build
- Provides an attractive aesthetic to the street

Constraints

- Need to accommodate pedestrian circulation in areas with on-street parking.

Maintenance Considerations

- Periodic landscape maintenance (mowing or dead-heading, removal of invasives)

Example

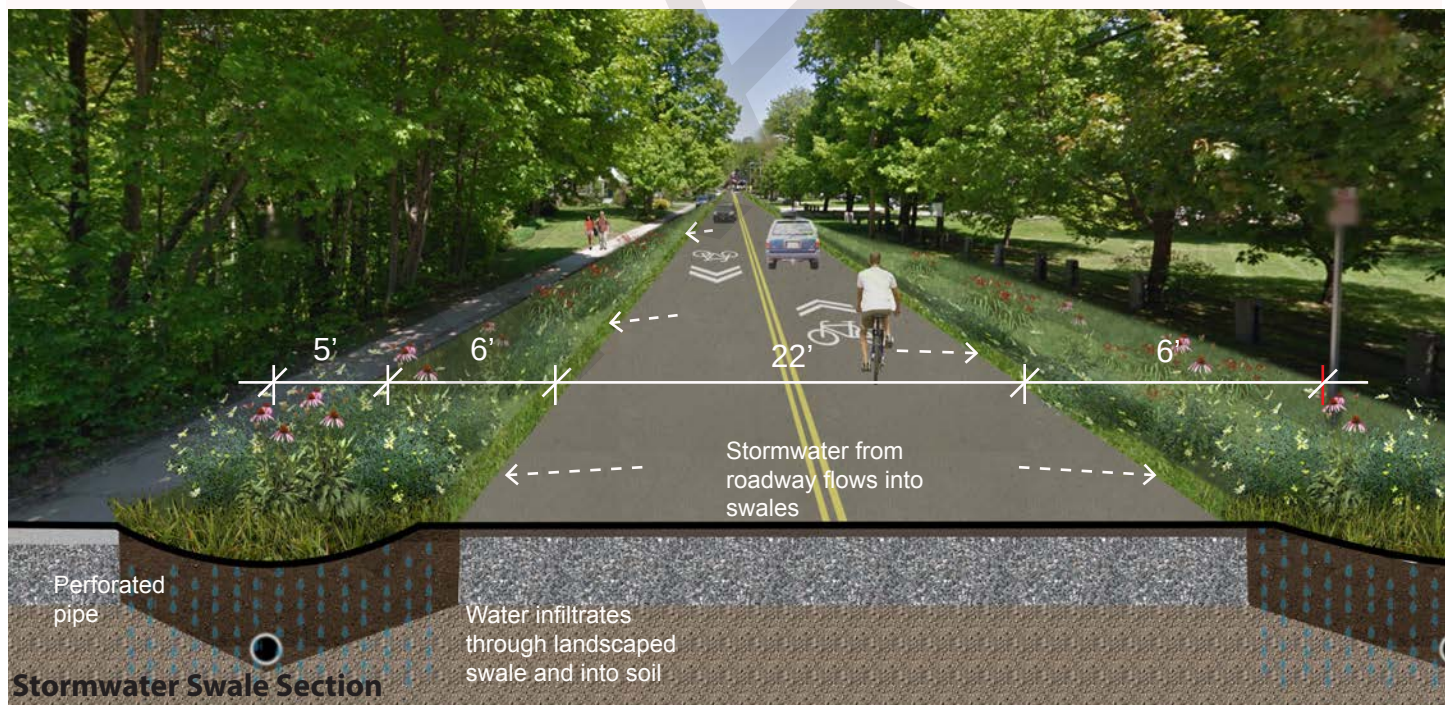
Landscaped stormwater swale in Portland, Oregon (below).





Existing Condition

Currently there is excess paved width in College Street which can be converted to landscaped stormwater swales. The existing street section includes a five foot sidewalk, a grass strip approximately three feet in width, and a 34-foot roadway. This street is designated as a 'share-the-road' street in the bicycle and pedestrian master plan.



Stormwater Swales

The above rendering re-imagines this location with a narrower paved street and stormwater swales on both sides of the street. The width of the street can be significantly reduced to two 11-foot travel lanes which would leave two six-foot stormwater swales on either side of the street. The lack of curbing on this street facilitates stormwater collection. The reduction in pavement and expansion of storage and infiltration area at the top of the hill would both decrease stormwater volumes and impacts downstream and improve water quality.

Heney-Jacobs Parking Lot - Stormwater Planters, Pervious Paving, Stormwater Drainage Well

Overview

Untreated stormwater from this parking lot sheet flows into the North Branch of the Winooski River. There are areas along the bank that are eroding due to the drainage. There are several possible 'green' tools to address stormwater management in this (and other) downtown parking lots. First, there are a couple of narrow landscaped islands which can be retrofitted as stormwater planters that accept and infiltrate stormwater. A new stormwater planter is added in one location where stormwater collects and drains into the river. Another opportunity would be to incorporate pervious paving which allows water to pass through the surface and infiltrate into the ground to reduce the volume of stormwater runoff from the parking area. There have been instances of failures of porous asphalt and concrete in Vermont, but unit pavers have been used successfully in parking areas. Periodic vacuuming of pervious surfaces is required to remove sediment that can clog infiltration pores. A third approach for this area is a subsurface well that collects stormwater and discharges it into surrounding stone storage media and/or soil through perforations in the well structure.

Benefits

- Reduces volume, controls erosion
- Provides an attractive landscape aesthetic to the area

Constraints

- Working around utilities in retrofit situation

Maintenance Considerations

- Periodic landscape maintenance
- Periodic vacuuming of pervious paving

Examples

Porous unit pavers in Burlington parking lot (left) and stormwater planter in White River Junction (right).





Existing Condition. The existing parking lot behind Main Street is a large paved area that drains into the North Branch of the Winooski River.



Pervious Paving and Stormwater Planters

The above rendering re-imagines this location with porous pavers beneath the parking stalls and the landscaped island converted to a stormwater planter.

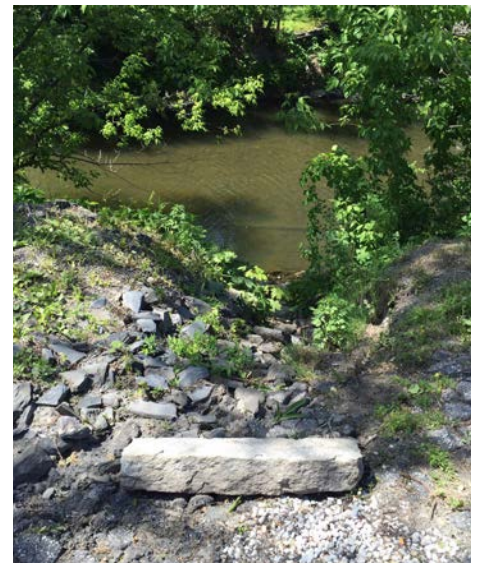


Existing Condition. The existing parking lot behind Main Street at the river's edge. The parking lot drains into the river and there is significant erosion at the low spot where the water drains into the river (see photos below).



Pervious Paving and Stormwater Planters. Paving beneath the parking stalls can be replaced with pervious pavers. The edge of the parking area can be curbed to prevent stormwater flow into the river. The parking space at the low point of the lot where water drainage is eroding the bank can be converted to a stormwater planter that collects and infiltrates stormwater.

Stormwater flows into the river from a low point in the parking area causing bank erosion and water quality problems.





Existing Condition. The existing parking lot behind Main Street at the river’s edge.



Stormwater Drainage Well. A subsurface drainage well that collects stormwater and then discharges the water through perforations in the well to surrounding stone storage media and soils is another option here. Stormwater may enter the well from inlet structures or through pretreatment systems (e.g., stormwater planter as shown above). The drainage well provides a large volume storage facility within a relatively small footprint.



Stormwater weeps through perforations in the walls of the well into surrounding stone and soil

9. Funding Sources for Stormwater Management Improvements

9.1. Ecosystem Restoration Program Grant

Since 2008, Vermont DEC has made available competitive grant funding through its Ecosystem Restoration Program (ERP), now part of the Clean Water Initiative. The State has indicated that the next round of grant funding may be announced as soon as September 15, 2016 (<http://dec.vermont.gov/watershed/cwi/grants>).

Previous ERP grant applications have indicated that a prioritized plan, such as Stormwater Master Plan, is a prerequisite for projects to be eligible for implementation funding. Thus, the City should be well-positioned with regard to obtaining additional ERP funding to support implementation. That said, discharges that are or could be regulated as point source discharges (e.g., projects addressing runoff from parcels with more than 3 acres of impervious cover) are unlikely to be a priority for ERP funding.

9.2. Lake Champlain Basin Program Grants

Since 1992, the Lake Champlain Basin Program has awarded nearly \$6.5 million in local implementation grants. While the Basin Program offers a number of different local grant programs in most years, the two that are most pertinent to the implementation of this plan are:

- Pollution Prevention – to support technical projects which address LCBP’s pollution prevention priorities, including urban stormwater management; and,
- Education & Outreach – for projects that increase awareness, knowledge, skills, and commitments to Lake Champlain issues.

LCBP has indicated that the next round of grant funding will likely be announced in late fall of 2016. Information on grant opportunities available through the Basin Program is available at <http://www.lcbp.org/about-us/grants-rfps/>.

9.3. Vermont Better Roads Grant Program

Through the Better Roads Program, the Vermont Agency of Transportation provides funding to support projects on municipal roads that improve water quality and result in maintenance cost savings. In 2017, paved roads became eligible for funding through the program for the first time. The program awards four types of grants:

- Road inventory and capital budget planning (“Category A”);
- Correction of a road related erosion problem and/or stormwater mitigation retrofit for both gravel and paved roads (“Category B”);
- Correction of a streambank or slope-related problem (“Category C”); and,

-
- Structure/culvert upgrades (“Category D”).

The City of Montpelier received a Category A grant during the most recent funding cycle. Funding opportunities are typically announced in the late winter or early spring, and are available at: <http://vtrans.vermont.gov/highway/better-roads>.

9.4. Vermont Watershed Grants Program

Half of the proceeds derived from the sale of the Vermont Conservation License Plate go towards funding the Vermont Watershed Grants Program; the other half of proceeds go towards helping the Vermont Non-Game and Natural Heritage Program. The Watershed Grants Program distributes grant dollars for local and regional water-related projects within Vermont. Grant funds are available for water-related projects that:

- Protect or restore fish and wildlife habitats;
- Protect or restore water quality, and shorelines;
- Reduce phosphorus loading and/or sedimentation as part of DEC’s Ecosystem Restoration Program objectives;
- Enhance recreational use and enjoyment;
- Identify and protect historic and cultural resources;
- Educate people about watershed resources; or
- Monitor fish and wildlife populations and/or water quality.

The total funding available through this program is significantly more limited than the other grant programs discussed above, making applications extremely competitive. More information on this grant opportunity is available at: <http://dec.vermont.gov/watershed/cwi/grants/watershed-grants>.

9.5. Clean Water State Revolving Fund (CWSRF)

Vermont's CWSRF Program provides low interest loans for clean water projects – including combined sewer overflow abatement and stormwater conveyance and/or treatment projects –to municipalities. Several types of loans are available covering the planning, design and construction project phases. The demand for CWSRF funding tends to outpace availability, so projects are ranked using criteria defined in the Vermont Environmental Protection Rules, Chapter 2. More information on the CWSRF loan program is available at: <http://dec.vermont.gov/facilities-engineering/water-financing/cwsrf>.

10. Next Steps

This document represents an extensive effort to identify and evaluate potential stormwater problem areas throughout the City of Montpelier. Several high priority potential stormwater improvement projects, including conceptual solutions, were identified in Section 8 that the City could pursue directly, or could work with partners to pursue funding to address.

Beyond addressing the specific problem areas identified in this plan, there are often opportunities to improve management of stormwater runoff that arise as part of routine municipal projects, such as the substantial reconstruction of a road surface or intersection. Grant funds may be available to cover the incremental cost of addressing stormwater runoff as part of such projects, if stormwater management is considered early enough in the design process. It is often significantly more cost-effective and efficient to incorporate stormwater management measures into a planned municipal project as compared to the construction of a “stand alone” stormwater management retrofit. The Harrison Avenue and Northfield Street retrofit concepts described in Section 8 are prime examples of how to take strategic advantage of such opportunities.

In addition to exploring opportunities to address current stormwater management needs, the City of Montpelier can take steps to prevent future stormwater problems by expanding how stormwater management is addressed in zoning regulations. The current draft of the Land Development Regulations (Section 3009, Stormwater Management) includes strong but sensibly tiered requirements for incorporating low-impact development (LID) concepts and green stormwater infrastructure (GSI) practices into future development projects where those projects will not trigger state requirements. As drafted, the stormwater management requirements in the proposed Land Development Regulations are likely to largely offset any potential stormwater impacts from future sub-jurisdictional new development and redevelopment activities. The proposed language also represents a substantial change from current requirements, which are primarily concerned with safe conveyance of runoff into the City’s closed drainage systems. This section has been flagged by the Planning Commission for independent expert review, which we also recommend to ensure that the proposed regulation meets the City’s needs and goals with regard to water quality and flood resilience as efficiently as possible and without placing an undue burden on future applicants and review boards.

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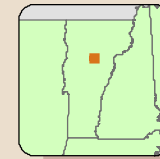
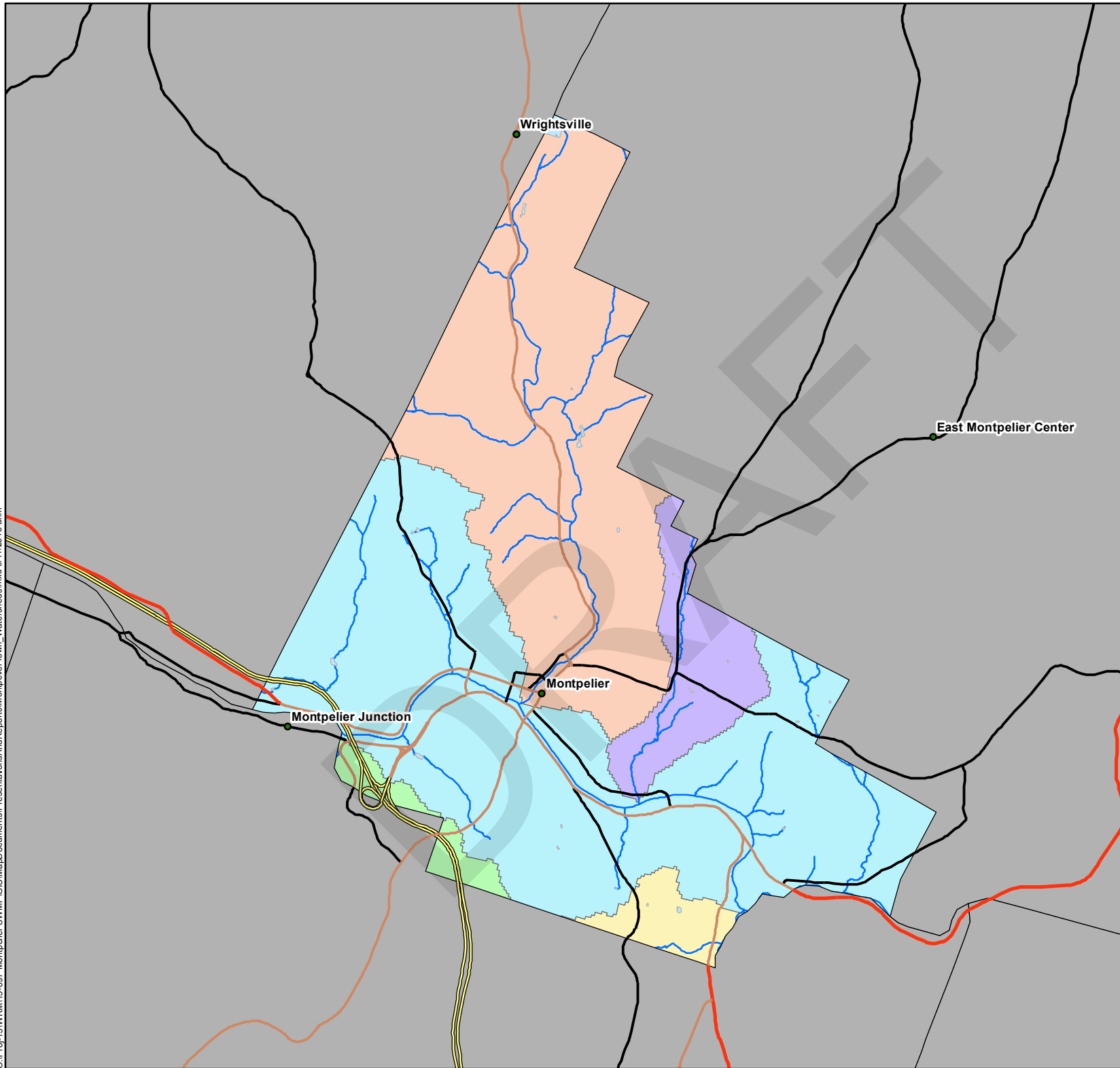
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Appendix A. Maps

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0 0.4 0.8 Miles

— River or Stream

Montpelier Watersheds

- Blanchard Brook
- Dog River
- North Branch Winooski River
- Stevens Branch Winooski River
- Winooski River

Sources: Watershed Boundaries: NHD Plus 2;
Administrative Boundaries, Roads: VCGI.

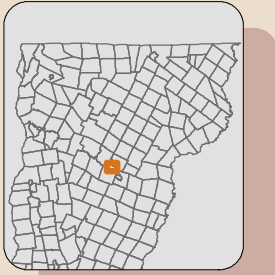
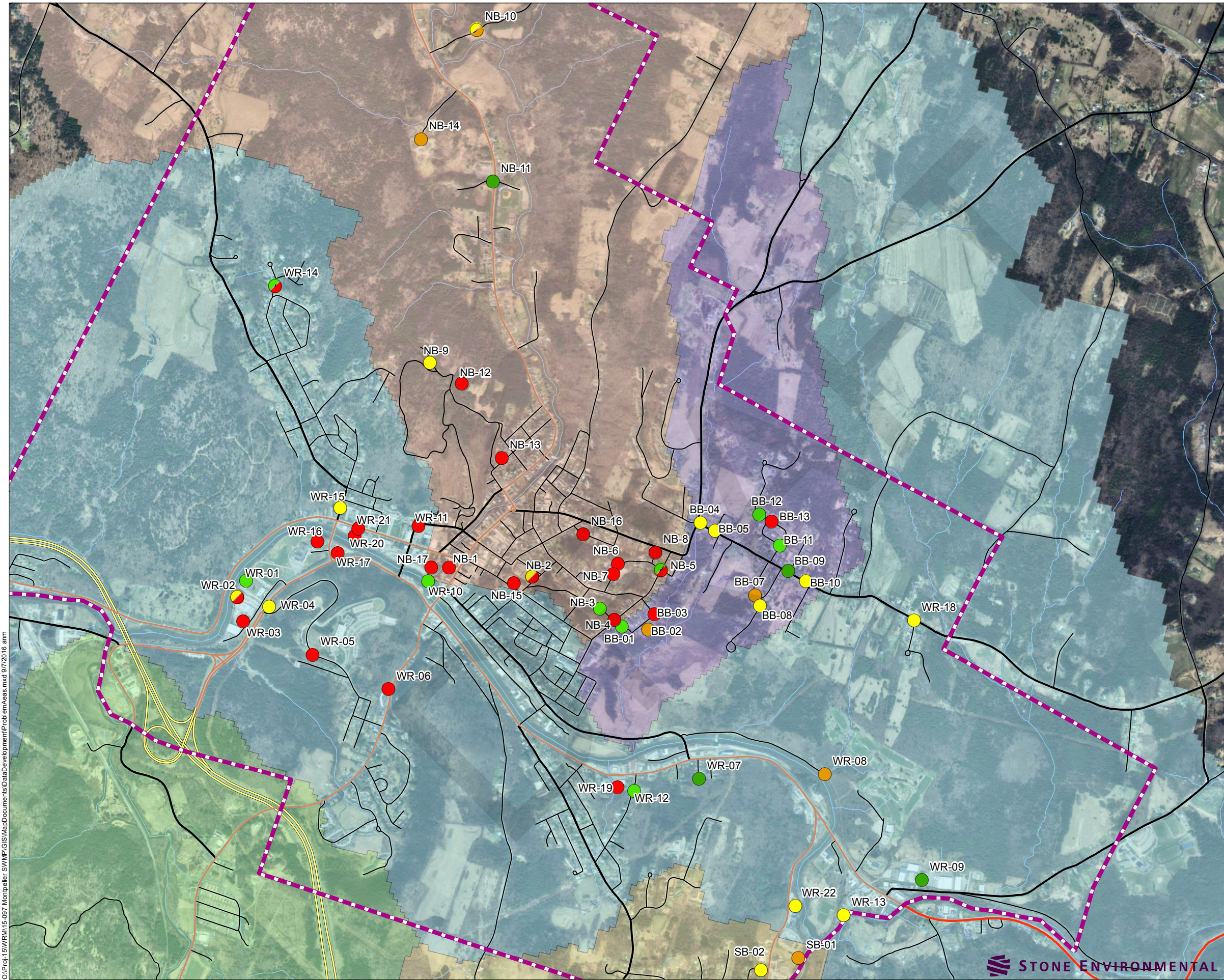
STONE ENVIRONMENTAL INC.

Watershed Boundaries

City of Montpelier
Stormwater Master
Planning

Figure 1

C:\Proj-15\WRM\15-097 Montpelier SWMP\GIS\MapDocuments\DataDevelopment\ProblemAreas.mxd 9/7/2016 am



Legend

Problem Area Classification

- 1 (Green circle)
- 2 (Light green circle)
- 3 (Yellow-green circle)
- 4 (Yellow circle)
- 5 (Orange circle)
- 6 (Red circle)
- 1.4 (Green and yellow circle)
- 3.6 (Yellow and red circle)
- 4.5 (Yellow and orange circle)
- 4.6 (Red and yellow circle)

Montpelier Watersheds

- Blanchard Brook (Purple outline)
- Dog River (Light green outline)
- North Branch Winooski River (Orange outline)
- Stevens Branch Winooski River (Yellow outline)
- Winooski River (Blue outline)

Level	Classification
1	Infeasible to remedy issue/ outside of project scope
2	Stable, but problem could escalate with future change in surrounding landuse
3	Limited erosion and/or drainage problems are present
4	Moderate erosion and/or drainage problems are present
5	Significant erosion and/or drainage problems are present
6	Strategic retrofit opportunity

0 0.25 0.5 Miles

Stormwater treatment opportunities in Montpelier, ranked according to severity of erosion and type.

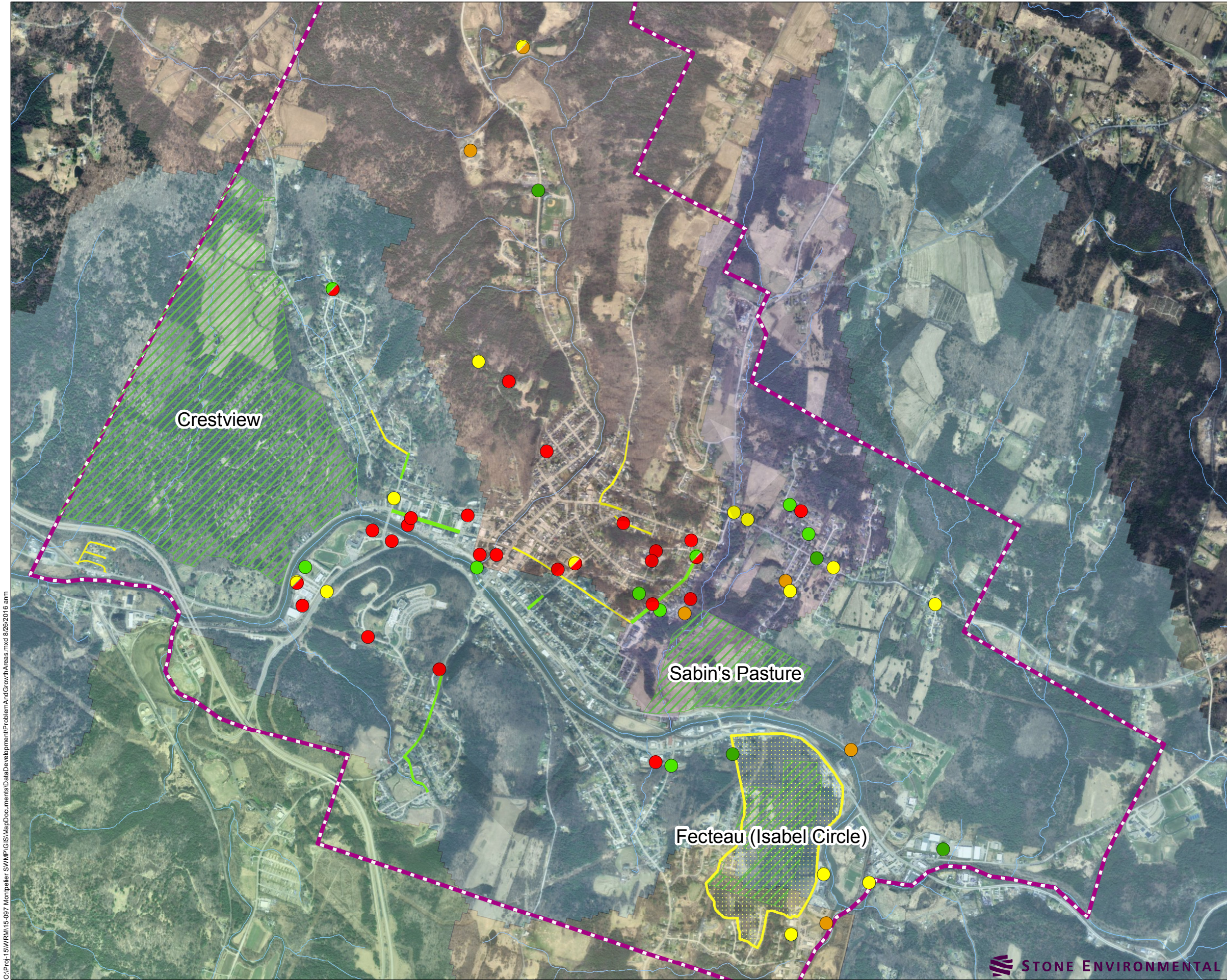
Sources: Treatment Sites: Stone Environmental Inc
Hydrography, Town Boundaries, Roads: VCGI

Stormwater Problem Area Locations

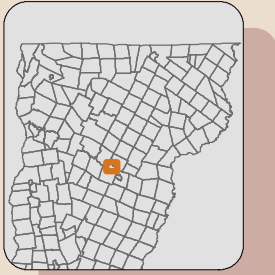
Montpelier Stormwater Master Planning



Figure 2



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Legend

- City Boundary

Future Growth Areas

Potential Drainage Areas

Planned Roadway Projects

Repaving and sidewalk work

Full-depth reconstruction
- Montpelier Watersheds**

Blanchard Brook

Dog River

North Branch Winooski River

Stevens Branch Winooski River

Winooski River

Problem Area Classification

- 1

2

3

4

5
- 6

1,4

3,6

4,5

4,6

Level	Classification
1	Infeasible to remedy issue/ outside of project scope
2	Stable, but problem could escalate with future change in surrounding landuse
3	Limited erosion and/or drainage problems are present
4	Moderate erosion and/or drainage problems are present
5	Significant erosion and/or drainage problems are present
6	Strategic retrofit opportunity

0 0.275 0.55 Miles

Stormwater treatment opportunities in Montpelier, ranked according to severity of erosion and type.

Future areas of potential concentrated development and planned roadway projects as identified by City staff.

Sources: Treatment Sites: Stone Environmental Inc
Hydrography, Town Boundaries, Roads: VCGI

Future Growth Areas and Planned Roadway Projects with Current Problem Area Locations

Montpelier Stormwater Master Planning

Figure 3

Appendix B. Stormwater Management Planning Library

DRAFT

FINAL

STORMWATER MASTER PLAN, REVIEW OF EXISTING PLANS AND DATA

CITY OF MONTPELIER

October 2015, updated September 2016

DRAFT

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Stone Project ID / 15-097

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1. BACKGROUND

Water has no political boundaries, and so evaluations of water quality tend to be undertaken along watershed boundaries and to involve land areas in multiple municipalities, counties, and, in the case of the Lake Champlain, countries. Although from a strict water quality perspective it would be ideal to manage water resources along watershed lines, the reality is that many decisions, in particular decisions about land use, are made at the local level. This report is designed to summarize the information currently available from the suite of reports that speak to water quality in the various ponds and streams that pass through or are located wholly within the City of Montpelier, Vermont. Although water quality assessment data dating back to the early 1970s is available for the Lake Champlain watershed, this summary focuses on assessments and reports that have been prepared in the past twenty years.

Relevant GIS-based data for the project area, including soils, topography, receiving waters, land use, impervious cover, and stormwater infrastructure are catalogued in this technical memorandum. In addition, information from plans, models, and other available reports related to the condition of City's watersheds and surface waters, as well as municipal ordinances directly or indirectly related to stormwater management, are summarized. This work will serve as the foundation for developing a Montpelier-specific "master plan" for stormwater management.

2. INTRODUCTION

The City of Montpelier is located in Washington County in central Vermont. The City has a total area of 10.3 square miles¹. As of the 2010 census, the population of the town was 7,855.² The Winooski River runs through the heart of downtown Montpelier, and confluences with three significant waterways within the City boundaries: the Dog River, the North Branch, and the Stevens Branch (see Map 1). In addition, there are a number of smaller drainages in the City including, most notably, Blanchard Brook.

Numerous and varied groups and individuals have invested considerable effort in evaluating different components of Montpelier's water, wastewater, and stormwater infrastructure; water resources; and the important interface between water resources and local land use decisions. At times these evaluations followed watershed boundaries, and at other times they have followed political boundaries. The following sections identify these evaluations and highlight information most relevant to Montpelier and most relevant to developing a list of strategic, prioritized projects that could be undertaken to improve water quality and increase resilience to future flooding.

3. WATERSHED-BASED ASSESSMENTS

The ongoing assessments described below are generally led by the State of Vermont's Agency of Natural Resources (ANR). These include:

¹ 2015 Wikipedia, https://en.wikipedia.org/wiki/Montpelier,_Vermont

² 2010 US Census data, <http://www.census.gov/2010census/popmap/>



-
- Basin planning efforts, whose main purpose is to guide ANR in its own work and in collaborative projects with the public, municipalities, and other state and federal agencies. The basin plans have a five-year scope. The City of Montpelier is located in the Winooski River Basin (Basin #8), where a final plan was approved in May 2012 by the Agency of Natural Resources.
 - Stream geomorphic assessment work, undertaken to understand the natural tendencies of a particular reach of stream or river, its current condition, and what changes may be anticipated in the future. To date, stream geomorphic assessments have been completed for the Dog River, the Stevens Branch, the North Branch, and the mainstem of the Winooski River in Montpelier.
 - In-stream water quality assessment work, including water chemistry and biological assessments.

3.1. Winooski River Basin Water Quality Management Plan ³

The Winooski River Basin Water Quality Management Plan, most recently revised in May 2012, provides an overview of the Winooski River Basin's surface waters and a description of ongoing and future steps to restore and protect those waters. Utilizing recommendations from a broad array of stakeholders, the Plan summarizes strategies and specific actions to guide efforts to sustain and improve water quality and aquatic habitat over the next five years.

Key strategies with implications for Montpelier include the following:

- Working with towns to protect river corridors and promote flood resiliency by establishing Fluvial Erosion Hazard zones and buffer zones in local zoning.
- Encouraging use of rivers and lakes in the basin to increase people's appreciation.
- Assisting towns to address aging wastewater treatment facilities and associated sewer pipes through the Clean Water State Revolving Fund (CWSRF) and other funding programs.
 - The Plan specifically notes that VT DEC will continue to work with the City to eliminate combined sewer overflows (CSOs).

A specific action called out in the Plan is:

- Assisting Montpelier in using recently completed town tree canopy maps to implement Green Infrastructure practices.

3.2. Stream Geomorphic Assessment Final Reports⁴

Stream geomorphic assessments have been completed for the mainstem of the Winooski River in Montpelier, as well as the North Branch, and the reaches of both the Stevens Branch and Dog River where they confluence with the Winooski. The assessment results are designed to direct future stream corridor restoration and protection measures. The nature of each section of the watershed is characterized and each reach described. Potential restoration projects identified during this work with ties to stormwater management and/or high flows are listed and briefly described below by stream and stream reach.

³ http://www.watershedmanagement.vt.gov/mapp/docs/mp_basin8final.pdf

⁴ <https://anrweb.vt.gov/DEC/SGA/finalReports.aspx>

3.2.1. Dog River Corridor Plan⁵

Only Segment M01-A of the Dog River is within the City of Montpelier. This segment begins at the confluence of the Dog River and the Winooski River near Junction Road on the Berlin-Montpelier town line and continues upstream to just below the Nelson Drive bridge. There are no specific measures identified for this segment, but the River Corridor Plan notes:

- The importance of defining Fluvial Erosion Hazard Zones for the Dog River; and,
- Improving stormwater management and construction practices in the Dog River watershed would reduce siltation of critical aquatic habitat and improve geomorphic stability.

3.2.2. North Branch Corridor Plan⁶

Segments M01 – M05 of the North Branch are within the City of Montpelier. There are a number of opportunities identified for restoring and protecting riparian areas along the North Branch; however, the majority of this work would take place on private property. In addition, the Corridor Plan noted that the high number of stormwater inputs on Segments M01 and M02 (from the confluence with the Winooski to the Mountaineers ball field) was adversely impacting the river. The following, specific opportunity was also identified:

- Replace Undersized Structure - Cummings Street bridge currently undersized (width = 80% of bankfull). Some erosion noted near abutments.

This structure is currently scheduled for replacement in 2016, with a final design under development at VTrans. The bridge clear span will be widened by 22' (from 59' to 81'), and although the replacement crossing will still be slightly narrower than the rest of the channel, the significant "pinch point" that currently exists will be largely mitigated by this project.

3.2.3. Stevens Branch Watershed River Corridor Management Plan⁷

The portions of the Stevens Branch assessed as part of the River Corridor Management Plan are well upstream of the City of Montpelier, and therefore the Plan does not offer any specific insights relevant to this stormwater management plan

3.2.4. Upper Winooski River: Plainfield to Montpelier, River Corridor Management Plan⁸

The Upper Winooski Corridor plan identifies a number of watershed-scale strategies that would benefit the Upper Winooski River including:

- The establishment and maintenance of riparian forests along the entire river corridor.

⁵ https://anrweb.vt.gov/DEC/SGA/report.aspx?rpId=155_CPA&option=download

⁶ https://anrweb.vt.gov/DEC/SGA/report.aspx?rpId=82_CPA&option=download

⁷ https://anrweb.vt.gov/DEC/SGA/report.aspx?rpId=152_CPA&option=download

⁸ https://anrweb.vt.gov/DEC/SGA/report.aspx?rpId=32_CPB&option=download



- On-site stormwater management retrofitting for all existing residential and commercial building sites, and implementation of low-impact design (LID) techniques for all future development.
- Replacing and/or retrofitting undersized bridges and culverts and ensuring all new structures are sized for geomorphic stability as well as habitat connectivity along the river corridor.
- Practicing soil conservation and erosion control practices (AMPs and BMPs) on all agricultural land, logging operations, construction areas, and other sites where soil is disturbed.
- Floodplain and river corridor planning and protection (such as adoption of Fluvial Erosion Hazard zones, stream setbacks, wetland regulations, etc.) to eliminate future floodplain encroachment.
- Development of an ecosystem services analysis of the Upper Winooski River and development of mechanisms (i.e. social, market, regulatory) that will allow these services to be appropriately valued and recognized by the watershed community.

In addition, the Corridor Plan highlights the importance of river corridor protection and restoration along reach M18, within the City of Montpelier.

3.3. LaRosa Volunteer Data^{9,10} (2007 – 2015)

In 2010, the Friends of the Winooski River formed the Four Rivers Partnership to monitor water quality in the mainstem of the Winooski River and a number its tributaries in the Barre-Montpelier area, including six sites within the City of Montpelier. The Four Rivers Partnership extends a water quality monitoring effort that started in the headwaters of the Winooski in 2007. The sites are sampled for *E. coli*, chloride, total phosphorus, and turbidity levels. All sample results are available online at the sources listed below.

The geometric mean of *E. coli* measurements collected by the Friends at all Montpelier stations are generally elevated. Further, the geometric mean for 2014, the most recent year which data is available, was generally higher than in other years at most sites. The total phosphorus concentrations recorded at several sites were at or greater than the VT standard for medium gradient, cold water streams (15 ug/L), including all three sites on the mainstem of the Winooski within City limits. Mean chloride concentrations were well below the Vermont “chronic” standard for average chloride of 230 mg/L. All of the individual samples taken at these sites had chloride levels below the VT “acute” maximum allowable concentration standard for chloride of 580 mg/L.

While land uses and management practices in Montpelier are likely contributing to the water quality impacts observed in the Winooski River, those impacts begin well upstream of the City and cannot not be treated or solved entirely within the City’s boundaries. For instance, similar patterns of elevated *E. coli* occur in the Winooski mainstem far up in the watershed (upstream of the Cabot WWTP). Further, while total phosphorus concentrations in the Winooski mainstem in Montpelier were above the VT standard for medium gradient cold water streams in 2014, total phosphorus concentrations in the headwaters portion of the Winooski near Martin Bridge in Marshfield average 14 ug/L, only slightly below the standard.

⁹ <http://www.winooskiriver.org/water-quality.php>

¹⁰ http://www.vtwaterquality.org/cfm/larosavm/mp_larosavolmon.cfm

4. MUNICIPALITY-SPECIFIC ASSESSMENTS

In addition to the watershed-based assessments, a number of assessments and datasets are developed on a municipality-by-municipality basis. These are important to fold into any effort to develop a list of strategic, prioritized projects that could be undertaken to improve water quality in and around Montpelier. These include direct input from the City, work by the Vermont Agency of Transportation, and past and current planning initiatives.

4.1. City Input

In meetings with Stone Environmental, City Public Works officials identified more than 20 areas of concern and priority projects throughout Montpelier, many of which are areas that sustained damage during the May 2011 flood event. The City has implemented a significant number of corrective measures and controls in many of the most impacted areas over the past four years; these projects will also be reviewed during the field evaluation. See Figure 2 for a map of concern areas and priority projects.

4.2. Vermont Agency of Transportation-Sponsored Programs

4.2.1. Vermont Online Bridge and Culvert Inventory Data¹¹

Vermont has 2,699 long structures (bridges and culverts) greater than 20 feet on interstate, state, and town routes and another 1,276 short structures between 6 and 20 feet on the state system that the state Agency of Transportation (VTrans) inspects. Inspections are conducted every 24 months on long structures and every 60 months on short structures unless conditions warrant more frequent inspections. Data collected as part of these inspections can help identify not only bridges and culverts with structural deficiencies but also structures that may be adversely impacting water quality. The system contains information for one bridge in Montpelier (on Towne Hill Road), and 267 culverts. The City has noted that this dataset is known to be incomplete. Of the mapped culverts in Montpelier, 49 are identified as being in “Fair” or “Poor” overall condition, meaning that when last assessed, the culverts were 25-50% open, or had existing or developing deficiencies (Map 2). No culverts were identified as being in “critical” or “urgent” overall condition. Montpelier’s entries in the bridge and culvert inventory were last updated in October 2007 – well before the May 2011 storm or Tropical Storm Irene.

4.2.2. Stream Geomorphic Assessment, Failure Modes Data¹²

Failure Modes- Problems and Causes

This document records the failure modes of select bridges and culverts. The tables provide a structure number and a road name for the structure. There is information for 12 structures within the City of Montpelier on the North Branch, and an additional 9 structures on the mainstem of the Winooski. Typical problems associated

¹¹ <https://www.vtculverts.org/>

¹² <https://anrweb.vt.gov/DEC/SGA/datasets/structures/reports.aspx?did=81>

with structures within the City include damage due to erosion of adjacent property, poor structure location or alignment, inlet obstructions, and, along the North Branch, beaver activity.

4.2.3. Better Roads Program¹³

The Better Roads (formerly Better Backroads) Program helps fund work on gravel roads to alleviate erosion issues and improve water quality, using grants to municipalities, under the leadership of VTrans and VANR. In 2013, in response to federal funding requirements and program needs, VTrans and VANR made a variety of changes to this program, including use of state (rather than federal) funding, and movement of administrative and technical assistance from the Northern Vermont Resource Conservation and Development Council to VTrans.

The Vermont Local Roads Program¹⁴, sponsored by the Vermont Agency of Transportation (VTrans) and the Federal Highway Administration (FHWA), provides information, training and technical assistance to cities, towns and villages in Vermont. This is done through seminars and workshops, distribution of materials and technical assistance to fulfill service requests. The administration and technical assistance offered through this program will be transitioned from St. Michael's College to VTrans.

The City of Montpelier was awarded a grant from the Better Backroads Program in 2006 to address erosion issues along Hubbard Park Road, and received a grant in 2016 to support road inventory and capital budget planning.

4.3. Vermont DEC Clean Water Initiative Program

4.3.1. Stormwater Mapping and Illicit Discharge Detection and Elimination Program

In 2000, the Vermont Legislature required DEC to implement a statewide program to promote detection and elimination of improper or illegal connections and discharges. (Sec. 3. 10 V.S.A. § 1264 (b)(9)). Illicit discharges are discharges of wastewater or industrial process water into a stormwater only drainage system. As part of this work, DEC has developed GIS (Geographic Information System) stormwater drainage maps for approximately ninety communities – including Montpelier.

Maps for Montpelier were completed during summer 2015 and show the connectedness of stormwater infrastructure throughout the City, including information on yard drains and driveway culverts where available. This information is useful in augmenting the more limited data on culverts that is currently available through the Vermont Online Bridge and Culvert Inventory, described in Section 4.2.1.

Efforts to identify and eliminate potential illicit discharges in Montpelier began in 2001, with a follow-on effort complete in 2009. Further work is taking place during the 2016 field season and, given the size of the City, it is likely that Montpelier will need to make an on-going commitment to monitoring for illicit discharges.

¹³ <http://vtransengineering.vermont.gov/sections/environmental/betterbackroads>

¹⁴ <http://vermontlocalroads.org/>

4.3.2. Ecosystem Restoration Projects¹⁵

Beyond the stormwater mapping and stream geomorphic assessment work discussed in Sections 4.3.1 and 3.2, respectively, the Ecosystem Restoration Program (ERP) has provided funding to the City to incorporate green stormwater infrastructure into the on-going Taylor Street redevelopment and Multitranst Center construction.

4.4. Vermont DEC Stormwater Permitting Program

4.4.1. State Stormwater Permits

Currently, Vermont DEC requires that a stormwater permit be obtained when any construction, new development, or redevelopment results in impervious or disturbed area equal to or greater than one acre, with stricter requirements in watersheds that are classified as stormwater impaired. The State has developed a suite of technical standards for stormwater-related mitigation that are outlined in the Vermont Storm Water Management Manual, Volumes I and II. For example, the goal of a stormwater management program during construction is to mitigate sediment loss during storm events—while during and after construction, the objective is to maintain as much of the pre-developed hydrology as possible. The State is currently in the process of revising its Storm Water Management Manual, and has indicated that it expects to release a draft manual for public comment in late 2015.

4.4.2. Environmental Research Tool¹⁶

ANR's Environmental Research Tool allows the user to look up the location of stormwater permits that have been issued by ANR, as well as hazardous waste sites, brownfields, and spills. There are 18 post-construction stormwater permits that have been issued to sites in Montpelier accessible through the tool. Most of the issued permits are up-to-date (they have not expired), though in several instances, annual or semi-annual inspections may not have been regularly completed or submitted to ANR. The age, style, size, and upkeep of an existing permitted facility – particularly facilities constructed prior to 2002 – may make it a strong candidate for improvement to enhance stormwater management capabilities.

Permit no.	Site name	Expiration Date	Restatement of Compliance Due Date
4820-9010	384 River Street	07/26/17	07/29/13
7196-9015	Capital Complex Additional Parking	01/13/25	07/15/18
6679-INDS	Community Colleges of Vermont Montpelier Academic Facility	09/28/16	07/15/12
1-1099.XXXX	Crestview Estates	09/30/97	N/A - expired
3146-9015.1	Distribution Center & Dry Storage Warehouse	09/05/24	07/15/15
3229-9010.R	Montpelier Capital Complex	02/08/21	02/08/16
3261-9010.R	Montpelier Public Works Garage	12/09/20	05/05/15

¹⁵ <http://www.vtwaterquality.org/erp/projects/>

¹⁶ <https://anrweb.vt.gov/DEC/ERT/StormWater.aspx>



3594-INDS	Montpelier-Berlin Pathway	09/05/19	07/15/15
3205-9010.R	Murray Hill Development	01/18/21	01/18/16
3206-9015.1	Murray Hill Development	09/21/17	06/01/12
3405-9015	National Life Insurance Company Office Building	02/03/21	07/15/14
3239-9010.R	North Park Drive	02/24/21	07/15/13
3492-9010.R	Sherwood Forest Condominium Development	10/06/20	07/15/12
4036-9010.R	State Street Improvements M 6400 17 S	03/22/21	07/15/13
4216-9015	The Family Center	12/15/08	N/A - expired
3248-9010.R	Third Greaves Farm Condominiums	09/14/20	07/15/13
4257-9015	Tractor Supply Company Store	07/24/16	07/15/14
5596-9010	Westview Meadows	08/04/18	07/15/16

4.5. City of Montpelier Code of Ordinances¹⁷

The City of Montpelier’s Code of Ordinances was most recently updated in 2012. There are two key sections of the Code that relate to stormwater management: Natural Resources (Chapter 13); and Zoning Regulations (Chapter 15).

The Natural Resources chapter has an article specific to river and streams, which includes two conditions: one prohibiting encroachment upon the “bed of the North Branch or of the Winooski River within the city”, and a second that prohibits placement of “rubbish or waste material of any kind” on the banks of either river.

The Zoning Regulations contain sections dedicated to Floodplain Development (Section 309) and Storm Drainage (Section 723), both of which have ties to this project. The City is currently engaged in an effort to substantially overhaul its Zoning Regulations. It will be important to ensure that recommendations stemming from the development of this stormwater master plan can be easily integrated into this larger framework. As part of the overhaul, the City anticipates that a stand-alone chapter on River Hazard Areas – which will include both river corridors and flood hazard areas – will be added to the Zoning Regulations.

Section 309 details the review of and permitting process that applies to any development project proposed for within the special flood hazard area. The City has adopted a Floodplain District overlay zone that imposes additional requirements above those required by the underlying zoning district, as required by the National Flood Insurance Program.

Section 723 provides the Director of Public Works with significant discretion to require stormwater management practices. This section states that “The best available technology shall be used to minimize stormwater runoff, increase on-site infiltration, encourage natural filtration functions, simulate natural drainage systems, and minimize discharge of pollutants to ground and surface water. Best available technology may include measures such as retention basins, recharge trenches, swales and minimal use of impervious surfaces.” This language provides a strong foundation for future stormwater management efforts, and would be strengthened by incorporating an explicit performance standard – such as managing the first inch of rainfall –

¹⁷ <http://www.montpelier-vt.org/community/206/Ordinances.html>

that minimizing stormwater runoff could be measured against. Part 3 of the proposed draft Montpelier Unified Development Regulations¹⁸ does add requirements for implementing low-impact development and green stormwater infrastructure in new and redevelopment situations, including but not limited to management of “one inch of rainfall from all impervious surfaces on the lot”. The draft Development Regulations do not make a distinction between areas served by combined and separate storm sewer systems.

4.6. Montpelier Flood Hazard Mitigation Plan¹⁹

In 1998, the City developed a Flood Hazard Mitigation Plan. The stated purpose of the Plan is to assess the flood risks which confront the City and to articulate a comprehensive strategy for implementing technically feasible flood mitigation activities. This plan specifically notes:

- The Montpelier reach of the Winooski River offers very limited environmental habitat or species diversity, due to urban degradation and the encroachment of development into the stream bed zone.
- The area can be characterized as having thin to nonexistent riparian zones (and therefore extremely limited flora or fauna) with a stream bed that is generally wide and shallow, and which is dominated by shifting sands and gravels (providing poor aquatic habitat).
- The Winooski and North Branch Rivers do serve as an amenity to the City and to visitors. Existing recreational paths along sections of the river provide passive recreation and aesthetics, while more paths are being planned. Current in-stream recreational use is limited to fishing and minor canoe activity.
- The 100 year flood plain encompasses 478.6 acres or 7.2% of the entire city. Nearly 27% of the city’s individual properties are at least partially within the flood plain, and 21.5% of all of the city’s structures are located within the flood plain.

The report contains a number of recommendations, many of which are related to the management of ice jams. Recommendations that merit further consideration as part of the development of the stormwater master plan include:

- Encouraging the preservation of existing open space in the floodplain. Approximately 25 acres of open space existed in the floodplain at the time the report was prepared (1998) which was made-up mostly of the Elm Street Recreation Field, Green Mountain Cemetery, Montpelier High School playing fields, and the Statehouse lawn.
- Seeking alternate locations for snow dumping and storage. The report notes that the City’s Code of Ordinances (Chapter 3, Article V) prohibits the placement of snow from private property in the public way.

Recently, the City has voluntarily eliminated snow storage along Old Country Club Road; the City continues to evaluate options for improving snow handling and disposal.

¹⁸ <http://www.placesense.com/current/montpelier>

¹⁹ <http://www.montpelier-vt.org/upload/groups/128/files/FloodPlan1998.pdf>

4.7. Enhancing our River Environment: A Proposed Plan for the Management of the Winooski Riverbank Vegetation in Montpelier²⁰

This plan, developed in 2002, has several stated goals. These include: 1) enhancing the beauty of the river corridor; 2) stabilizing the Winooski's banks with vegetation to mitigate erosion; 3) identifying areas where selection of species of planted trees and shrubs corresponds with the type of soil present; and 4) taking advantage of small pockets of open space to be used for public enjoyment. The report makes specific planting and vegetation management recommendations for various segments of the mainstem of the Winooski as it flows through Montpelier. The implementation of the plan was envisioned to be primarily a volunteer effort to be carried out by the Tree Board, Conservation Commission, and Friends of the Winooski River, with assistance from the Conservation District, City Tree Warden, Cemetery Commission, Public Works Department, state agencies, and riverbank property owners.

5. CONCLUSIONS

This report is part of a larger project, funded by Vermont DEC, which will ultimately lead to a set of community-specific, prioritized projects to address stormwater runoff. Rather than starting from scratch in identifying stormwater management needs, the project (and this report) is drawing from existing reports and water quality assessments, and augmenting this information with interviews with local officials.

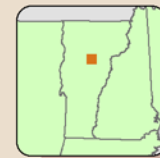
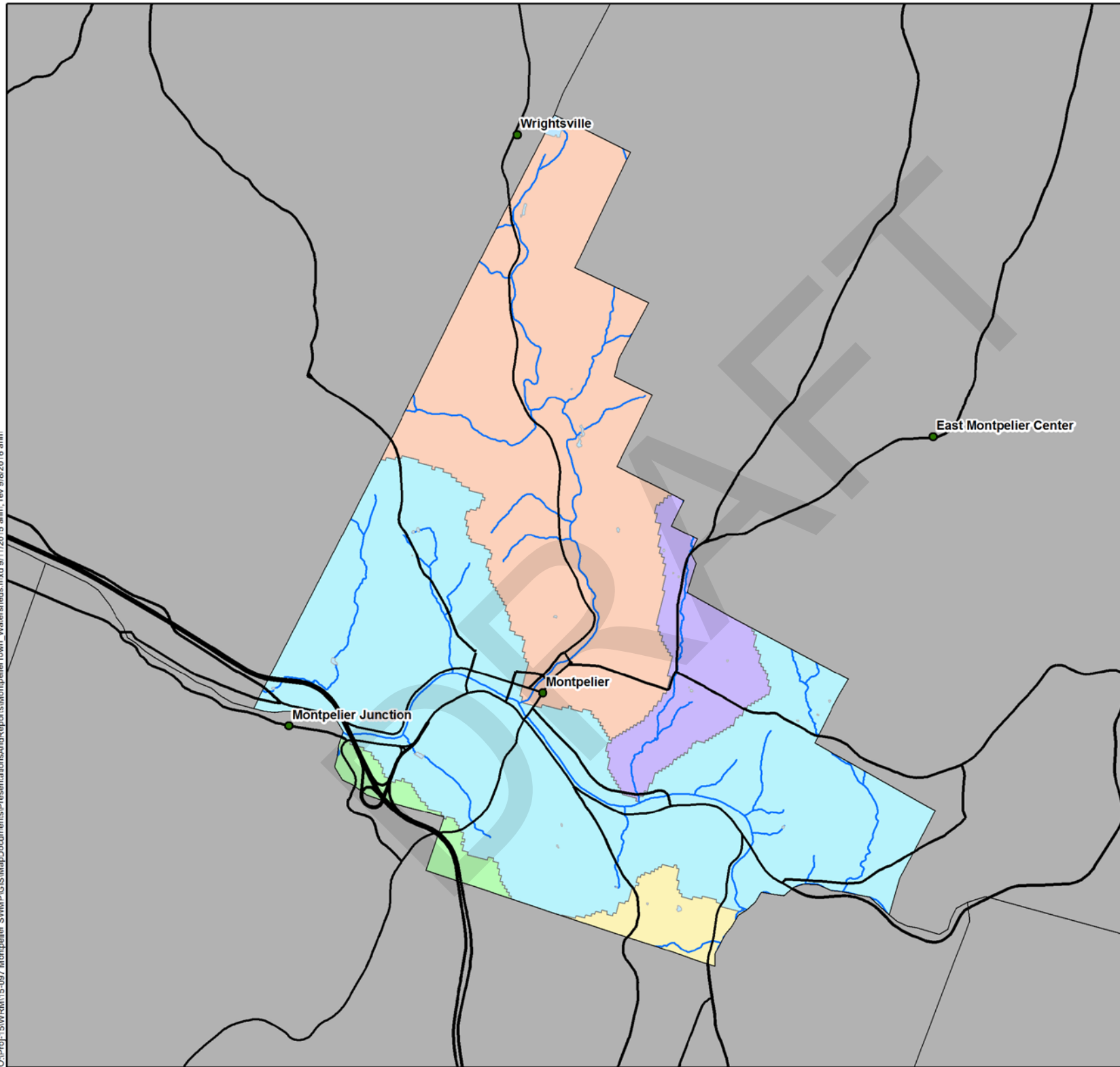
As this report demonstrates, there are numerous agencies and entities whose activities touch on various aspects of water quality in the Winooski River watershed, and in the City of Montpelier. This work is dynamic and ongoing, and so, while this summary is believed to be comprehensive, it will be important to periodically review and update the content to ensure the most current information can be incorporated. A comprehensive inventory of existing water quality assessments serves as a basis for connecting land use, stormwater management, floodplain management, river management activities, and public infrastructure needs to more effectively address all of the issues which contribute to degradation of a watershed.

²⁰ <http://www.montpelier-vt.org/upload/pages/369/files/vegetationmanagementplan.pdf>

MAPS

DRAFT

O:\Proj\15WRM\15-097 Montpelier SWMP\GIS\MapDocuments\PresentationAndReports\MontpelierTown_Watersheds.mxd 9/11/2015 ann; rev 9/8/2016 ann



0 0.4 0.8 Miles

— River or Stream

Montpelier Watersheds

- Blanchard Brook
- Dog River
- North Branch Winooski River
- Stevens Branch Winooski River
- Winooski River

Sources: Watershed Boundaries: NHD Plus 2;
Administrative Boundaries, Roads: VCGI.

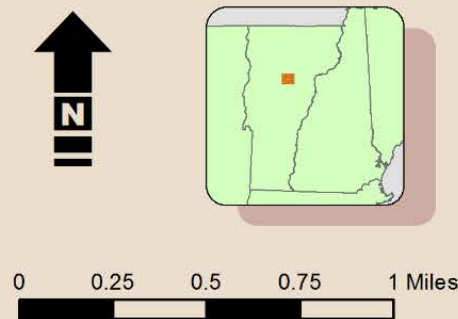
 **STONE ENVIRONMENTAL INC.**

Watershed Boundaries

City of Montpelier
Stormwater Master
Planning

Map #1

O:\Proj-15\WRM\15-097 Montpelier SWMP\GIS\MapDocuments\Presentation\AndReports\Montpelier_SrmwtrProblemAreas.mxd 9/15/2015 ann; rev 9/8/2016 ann



- Stormwater Problem Severity**
- Unknown
 - Minor
 - Moderate
 - Significant
 - Severe
- Stormwater Problem Areas
- VT Culvert Inventory**
- "Fair" or "Poor" condition
 - DEC Mapping Priority 1 Retrofits
 - City of Montpelier Boundary
 - River or Stream
- Roads - State level**
- Interstate
 - US Highway
 - VT State Highway
 - US/State Highway - City
- Roads - Local**
- Town Highway - 3
 - Town Highway - 4
 - Private Y
 - Private N
 - Forest Highway, Legal Trail
 - Unknown

Sources: Priority 1 Retrofits: VT DEC;
Stormwater Problem Areas: City of Montpelier, Administrative Boundaries, Roads: VCGI, Flowlines: NHD Plus 2, Imagery: ESRI

STONE ENVIRONMENTAL INC

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Appendix C. Problem Area Data Sheets

DRAFT

August 16, 2016

To: Mike Miller
City of Montpelier

MEMO



STONE ENVIRONMENTAL INC

From: Julie Moore
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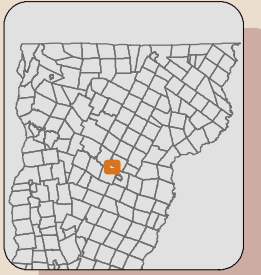
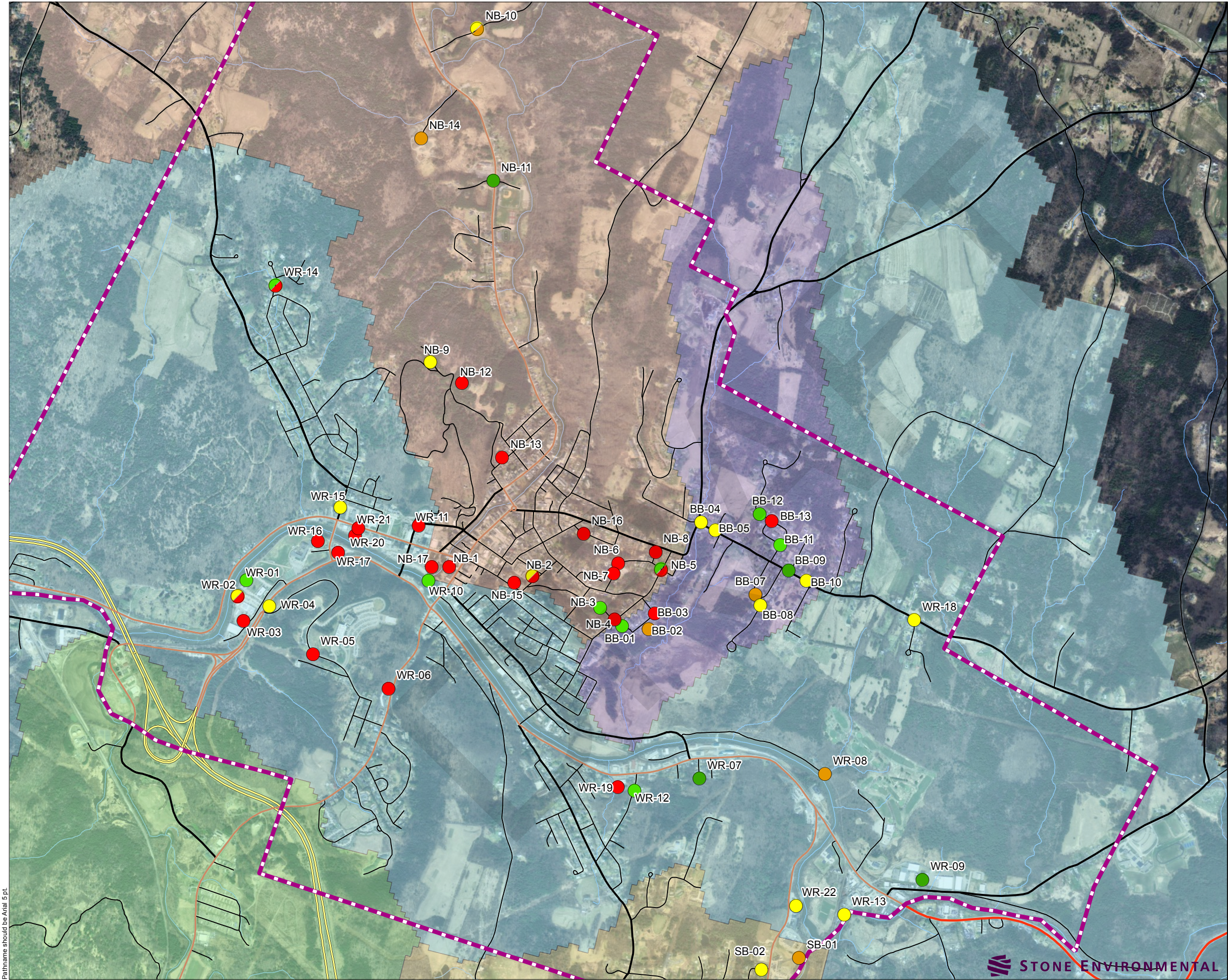
SEI No. 15-097
Re: Stormwater Problem Area Data Sheets for the City of Montpelier

Stone Environmental has combed through existing reports, including the stormwater infrastructure mapping recently completed by VT DEC, and also worked directly with City staff to identify current problem areas (e.g., actively eroding sites, areas impacted during recent high flow events, culverts or other structures with insufficient hydraulic capacity) that are a direct, or indirect, result of stormwater runoff. The location of each problem area is shown in Figure 1.

A “problem area data sheet” was developed and used as a guide to ensure consistent information was collected as site visits were completed. The data sheets for all of the problem areas identified in Montpelier are attached to this memo. Each problem area was given a preliminary classification according to the following system:

Level	Classification
1	Infeasible to remedy issue/outside of project scope.
2	Stable, but problem could escalate with future change in surrounding land use.
3	Limited erosion and/or drainage problems are present; issues could be readily addressed.
4	Moderate erosion and/or drainage problems are present; issues may be readily addressed.
5	Significant erosion and/or drainage problems are present; issues may be readily addressed.
6	Strategic retrofit opportunity

Ultimately, the information collected during this phase of the project will be incorporated in an evaluation that considers both the City’s priorities and anticipated water quality benefits of addressing each problem area to develop a refined list of high priority projects.



Legend
Problem Area Classification

1

2

3

4

5

6

1.4

3.6

4.5

4.6

Montpelier Watersheds

Blanchard Brook

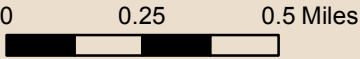
Dog River

North Branch Winooski River

Stevens Branch Winooski River

Winooski River

Level	Classification
1	Infeasible to remedy issue/ outside of project scope
2	Stable, but problem could escalate with future change in surrounding landuse
3	Limited erosion and/or drainage problems are present
4	Moderate erosion and/or drainage problems are present
5	Significant erosion and/or drainage problems are present
6	Strategic retrofit opportunity



Stormwater treatment opportunities in Montpelier, ranked according to severity of erosion and type.

Sources: Treatment Sites: Stone Environmental Inc
Hydrography, Town Boundaries, Roads: VCGI

Problem Area Locations

Montpelier Stormwater Management Planning



Problem Area Data Sheet

Problem Area ID: WR-01		Latitude: 44.258732	Longitude: -72.590663
Watershed: Winooski River (VT DEC Subwatershed 23)			
Location: Department of Labor Parking Lot			
Problem Type: Erosion			
Identification Source: VTDEC Montpelier Stormwater Infrastructure Mapping Project			
Ownership: State			
Classification: 3			

Date of Field Data Collection: September 9, 2015

Description of Observed Conditions:

Large portion of green space in satellite photos has been paved as part of the parking lot expansion. Workers on site indicated a stormwater infiltration system was installed under the new pavement. Green strip at the edge of the new paved area should be reshaped to allow sheet flow from adjacent parking spaces.

Field Photos



Photo 1. New paved area (previously green space)

Photo 2. West edge of new parking area

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	2	2	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-02		Latitude: 44.258195	Longitude: -72.591873
Watershed:	Winooski River (VT DEC Subwatershed 21)		
Location:	Green Mountain Power parking lot		
Problem Type:	Erosion		
Identification Source:	VTDEC Montpelier Stormwater Infrastructure Mapping Project		
Ownership:	Private		
Classification:	4/6		



Date of Field Data Collection: September 9, 2015

Description of Observed Conditions:

Stormwater is directed into a steep-sided, eroded swale. VT DEC retrofit concept for an infiltration basin in this area appears to be a viable option.

Field Photos



Photo 1. View of swale behind parking lot

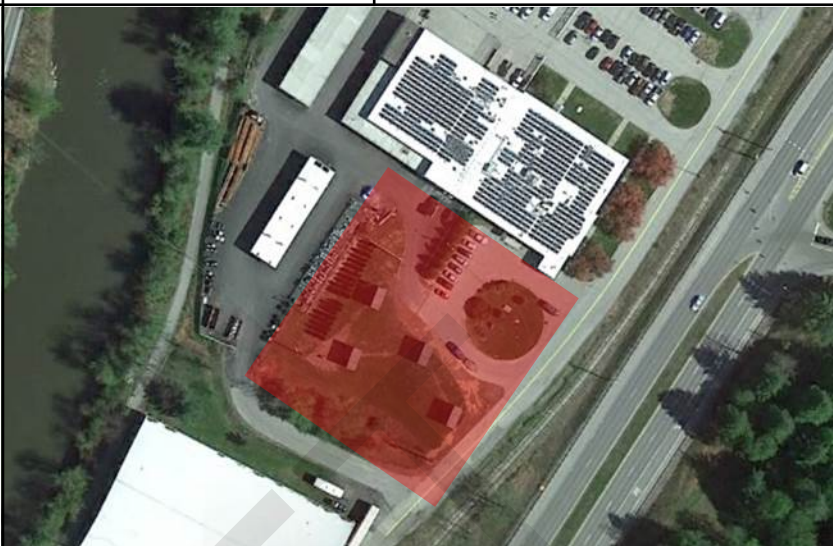


Photo 2. Pipe outlet across the fence

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	2	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-03		Latitude: 44.256907	Longitude: -72.591447
Watershed: Winooski River (VT DEC Subwatershed 24)			
Location: Green Mountain Power campus			
Problem Type: Unmanaged impervious			
Identification Source: VTDEC Montpelier Stormwater Infrastructure Mapping Project			
Ownership: Private			
Classification: 6			

Date of Field Data Collection: September 9, 2015

Description of Observed Conditions:

The two catch basins (including the one pictured in Photo 2, below) could be capped, and rainwater should be redirected in the circular green space or the lawn area where the solar panels are installed.

Field Photos



Photo 1. Solar panel installation that could be modified to incorporate stormwater management



Photo 2. Catch basin that could be plated over (1 of 2)

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	1	1	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-04		Latitude: 44.257685	Longitude: -72.589562
Watershed: Winooski River (VT DEC Subwatershed 6)			
Location: National Life Drive			
Problem Type: Infrastructure, erosion			
Identification Source: VTDEC Montpelier Stormwater Infrastructure Mapping Project			
Ownership: Private/City/State			
Classification: 4			

Date of Field Data Collection: September 9, 2015

Description of Observed Conditions:

Elevation of the open green space on east side of Memorial Drive makes it a good candidate site for runoff capture. Stormwater water currently conveyed through the area in a 24" (?) diameter pipe; stormwater is flowing around pipe, resulting in moderate erosion.

Field Photos



Photo 1. View of green space. Pipe runs to the left of the birch tree.



Photo 2. Exposed pipe (in box) and eroded area

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	3	2	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-05		Latitude: 44.255167	Longitude: -72.586394
Watershed:	Winooski River (VT DEC Subwatershed 1)		
Location:	National Life Drive		
Problem Type:	Infrastructure		
Identification Source:	VTDEC Montpelier Stormwater Infrastructure Mapping Project		
Ownership:	Private/City		
Classification:	6		



Date of Field Data Collection: September 9, 2015

Description of Observed Conditions:

Open green space on the right side (driving uphill) of National Life Drive. There is an existing, subsurface storage pipe system in this green space that was installed by National Life as part of their permit that will need to be considered. Capping the catch basin in Photo 2 and constructing a berm at location indicated in Photo 1 to turn water out into the swale could be effective. Pipe running downhill from the catch basin in Photo 2 is not deep; there may be an opportunity to “daylight” additional stormwater into the swale. Depending on the drainage area, the swale may need to be reinforced and/or require check dams.

Field Photos



Photo 1. Berm would be constructed on low area behind location indicated by the arrow.



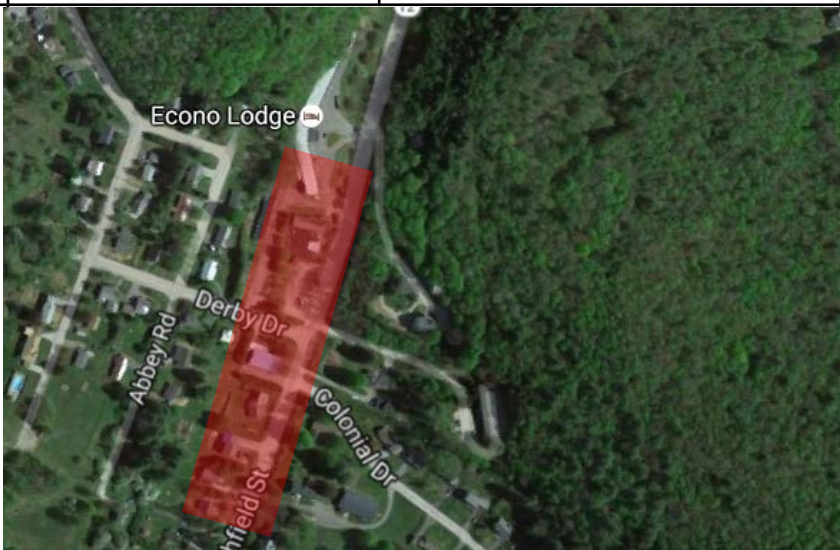
Photo 2. Catch basin uphill of green space

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	1	1	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-06		Latitude: 44.253390	Longitude: -72.580873
Watershed:	Winooski River (VT DEC Subwatershed 38)		
Location:	Northfield St/Route 12		
Problem Type:	Unmanaged impervious		
Identification Source:	VTDEC Montpelier Stormwater Infrastructure Mapping Project		
Ownership:	Private/State		
Classification:	6		



Date of Field Data Collection: September 9, 2015

Description of Observed Conditions:

There is green space along the west side of Vermont 12, both north and south of Derby Drive, that could be suitable for stormwater management. This includes “depaving” the overly-wide shoulder in front of the Econo Lodge. The City has indicated that this section of roadway is scheduled for paving in 2017.

Field Photos



Photo 1. VT-12 facing downhill (north), at the EconoLodge



Photo 2. VT-12 facing south, at the Derby Drive

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	1	1	Y	Y	N	Y

Problem Area Data Sheet

Problem Area ID: WR-07		Latitude: 44.248710	Longitude: -72.558281
Watershed:	Winooski River		
Location:	Taplin Street		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	Public		
Classification:	2		



Date of Field Data Collection: September 10, 2015

Description of Observed Conditions:

Drainage at the top of the street has been stabilized with riprap (Photo 1). In addition, there is a concrete manhole with small inlets at its base and an overflow inlet located out-of-site in this photo beyond the rip-rap. No ditches along the sides of the steep street but little erosion was visible along the permanent edge. The City has plans to construct a small retention basin with an outlet control structure on Isabel Circle, which is at the top of this drainage area.

Field Photos



Photo 1. Rock pile constructed in the yard of the topmost house in the line of flow



Photo 2. View down the steep street

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	1	1	1	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-08		Latitude: 44.248940	Longitude: -72.549133
Watershed: _____ Winooski River			
Location: _____ Old Country Club Rd			
Problem Type: _____ Infrastructure, erosion			
Identification Source: _____ SWMP Assessment/VTrans			
Ownership: _____ Public			
Classification: _____ 5			

Date of Field Data Collection: September 10, 2015

Description of Observed Conditions:

Significant, ongoing erosion around culvert damaged by Irene (Photo 1). Rehab of the surrounding area could be implemented to reduce erosion, regardless of whether the culvert is ultimately replaced. Banks of roadside ditches on Old Country Club Rd. are also oversteepened and eroding (Photo 2).

Field Photos



Photo 1. Damaged culvert and severe storm damage.



Photo 2. Erosion of area draining into the ditch on side of the road.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
3	3	3	2	Y	Y	Y	Y

Problem Area Data Sheet

Problem Area ID: WR-09		Latitude: 44.243424	Longitude: -72.542053
Watershed: _____ Winooski River			
Location: _____ Gallison Hill Rd			
Problem Type: _____ Infrastructure			
Identification Source: _____ SWMP Assessment			
Ownership: _____ Private			
Classification: _____ 2			

Date of Field Data Collection: September 11, 2015

Description of Observed Conditions:

Permitted facility (#3146). Pond appears to be maintained (Photo 1). Little erosion around storm water flow paths around pond. Ditches on west side of campus could use some maintenance (Photo 2).

Field Photos



Photo 1. Pond between the two building complexes



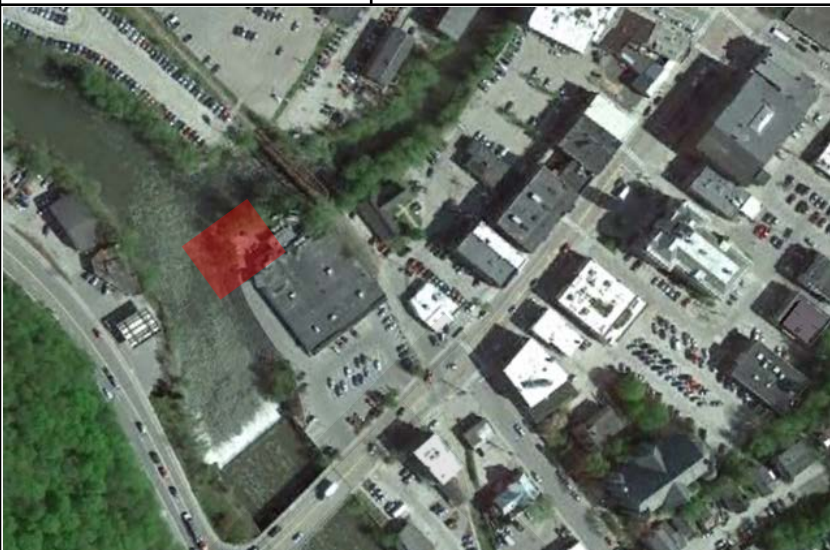
Photo 2. Ditch that could be reshaped and stabilized to provide better treatment for storm water before it reaches the pond.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	1	1	1	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-10		Latitude: 44.259022	Longitude: -72.577985
Watershed:	Winooski River (VT DEC Subwatershed 91)		
Location:	Shaw's parking lot		
Problem Type:	Pollution prevention		
Identification Source:	VTDEC Montpelier Stormwater Infrastructure Mapping Project		
Ownership:	Private		
Classification:	3		



Date of Field Data Collection: September 10, 2015

Description of Observed Conditions:

Dumpster and bagged garbage stored on edge of parking lot immediately adjacent to river; should be removed. Runoff from the parking lot also drains directly into the Winooski.

Field Photos



Photo 1. Area behind Shaw's



Photo 2. Food waste left in bags near flow path to river

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	1	2	1	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-11		Latitude: 44.261911	Longitude: -72.578699
Watershed: Winooski River (VT DEC Subwatershed 149)			
Location: Governor Davis Ave Parking Lot			
Problem Type: Unmanaged impervious			
Identification Source: VTDEC Montpelier Stormwater Infrastructure Mapping Project			
Ownership: State			
Classification: 6			

Date of Field Data Collection: September 10, 2015

Description of Observed Conditions:

Potential for a small, linear bioretention at toe of green space to capture/infiltrate a portion of parking lot runoff. Site also received excess runoff from the State House during large/intense wet weather events through a weir/manhole by the Pavilion Office Building. Site is somewhat constrained due to the steep slope of the available green space. When lot is resurfaced, consideration should be given to the use of a porous pavement.

Field Photos



Photo 1. Proposed green space around staircase

Photo 2. Gov. Davis Ave parking lot

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	1	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-12		Latitude: 44.248057	Longitude: -72.563002
Watershed:	Winooski River (VT DEC Subwatershed 57)		
Location:	Wheelock Road		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	Private		
Classification:	3		



Date of Field Data Collection: September 28, 2015

Description of Observed Conditions:

Road is too steep for a Green Streets project, but there seems to be enough vegetation to retain storm flow. Ditch draining the parking lot of Vermont-NEA has deteriorated, and the catch basin could use a riser.

Field Photos



Photo 1. Catch basin and ditch could be improved.

Photo 2. The road is steep but has vegetation on either side.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	1	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-13		Latitude: 44.241584	Longitude: -72.547747
Watershed: Winooski River (VT DEC Subwatershed 83)			
Location: Casella Waste Systems property			
Problem Type: Erosion			
Identification Source: VTDEC Montpelier Stormwater Infrastructure Mapping Project			
Ownership: Private			
Classification: 4			

Date of Field Data Collection: September 14, 2015

Description of Observed Conditions:

Permitted facility (#4790). Standing water from rain the day before remained on the gravel machinery parking area (Photo 1). In the image, the river is to the left. There is a vegetated berm-like structure preventing flow into the river along most of that side of the parking lot, but one flat section allows flow into the river (Photo 2). A strip of gravel and grass along the right side of the lot (relative to Photo 1) was under standing water. A Casella Waste Systems employee stated there is one catch basin draining the paved lot at the front of the property.

Field Photos



Photo 1. Casella Waste Management vehicle storage area, located on a “peninsula” between the railroad and the Winooski River

Photo 2. Evidence of water from parking lot flowing towards river; dumpsters stored near river bank

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	3	2	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-14		Latitude: 44.274457	Longitude: -72.589144
Watershed: _____ Winooski River			
Location: _____ Dunpatrick Circle			
Problem Type: _____ Unmanaged impervious, erosion			
Identification Source: _____ VTrans/CVRPC			
Ownership: _____ City/Private			
Classification: _____ 3/6			

Date of Field Data Collection: November 5, 2015

Description of Observed Conditions:

There are a number of drainage features that all intersect in the vicinity of Dunpatrick Circle. Water from this area ultimately becomes part of a more significant surface water feature along the west side of Terrace Street.

Field Photos

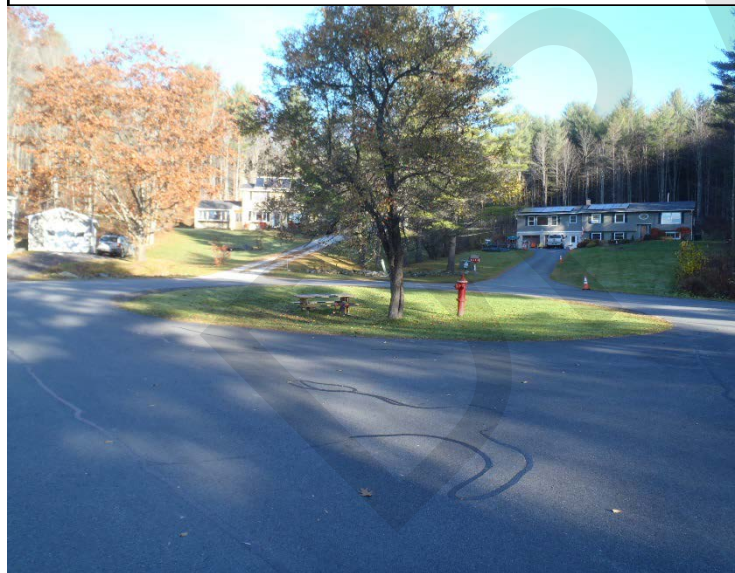


Photo 1. Cul-de-sac presents potential retrofit opportunity.



Photo 2. Existing natural areas along Dunpatrick Circle could potentially be used to better manage stormwater.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	1	1	Y	Y	Y	Y

Problem Area Data Sheet

Problem Area ID: WR-15		Latitude: 44.262860	Longitude: -72.584403
Watershed:	Winooski River		
Location:	Bailey Ave.		
Problem Type:	Unmanaged impervious, erosion		
Identification Source:	SWMP Assessment		
Ownership:	City/Private		
Classification:	4		



Date of Field Data Collection: November 4, 2015

Description of Observed Conditions:

Significant stormwater runoff along the shoulders of Bailey Ave accesses and erodes off-street parking areas; there is a need to comprehensively address stormwater runoff along this block.

Field Photos



Photo 1. Runoff along the shoulder of Bailey Ave is accessing and eroding an off-street parking area.



Photo 2. Potential "green street" location along the east-side of Bailey Ave.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	2	Y	Y	Y	Y

Problem Area Data Sheet

Problem Area ID: WR-16		Latitude: 44.261085	Longitude: -72.586039
Watershed:	Winooski River		
Location:	Montpelier High School		
Problem Type:	Unmanaged impervious, erosion		
Identification Source:	SWMP Assessment		
Ownership:	City		
Classification:	6		



Date of Field Data Collection: November 4, 2015

Description of Observed Conditions:

There are a number of opportunities for improved stormwater management on the Montpelier High School campus. These include: addressing sediment transport from the overflow parking area in front of the school (Photo 1), retrofitting the green space in the traffic loop in front of the school to accept stormwater runoff, and improving stormwater management measures designed to capture runoff from the back parking lot which show evidence of short circuiting (Photo 2).

Field Photos



Photo 1. Overflow parking area



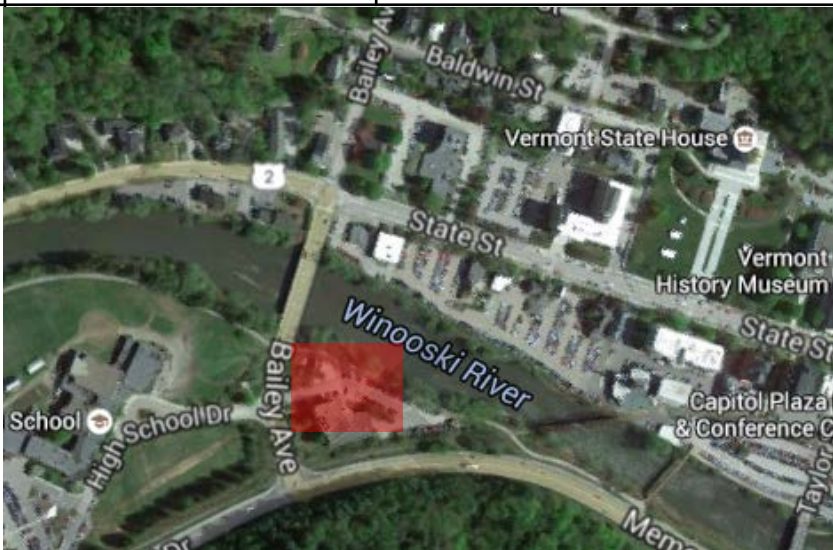
Photo 2. Existing stormwater management in back parking lot

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	3	2	Y	Y	Y	N

Problem Area Data Sheet

Problem Area ID: WR-17		Latitude: 44.260495	Longitude: -72.584568
Watershed:	Winooski River		
Location:	VSECU, 1 Bailey Ave		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	Private		
Classification:	6		



Date of Field Data Collection: November 4, 2015

Description of Observed Conditions:

The VSECU parking lot represents a significant amount of unmanaged impervious surface that drains directly to the Winooski River. There is an existing green space between the northern edge of the lot and the Montpelier bike path that has a landscape position that would allow it to readily accept stormwater management.

Field Photos

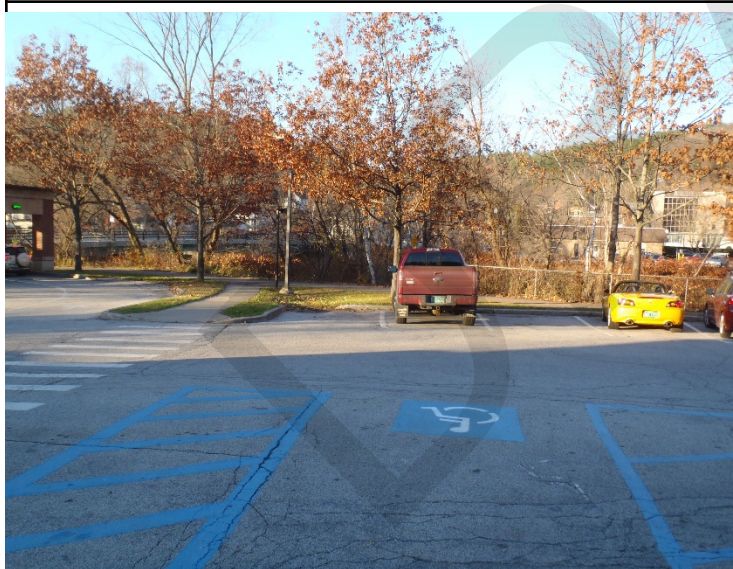


Photo 1. Parking lot is graded to drain toward existing green space



Photo 2: Sediment accumulation notes at corner of parking lot

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	1	1	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-18		Latitude: 44.257003	Longitude: -72.542647
Watershed:	Winooski River		
Location:	Hackamore Dr		
Problem Type:	Unmanaged impervious, erosion		
Identification Source:	SWMP Assessment		
Ownership:	City		
Classification:	4		



Date of Field Data Collection: November 5, 2015

Description of Observed Conditions:

Erosion along the road shoulder was observed at the north end of Hackamore Dr, near the intersection with Towne Hill Rd – including and accumulation of sediment in the drainage ditch along Towne Hill.

Field Photos



Photo 1. Erosion along the road shoulder



Photo 2. Sediment accumulation in drainage ditch

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	2	Y	Y	Y	N

Problem Area Data Sheet

Problem Area ID: WR-19		Latitude:	Longitude:
Watershed: Winooski River			
Location: VT NEA and Leahy Press, Wheelock St			
Problem Type: Unmanaged impervious			
Identification Source: SWMP Assessment			
Ownership: Private			
Classification: '6			

Date of Field Data Collection: November 18, 2015

Description of Observed Conditions:

The are significant areas of unmanaged impervious surface, mainly parking areas, associated with both of these facilities that could benefits from improved stormwater management. In addition, these lots have been reported to receive significant “run-on” from uphill residential development. There is an existing drainage swale along the north edge of these parking areas that could be improved to better manage stormwater; there are also opportunities to better manage stormwater runoff in the upper watershed.

Field Photos

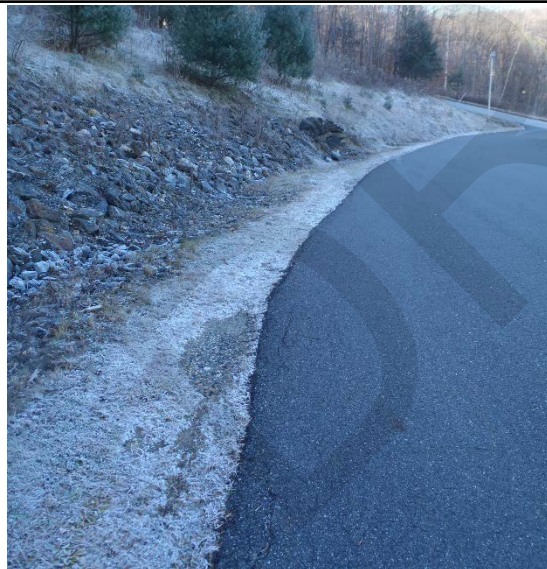


Photo 1. Drainage swale along north edge of VT NEA parking area

Photo 2. Parking area at Leahy Press

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	1	1	1	N	Y	N	Y

Problem Area Data Sheet

Problem Area ID: WR-20		Latitude: 44.261379	Longitude: -72.583344
Watershed:	Winooski River		
Location:	State Parking Lots		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	State		
Classification:	6		



Date of Field Data Collection: November 18, 2015

Description of Observed Conditions:

Small islands of green space within the existing state-operated parking areas between State St and the Winooski River could be retrofitted to provide stormwater management for a portion of the surrounding impervious surface.

Field Photos

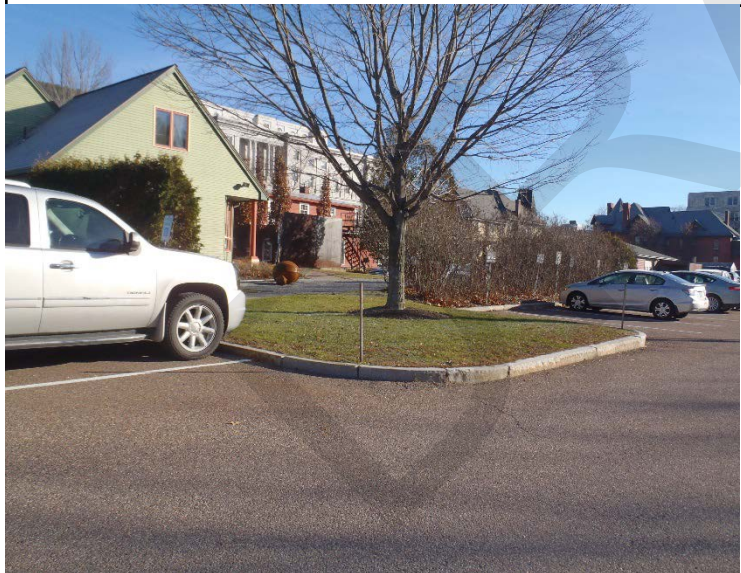


Photo 1. Green space behind Visitor Center



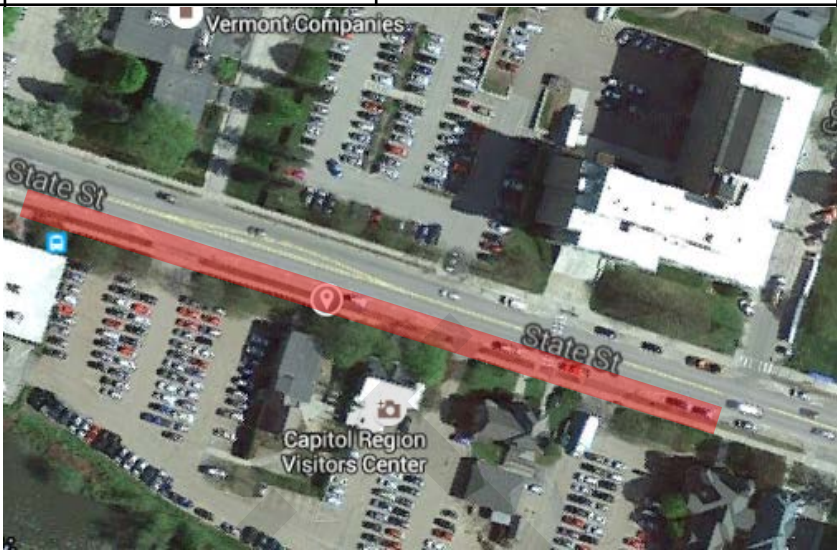
Photo 2. Green space in lot behind 116 State St

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	1	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-21		Latitude: 44.261774	Longitude: -72.583092
Watershed:	Winooski River		
Location:	State St		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	City		
Classification:	6		



Date of Field Data Collection: November 18, 2015

Description of Observed Conditions:

There is existing green space along the south-side of State St that could be retrofit using a "Green Street" style approach to improve stormwater management for road (and sidewalk) related runoff.

Field Photos



Photo 1. Green space, looking west along State St.

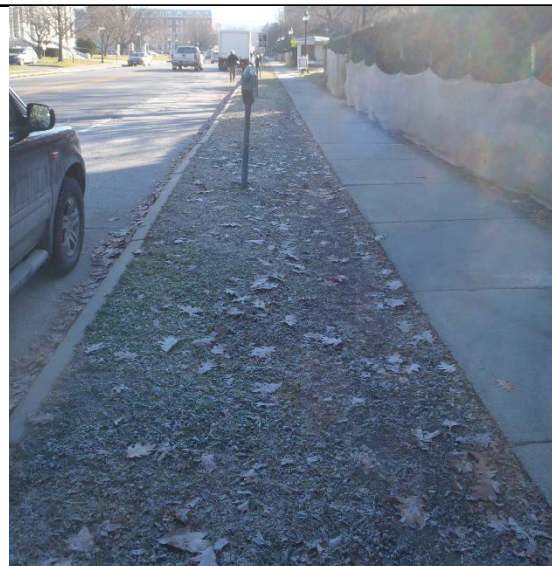


Photo 2. Green space, looking east along State St.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: WR-22		Latitude: 44.242150	Longitude: --72.551193
Watershed: Winooski River			
Location: A Quilter's Garden Barre-Montpelier Road			
Problem Type: Infrastructure, erosion			
Identification Source: SWMP Assessment			
Ownership: Private			
Classification: 4			

Date of Field Data Collection: June 16, 2016

Description of Observed Conditions:

Undersized culvert to the north and east of the Quilter's Garden which used to convey an intermittent stream blown out in May 2011. Area where culvert had been is actively eroding.

Field Photos



Photo 1. Damaged area where culvert used to be.



Photo 2. Visible evidence of active erosion.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
3	3	3	2	N	Y	Y	Y

Problem Area Data Sheet

Problem Area ID: SB-01		Latitude: 44.239333	Longitude: -72.551040
Watershed:	Stevens Branch (VT DEC Subwatershed 71)		
Location:	Crossway Saab/Cody Chevrolet		
Problem Type:	Erosion, unmanaged impervious		
Identification Source:	VTDEC Montpelier Stormwater Infrastructure Mapping Project		
Ownership:	Private		
Classification:	5		



Date of Field Data Collection: September 10, 2015

Description of Observed Conditions:

Undersized culvert on Crossway Saab property captures intermittent stream and conveys under Route 302 through the Cody Chevrolet property to Stevens Branch. Significant sediment deposits at culvert outlet, likely attributable to actively eroding channel above Crossway Saab. In addition, there is significant headcutting due to overland flow behind Cody Chevrolet which contributes to the sediment load being delivered to Stevens Branch.

Field Photos



Photo 1. Shallow ditch and wet area reaching from the auto body service center parking lot to the culvert outlet pool



Photo 2. Culvert outlet pool. Note eroded banks.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
3	3	3	3	Y	M	Y	Y

Problem Area Data Sheet

Problem Area ID: SB-02		Latitude: 44.238707	Longitude: -72.553753
Watershed: Stevens Branch			
Location: Moonlight Terrace			
Problem Type: Unmanaged impervious, erosion			
Identification Source: SWMP Assessment			
Ownership: City			
Classification: 4			

Date of Field Data Collection: November 18, 2015

Description of Observed Conditions:

The drainage ditch along the southside of Moonlight Terrace appears to receive a high sediment load. The ditch has previously been stabilized with rip rap and two check dams, but additional check dams are likely needed given the road slope.

Field Photos



Photo 1. Looking west along Moonlight Terr away from the Barre-Montpelier Rd.



Photo 2. Looking east along Moonlight Terr

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	1	2	1	Y	Y	Y	Y

Problem Area Data Sheet

Problem Area ID: NB-01		Latitude: 44.259739	Longitude: -72.576481
Watershed:	North Branch (VT DEC Subwatershed 104)		
Location:	Lots to west of Main Street		
Problem Type:	Unmanaged impervious		
Identification Source:	VTDEC Montpelier Stormwater Infrastructure Mapping Project		
Ownership:	City		
Classification:	6		



Date of Field Data Collection: September 11, 2015

Description of Observed Conditions:

Expand/improve existing islands in parking lot for storm water capture and treatment prior to discharge to the Winooski River.

Field Photos

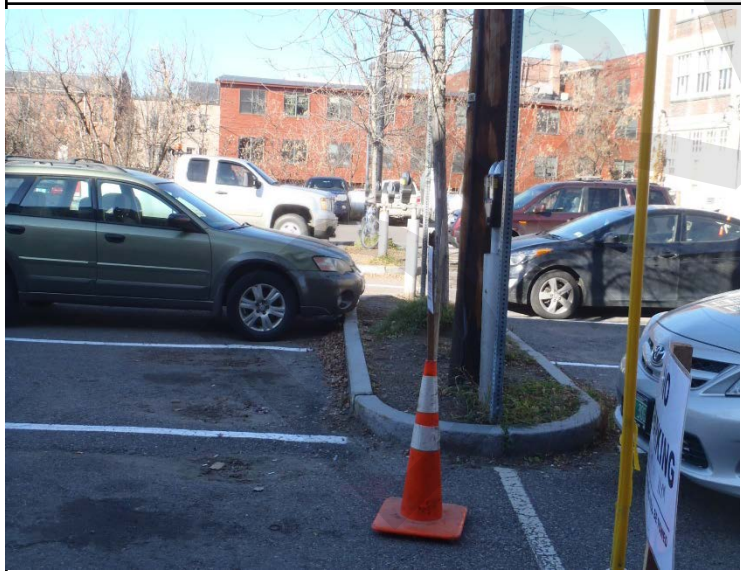


Photo 1. Islands in parking lot could be reconfigured to promote stormwater management.



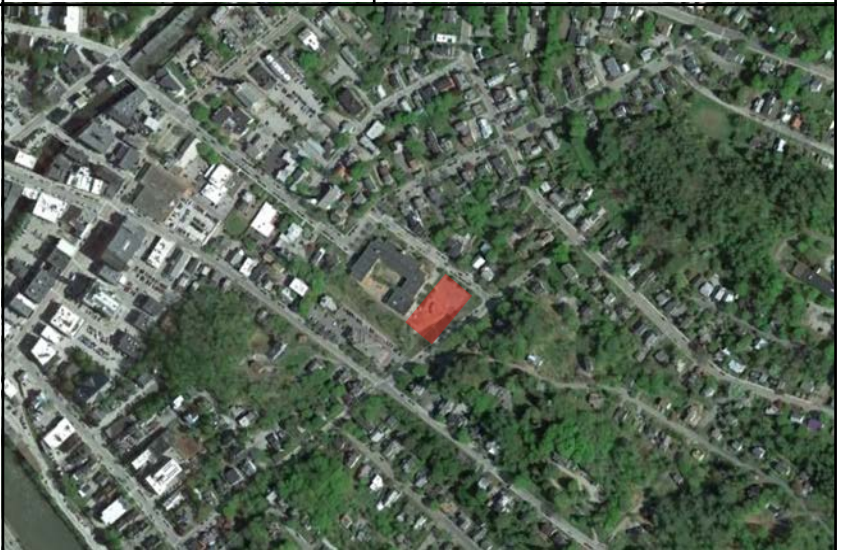
Photo 2. More islands.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-02		Latitude: 44.259273	Longitude: -72.570421
Watershed:	North Branch (VT DEC Subwatershed 109)		
Location:	Union Elementary School		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	City		
Classification:	4/6		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Due to its landscape position, Union Elementary School receives considerable run-on from south and east. There are a number of catch basins on the school property that are partially or fully located within the school's outdoor recreation areas, and thus collect a considerable amount of wood chips used to treat these areas. The school is actively fundraising to make improvements to these recreation areas, and hopes to incorporate improved stormwater management efforts into the overall renovation.

Field Photos



Photo 1. Surface of the playground area contributing to sediment buildup in the catchbasin (under picnic table).



Photo 2. View from the top of the hill toward the playground (new surface recently added)

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	3	2	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-03		Latitude: 44.2576	Longitude: -72.5655
Watershed:	North Branch (VT DEC Subwatershed 109)		
Location:	Marvin Street		
Problem Type:	Unmanaged impervious, erosion		
Identification Source:	SWMP Assessment		
Ownership:	City/Private		
Classification:	3		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Marvin Street is steep and narrow, making the construction and maintenance of appropriate roadside drainage difficult (particularly along the section between Hubbard and Bingham Streets) (Photo 1). Potential opportunity for bioretention at the corner of Marvin and Bingham (Photo 2), though this site is on private property.

Field Photos



Photo 1. Erosion on roadside requiring ditch maintenance



Photo 2. Potential bioretention location at the corner of Marvin and Bingham Streets

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-04		Latitude: 44.257005	Longitude: -72.564457
Watershed:	North Branch (VT DEC Subwatershed 109)		
Location:	College St at Marvin St		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	City		
Classification:	6		
			

Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

College Street is wide, with no curbs separating the road edge from the adjoining green space. "Green Street" retrofit could be used to capture/treat runoff and add the benefit of traffic calming.

Field Photos



Photo 1. Corner of Marvin and College. Traffic moves fast on College St.

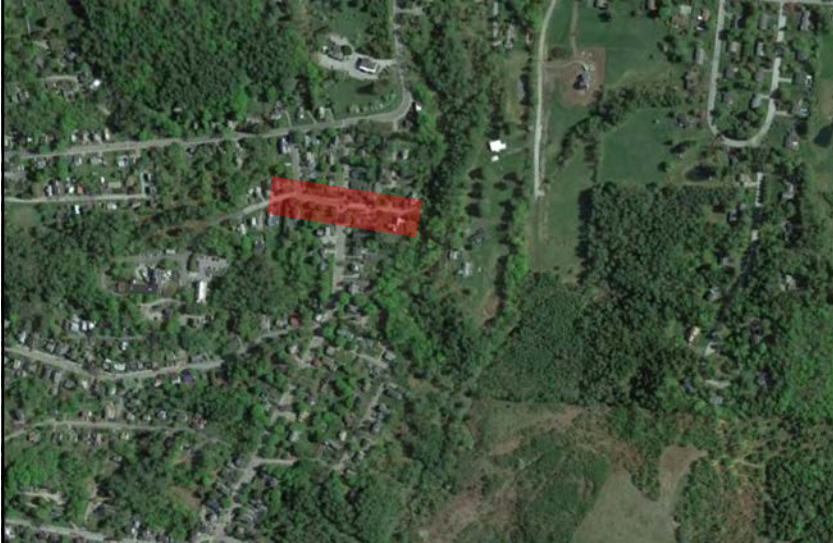


Photo 2. Facing the opposite direction as Photo 1. (Photo from Google Maps)

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-05		Latitude: 44.259627	Longitude: -72.561070
Watershed:	North Branch (VT DEC Subwatershed 109)		
Location:	College St and Woodrow Ave		
Problem Type:	Erosion, unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	Public		
Classification:	3/6		
			

Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Catch basin at the corner is full of sediment. Flat green strips on either side of College St (especially the north side, photo 1) are well-suited for a Green Streets project. Parking may need to be reorganized but no curbs need to be removed. Additionally, erosion along the north side of Woodrow Ave could be addressed as part of this project (Photo 2).

Field Photos



Photo 1. North side of College St.



Photo 2. Minor erosion along Woodrow Ave.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	1	Y	Y	Y	N

Problem Area Data Sheet

Problem Area ID: NB-06		Latitude: 44.259946	Longitude: -72.564180
Watershed:	North Branch (VT DEC Subwatershed 109)		
Location:	Heaton Woods		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	Private		
Classification:	6		
			

Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

A bioretention or other treatment could be installed on the green corner at the turn-in to Heaton Woods (Photo 1). Catch basin on Woodrow Ave could be capped and stormwater diverted into the treatment area.

Field Photos

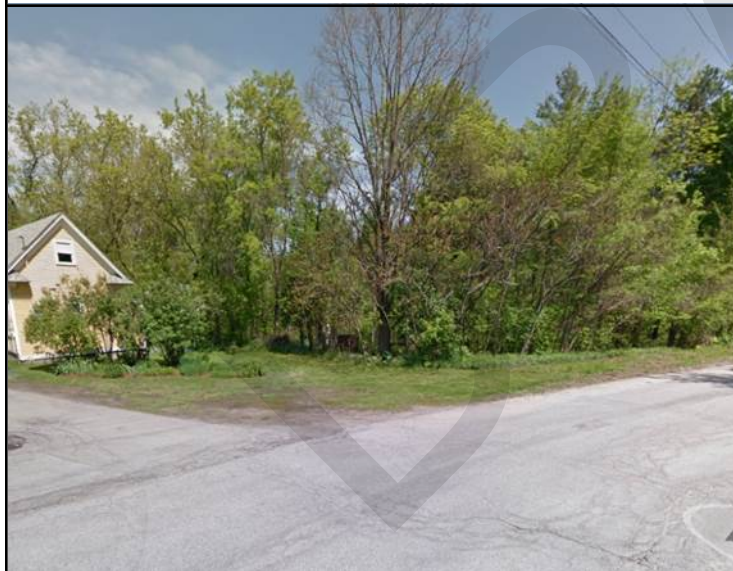


Photo 1. Location of potential bioretention area. Image from Google Maps.



Photo 2. View of the proposed rain garden location showing the catch basin to be capped

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	1	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-07		Latitude: 44.259420	Longitude: -72.564521
Watershed:	North Branch (VT DEC Subwatershed 109)		
Location:	Washington County Mental Health Services		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	Private		
Classification:	6		
			

Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

This facility contains a significant amount of unmanaged impervious surface. There is green space in front of the building along Heaton St. that could be retrofit to manage runoff from the parking lot.

Field Photos

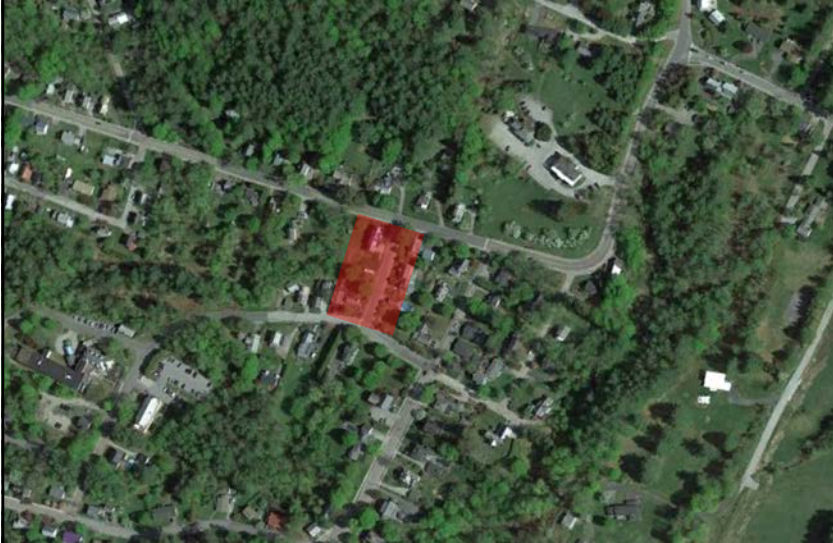


Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	1	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-08		Latitude: 44.260530	Longitude: -72.561470
Watershed:	North Branch (VT DEC Subwatershed 109)		
Location:	Emmons St		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessments		
Ownership:	City		
Classification:	6		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Limiting parking to the west-side of the street would allow for beneficial landscape positioning of a “Green Streets” application on the east side of the road. The catch basin on Main Street could be capped, and the runoff redirected to the treatment area.

Field Photos



Photo 1. Emmons St. looking south



Photo 2. Corner of Emmons St. and Main St.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	1	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-09		Latitude: 44.270448	Longitude: -72.577875
Watershed: North Branch			
Location: Hubbard Park			
Problem Type: Erosion, unmanaged impervious			
Identification Source: SWMP Assessment			
Ownership: Public			
Classification: 4			

Date of Field Data Collection: September 28, 2015

Description of Observed Conditions:

There is active erosion along many of the main roads (examples presented in Photos 1 & 2) in park. A comprehensive assessment of the road network within the park would provide an important foundation for understanding and addressing the highest priority needs within the park.

Field Photos



Photo 1. Roadside erosion in Hubbard Park



Photo 2. Roadside erosion in Hubbard Park

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	3	2	Y	N	Y	Y

Problem Area Data Sheet

Problem Area ID: NB-10		Latitude: 44.287871	Longitude: -72.574495
Watershed: _____ North Branch			
Location: _____ Gould Hill Road			
Problem Type: _____ Erosion, unmanaged impervious			
Identification Source: _____ SWMP Assessment/VTRANS			
Ownership: _____ Public/Private			
Classification: _____ 4/5			

Date of Field Data Collection: September 28, 2015

Description of Observed Conditions:

Rock-lined ditch at lat/long listed above needs improved stabilization (Photo 1). Oversteepened embanks are also causing roadside erosion is significant in places as well (Photo 2). Drainage along gravel portion of road is poor, partly due to challenging terrain. Significant gully observed below cross culvert outlet at 574 Gould Hill Rd. Boards and asphalt berms under guardrails further concentrate flows. Additionally, culvert 23055127 is classified in VOBICIT as being in "poor" condition.

Field Photos



Photo 1. Rock-lined ditch in need of improvement.

Photo 2. Erosion along the road.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
3	2	3	2	Y	Y	Y	Y

Problem Area Data Sheet

Problem Area ID: NB-11		Latitude: 44.279933	Longitude: -72.573296
Watershed: North Branch			
Location: Trillium Hill Road			
Problem Type: Erosion, unmanaged impervious			
Identification Source: SWMP Assessment			
Ownership: Private			
Classification: 2			

Date of Field Data Collection: September 28, 2015

Description of Observed Conditions:

The private road - Trillium Hill – shows evidence of water running down the road surface and poor drainage (Photo 1). In speaking with property owners, they believe the road was improperly installed originally and is cost-prohibitive to fix. Additionally, a riser could be used on the catch basin between Trillium Hill and the CCV parking lot to create storage.

Field Photos



Photo 1. Eroded road



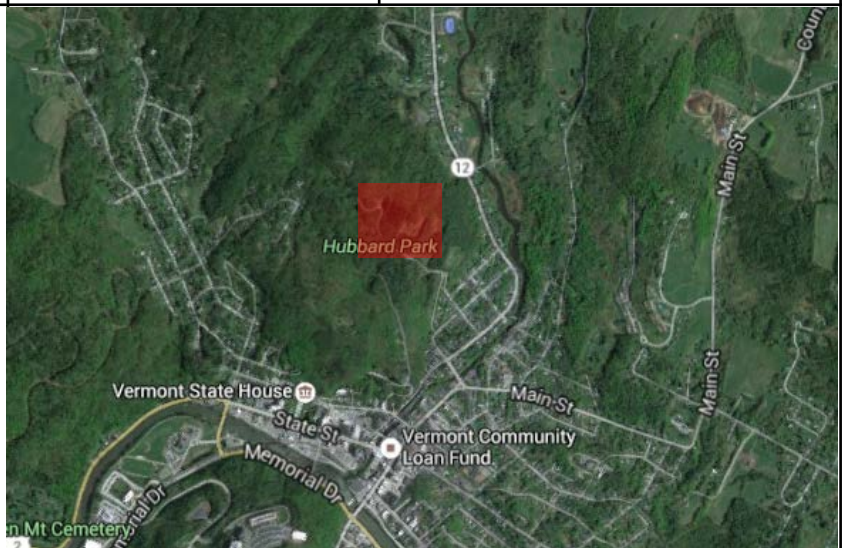
Photo 2. Catch basin that needs to be raised

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	3	2	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-12		Latitude: 44.269354	Longitude: -72.575557
Watershed:	North Branch		
Location:	Hubbard Park "Frog Pond"		
Problem Type:	Infrastructure		
Identification Source:	SWMP Assessment		
Ownership:	City		
Classification:	6		



Date of Field Data Collection: November 18, 2015

Description of Observed Conditions:

The stormwater management pond (also called the "frog pond") near the Parkway Road park entrance could be retrofit to improve stormwater management. There is a significant sediment delta that has accumulated at the pond entrance and the outlet structure is in a state of disrepair. The pond appears to provide little residence time for settling currently.

Field Photos



Photo 1. Sediment accumulation at pond inlet



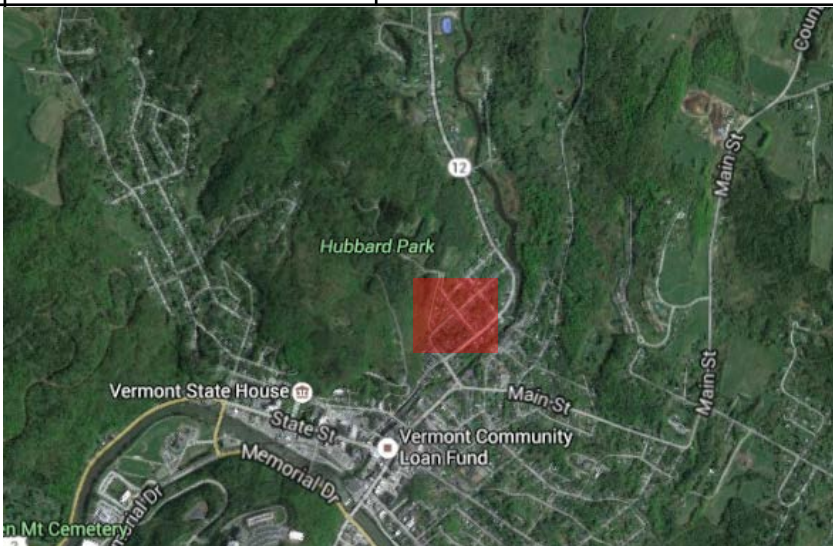
Photo 2. Existing pond outlet structure

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	3	2	Y	Y	Y	N

Problem Area Data Sheet

Problem Area ID: NB-13		Latitude: 44.265426	Longitude: -72.572485
Watershed:	North Branch		
Location:	Summer Street		
Problem Type:	Unmanaged impervious		
Identification			
Source:	SWMP Assessment		
Ownership:	City		
Classification:	6		



Date of Field Data Collection: June 16, 2016

Description of Observed Conditions:

The City previously installed a bump-out in front of a small, neighborhood park to promote better line-of-sight. The area could be recessed to also accept storm flows from Summer St.

Field Photos



Photo 1. Looking northeast along Summer St

Photo 2. Looking to the southwest along Summer St

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-14		Latitude: 44.282012	Longitude: -72.578673
Watershed: North Branch			
Location: Finch St/stump dump			
Problem Type: Erosion			
Identification Source: SWMP Assessment			
Ownership: City			
Classification: 5			

Date of Field Data Collection: March 17, 2016

Description of Observed Conditions:

The City's "stump dump" is a location where stockpiles of gravel and road sand area stored, as well as miscellaneous construction materials. In addition, residents are able bring Christmas trees and other organic yards wastes for disposal and/or reuse. Small watercourses surround the stump dump on all sides, and sideslopes between the working area and these watercourses are generally over-steepened and subject to erosion. In addition, unmanaged road runoff concentrates along road shoulders, causing erosion.

Field Photos



Photo 1. Erosion along haul road shoulder.



Photo 2. Material stockpile slumping into watercourse.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
3	3	2	2	N	Y	Y	N

Problem Area Data Sheet

Problem Area ID: NB-15		Latitude: 44.259079	Longitude: -72.571939
Watershed:	North Branch		
Location:	54 East State St		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	City		
Classification:	6		



Date of Field Data Collection: June 16, 2016

Description of Observed Conditions:

Runoff from the parking lot and building roof at 54 East State St are currently unmanaged, and the catch basins serving this site are connected to the City's combined sewer system.

Field Photos



Photo 1. Existing green space along southern boundary of 54 East State St.



Photo 2. Existing parking lot island at 54 East State St

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	2	Y	Y	Y	N

Problem Area Data Sheet

Problem Area ID: NB-16		Latitude: 44.261486	Longitude: -72.566709
Watershed:	North Branch		
Location:	Harrison Ave		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	City/private		
Classification:	6		



Date of Field Data Collection: August 10, 2016

Description of Observed Conditions:

The City has indicated that water main replacement and road paving is planned for Harrison Ave in 2018, which provides an opportunity to consider stormwater management solutions for this neighborhood. There is an existing recreation field in the south west corner of this neighborhood, surrounded by a swale that could provide an opportunity for enhanced treatment.

Field Photos



Photo 1. Harrison Ave is narrow with sidewalk immediately adjacent to the roadway.



Photo 2. Swale surrounds small recreation field south of Harrison Ave.; swale could be improved/expanded to provide treatment.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	1	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: NB-17		Latitude: 44.259752	Longitude: -72.577768
Watershed: North Branch (VT DEC Subwatershed 150/151)			
Location: Montpelier Public Parking Lot			
Problem Type: Unmanaged impervious			
Identification Source: VTDEC Montpelier Stormwater Infrastructure Mapping Project			
Ownership: City			
Classification: 6			

Date of Field Data Collection: September 11, 2015

Description of Observed Conditions:

Potential retrofit in southeast corner of lot to capture/treat runoff from parking lot prior to discharge into the Winooski. There may be opportunities to reconfigure parking in lot to the west to create bioretention islands in the lot.

Field Photos



Photo 1. Small, existing island that could be reconfigured to except stormwater runoff



Photo 2. Strip of downward-sloping green space looking toward railway bridge

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: BB-01		Latitude: 44.256666	Longitude: -72.563895
Watershed: Blanchard Brook (VT DEC Subwatersheds 109/126)			
Location: Arsenal Drive			
Problem Type: Erosion, unmanaged impervious			
Identification Source: SWMP Assessment			
Ownership: City/Private			
Classification: 3			

Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Stormwater runoff from approximately 150' immediately east of College St. is turned out over a steep hillside and through an area where lawn waste is being composted. "Green Street" retrofitting could be used to better manage road runoff.

Field Photos



Photo 1. View of Arsenal Drive toward College St. Hill slope is to the left of this photo.



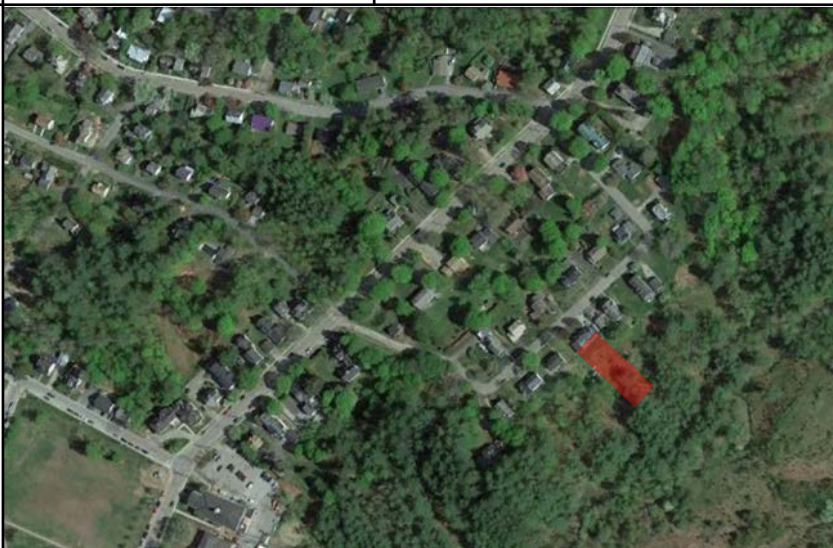
Photo 2. Runoff turnout visible; view down the slope with lawn waste containment structures

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	2	1	N	Y	N	N

Problem Area Data Sheet

Problem Area ID: BB-02		Latitude: 44.256503	Longitude: -72.561980
Watershed:	Blanchard Brook (VT DEC Subwatershed 126)		
Location:	8 McKinley St		
Problem Type:	Erosion		
Identification Source:	SWMP Assessments		
Ownership:	Private		
Classification:	5		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

City constructed a small splash pad/energy dissipation area approximately ¼ of the way down the slope in the backyard of #8 McKinley St as part of a CSO separation project. Homeowner indicated a willingness to consider improvements to the pond. Some erosion was visible below this structure.

Field Photos



Photo 1. Pool about ¼ of the way down the slope in the back yard.

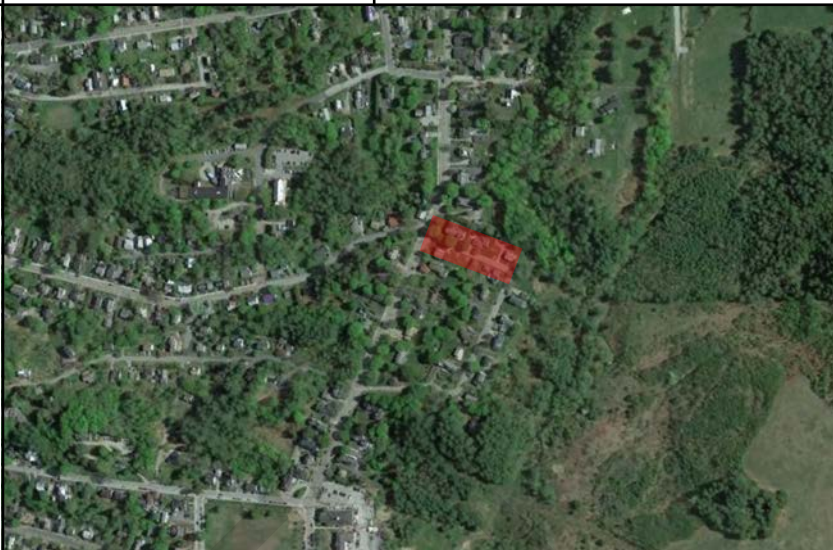


Photo 2. View down the slope from the pond.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
3	2	2	2	N	Y	Y	Y

Problem Area Data Sheet

Problem Area ID: BB-03		Latitude: 44.257311	Longitude: -72.561528
Watershed:	Blanchard Brook (VT DEC Subwatersheds 109/126)		
Location:	Hinkley Street		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	Public		
Classification:	6		
			

Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Hinkley Street is wide, with no curbs separating the road edge from the adjoining green space. "Green Street" retrofit could be used to capture/treat runoff and add the benefit of traffic calming.

Field Photos



Photo 1.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	1	2	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: BB-04		Latitude: 44.262094	Longitude: -72.558453
Watershed:	Blanchard Brook (VT DEC Subwatershed 120)		
Location:	Towne Hill Rd/Main St		
Problem Type:	Erosion, unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	Public		
Classification:	4		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Roadside drainage at the intersection of Towne Hill Rd and Main St is eroding. Drainage could be reshaped and stabilized to both reduce erosion and improve treatment.

Field Photos

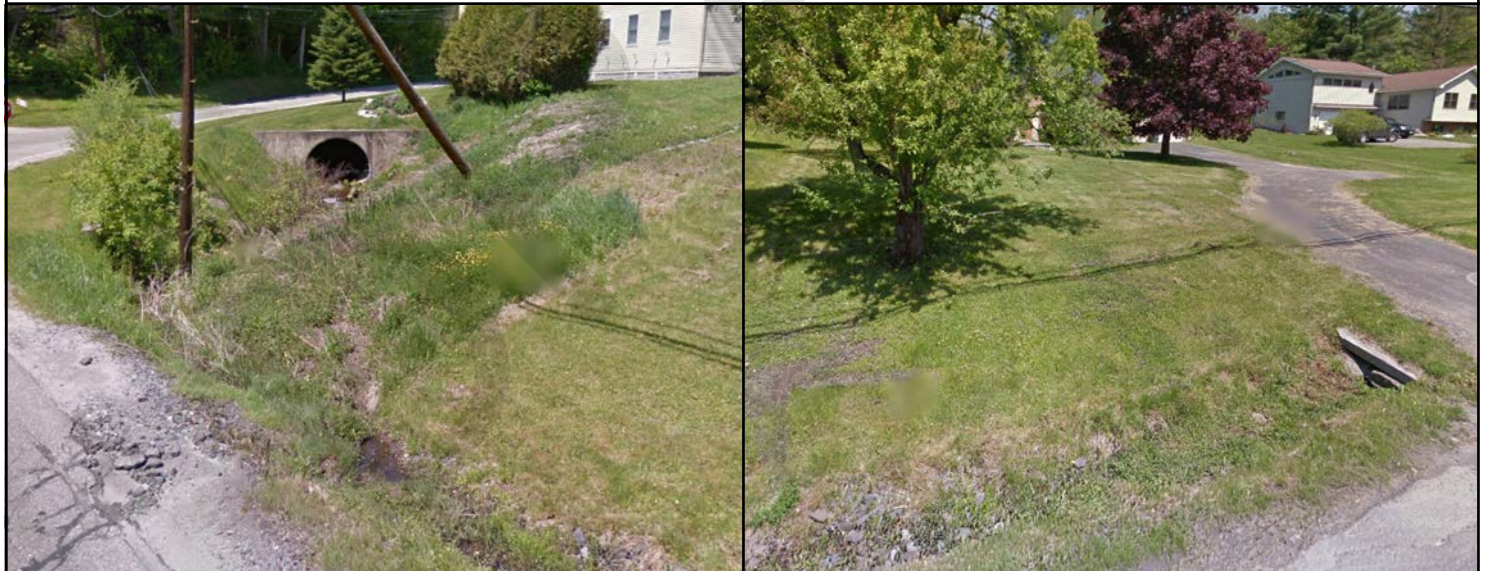


Photo 1. Ditch running into creek.

Photo 2. More permanent vegetation should be planted in this ditch.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	3	2	2	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: BB-05		Latitude: 44.261693	Longitude: -72.557134
Watershed:	Blanchard Brook (VT DEC Subwatershed 120)		
Location:	Easy Street		
Problem Type:	Erosion, unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	Private		
Classification:	4		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Significant erosion of both the road surface and in the adjacent ditch was observed (Photo 1). A storm water treatment practice at the corner of Easy St and Towne Hill Rd could be effective in slowing and treating flow. The ditch itself should also be appropriately shaped and stabilized, and the road should be crowned.

Field Photos



Photo 1. Easy Street and roadside ditch to the right.



Photo 2. Ditch in need of repair.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	3	2	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: BB-07		Latitude: 44.258303	Longitude: -72.554199
Watershed:	Blanchard Brook (VT DEC Subwatershed 131)		
Location:	Grandview Terrace, SW end		
Problem Type:	Unmanaged impervious, erosion		
Identification Source:	SWMP Assessment/VTrans		
Ownership:	City/Private		
Classification:	5		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Grandview Terrace was resurfaced during the summer of 2015. Concentrated flow along the edge of the shoulder has already started to erode the gravel and it is accumulating around the catch basins at the bottom of Grandview Terrace. The paved turnout was installed too high, making it ineffective for directing storm water. The shoulder at ~140 Grandview Terrace is in poor shape as well, and requires maintenance.

Field Photos



Photo 1. Erosion at catch basin

Photo 2. Ineffective turnout structure.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
3	2	3	3	Y	Y	N	N

Problem Area Data Sheet

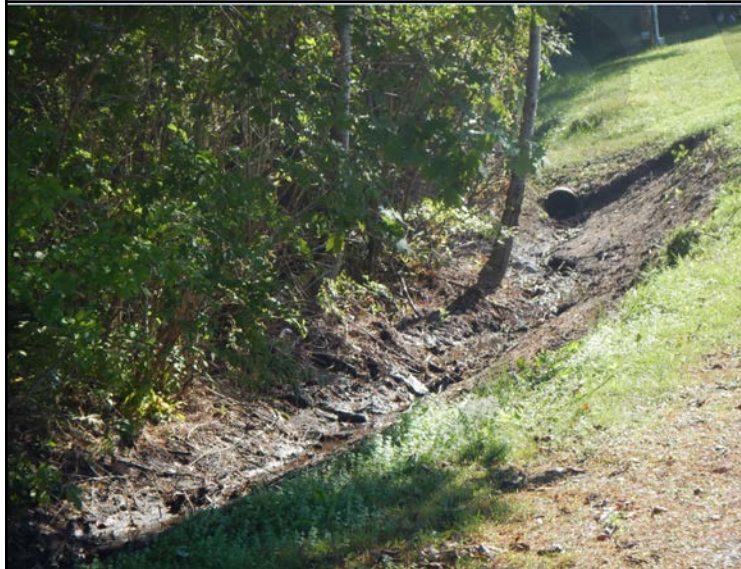
Problem Area ID: BB-08		Latitude: 44.257749	Longitude: -72.553852
Watershed:	Blanchard Brook (VT DEC Subwatershed 131)		
Location:	Spring Hollow Road		
Problem Type:	Erosion, drainage		
Identification Source:	SWMP Assessments		
Ownership:	Private		
Classification:	4		
			

Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Drainage at 28 Spring Hollow Road has recently been maintained, but was not stabilized. The V-shape and oversteepened banks of the drainage ditch will also need to be addressed.

Field Photos

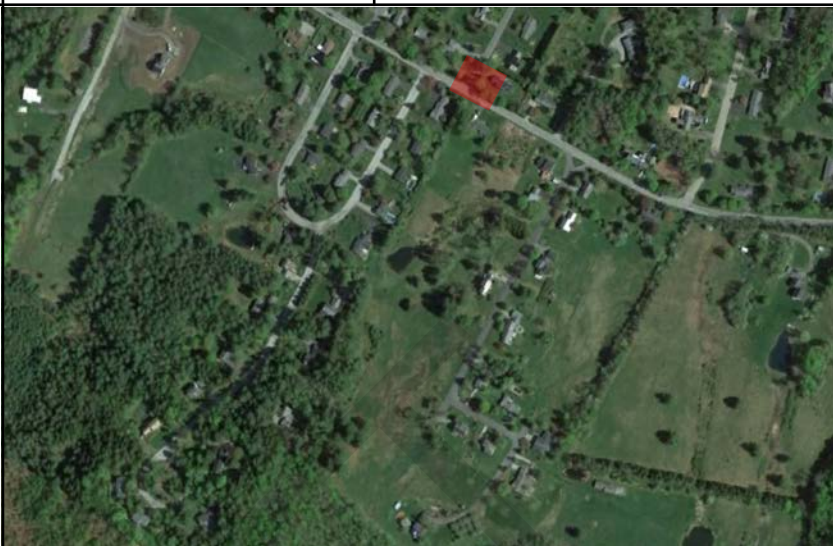


Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
2	2	3	2	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: BB-09		Latitude: 44.259568	Longitude: -72.551785
Watershed:	Blanchard Brook (VT DEC Subwatershed 127)		
Location:	Woodcrest Road		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessments		
Ownership:	City		
Classification:	2		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

"Green Street" or other retrofit within the ROW on Woodcrest Rd could be used to capture/treat runoff and add the benefit of traffic calming (Photo 1). On the opposite side of Woodcrest Rd a riser could be added to the catch basin to more effectively manage storm flows (Photo 2).

Field Photos



Photo 1. Potential rain garden site at the corner of Woodcrest and Towne Hill Rds.



Photo 2. Catch basin that needs to be fitted with a riser.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: BB-10		Latitude: 44.259040	Longitude: -72.550512
Watershed:	Blanchard Brook (VT DEC Subwatershed 127)		
Location:	438 Towne Hill Road		
Problem Type:	Erosion		
Identification			
Source:	SWMP		
Ownership:	City/Private		
Classification:	4		
			

Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

The narrow ditch on the east side of the road needs to be reshaped and stabilized. Catch basin immediately to the west also shows signs of erosion.

Field Photos



Photo 1. Narrow ditch that needs to be expanded.



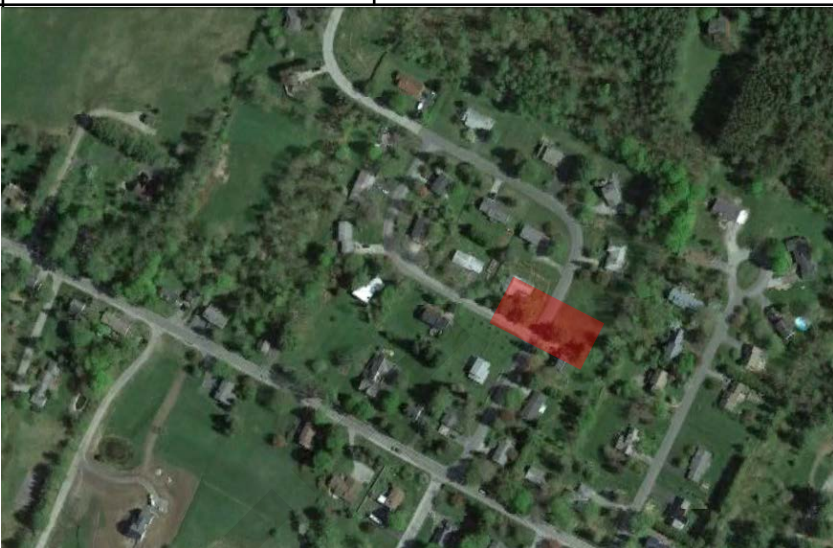
Photo 2. Erosion around catch basin.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: BB-11		Latitude: 44.260909	Longitude: -72.552409
Watershed:	Blanchard Brook (VT DEC Subwatershed 127)		
Location:	Dover Rd. at Phillips Rd.		
Problem Type:	Erosion, unmanaged impervious		
Identification Source:	SWMP Assessment		
Ownership:	City/Private		
Classification:	3		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

The catch basin at the corner of Dover and Phillips could be raised. Stormwater storage/treatment could be provided in the green space as well (Photo 1). The ditch on the property across Dover Rd. could be reshaped and stabilized to reduce erosion (Photo 2).

Field Photos



Photo 1. Catch basin and potential treatment area.



Photo 2. Narrow ditch that could be reshaped.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	2	1	Y	Y	N	N

Problem Area Data Sheet

Problem Area ID: BB-12		Latitude: 44.262527	Longitude: -72.553891
Watershed:	Blanchard Brook (VT DEC Subwatershed 127)		
Location:	Chestnut Hill Road		
Problem Type:	Erosion		
Identification Source:	VTDEC Montpelier Stormwater Infrastructure Mapping Project		
Ownership:	Private		
Classification:	3		



Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

The old concrete culvert to the east of 60 Chestnut Hill Road appears to be undersized and should eventually be replaced. For now, a splash pad beneath the outfall would help reduce localized erosion.

Field Photos



Photo 1. A splash pad at the outfall could reduce localized erosion.

Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	2	1	N	Y	Y	N

Problem Area Data Sheet

Problem Area ID: BB-13		Latitude: 44.262167	Longitude: -72.553011
Watershed:	Blanchard Brook (VT DEC Subwatersheds 127/129)		
Location:	Chestnut Hill Road		
Problem Type:	Unmanaged impervious		
Identification Source:	SWMP Assessments		
Ownership:	City		
Classification:	6		
			

Date of Field Data Collection: September 17, 2015

Description of Observed Conditions:

Stream channel is currently unraveling below the road; this channel was partially stabilized following a 2008 storm event. Removing the curb on the east side of the street below 135 Phillips Road would allow for a grassed swale to manage stormwater runoff.

Field Photos



Prioritization Ranking Factors

Relative Impact	Frequency	Current Condition	Urgency	Impact to public infrastructure?	Realistic to fix?	Impacts beyond water resources?	Part of a larger or systemic problem?
1	2	2	1	Y	Y	N	N

Appendix D. Details of Anticipated Regulatory Requirements

There are currently several state-level rulemaking and other regulatory initiatives – most stemming from the passage of Vermont’s Clean Water Act (Act 64) in June of 2015 – that have important implications for the City of Montpelier. Rulemaking is underway related to stormwater runoff from municipal roads and management of combined sewer overflows. While changes in post-construction stormwater permitting for existing properties with over 3 acres of unpermitted impervious surface are a few years away, the DEC Stormwater Program recently recommended to the Legislature that the state’s post-construction permitting threshold for new impervious cover be lowered to 0.5 acres (from the current 1 acre or more of impervious cover for new construction).

The status of and key points for each of these efforts is included below—but it is important to be aware that much of this information is evolving and may not be fully resolved for some time to come.

D.1 Municipal Roads

Act 64 created a new permit process for municipalities aimed at addressing stormwater run-off from local roadways, both paved and unpaved. Phased implementation of a new general permit for municipal roads will begin in 2018, with all municipalities signed up by 2021¹. As currently envisioned, municipalities will first be required to develop a long-term (e.g., 20-year) transportation capital plan, which will include an implementation schedule that prioritizes the most impactful projects. Outreach from VTTrans and DEC to Regional Planning Commissions and towns began in late winter of 2016, and a stakeholder process to develop the general permit and standards began in the spring of 2016.

The general permit will require:

- A management plan to oversee implementation and bring roads up to standards over a period of several years. The general permit will *not* require separate approval for every maintenance activity or upgrade.
- Implementation of practices to reduce erosion and stormwater discharges being generated from roads and drainage systems. New roads will likely continue to be permitted as they are now. All practices will be required to be consistent with the VTTrans Road and Bridge standards².

¹ <http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program>

² <http://localroads.vermont.gov/sites/localroads/files/files/resources/materials/Vermont-Town-Road-and-Bridge-Standards.pdf>

D.2 Developed Lands - Post-Construction Stormwater Management

Several reports and guidance documents have recently been released by the DEC Stormwater Program, in accordance with the overall timeline established in Act 64 and in the Lake Champlain Phosphorus TMDL Phase I Plan:

- Development of a stormwater management practices handbook for sub-jurisdictional activities was due January 1, 2016. The Green Stormwater Infrastructure Simplified Sizing Tool and guidance, developed by Stone for VLCT with funding and support from DEC, may be used by DEC to meet this deliverable (see <http://www.vlct.org/municipal-assistance-center/water-resources-assistance/>). This tool and guidance is most applicable for development and re-development projects with less than half an acre of impervious cover following project completion.
- A report on lowering the state's post-construction stormwater management permitting threshold for impervious surfaces from one acre to 1/2 acre was delivered to the Legislature on January 15, 2016. In the report, the DEC Stormwater Program recommended lowering the threshold. Although testimony related to this report was taken in the House Fish, Wildlife & Water Resources Committee, this initiative is not currently included in any session bill. If the Legislature ultimately votes to lower the jurisdictional threshold for post-construction stormwater permitting, it is likely that this permit program will capture a somewhat greater portion—though not the entirety—of development and re-development activity in the City.
- The revised Vermont Stormwater Management Manual entered the formal rule-making process in late August 2016, and the public comment period begins on September 15, 2016³.
- Not imminent, but still important: All developed properties with 3 or more acres of impervious surface will eventually require a state stormwater permit. The developed lands general permit must go into effect before January 2018, with all projects in the Lake Champlain basin under a permit and with retrofit plans in place by 2023. If a site does not have a stormwater system designed to the 2002 Vermont Stormwater Management Manual or more current standards, it will need to implement stormwater management practices.

D.3 Combined Sewer Overflows

DEC recently adopted substantial changes to Vermont's Combined Sewer Overflow (CSO) Rule for the first time since it was promulgated in 1990. The revised rule was adopted on August 28, 2016 and will become effective on September 15, 2016. The rule contains a number of significant changes, including:

- A requirement to implement the full suite of minimum control measures outlined in the federal CSO Policy. New requirements for Vermont communities include:
 - **Review and modification of pretreatment requirements**, which generally involves developing an inventory of non-domestic dischargers, assessing potential volume- and pollutant-related impacts of these facilities during wet weather events, evaluating the feasibility of modifying pretreatment program requirements for these dischargers, and then implementing requirements as necessary.
 - **Control of solids and floatable materials**, which is typically accomplished by implementing one or more of the following activities: preventing extraneous solids and floatables from entering the sewer system via street sweeping; discouraging households from flushing personal hygiene

³ http://dec.vermont.gov/watershed/stormwater/manual_update

-
- products; using physical controls (e.g., catch basin hoods, baffles, end-of-pipe netting systems) to keep floatables in the sewer system or capture them before discharge.
- **Establishment of a pollution prevention program**, which may include activities such as hazardous waste collection, bulk refuse disposal, product bans or substitutions to reduce problematic packaging waste (e.g., plastic shopping bags), and water conservation.
 - **Public notification activities**, such as: posting informational signs near CSO outfalls, posting affected use areas (e.g., swimming holes), and maintaining a website to keep the public apprised of problems and changing conditions. Vermont's draft CSO policy goes further than the federal policy by proposing to require event reporting to ANR and the local health officer within four hours from the detection of a discharge.
 - A requirement for Vermont communities to develop a long-term control plan (LTCP), as opposed to relying on engineering studies. The federal CSO Policy lists minimum elements that should be addressed, as appropriate, in the development of an LTCP. These are:
 - Undertaking system characterization, monitoring, and modeling activities to support the selection and implementation of cost-effective CSO controls;
 - Coordination and communication with the public and regulatory agencies for the purpose of discussing proposed controls. Vermont's draft policy requires a public participation process involving the affected public, including persons who reside downstream from the CSO outfalls and persons who use and enjoy downstream waters;
 - Give priority to controlling CSOs that discharge to sensitive areas, such as waters with primary contact recreation, public drinking water intakes, or waters with threatened or endangered species;
 - Evaluate and consider a reasonable range of control alternatives. Vermont's draft policy specifically encourages municipalities to evaluate and implement green stormwater infrastructure approaches to the greatest extent possible;
 - Develop cost/performance curves to compare control alternatives in relation to performance, cost, and environmental benefit in choosing the most appropriate solution;
 - Develop an operational plan that provides a framework for the coordinated operation of the combined sewer system in a manner that reduces overflows and provides maximum levels of treatment to wet weather flows;
 - Develop an implementation schedule, based on a combination of financial, environmental, and other site-specific factors; and,
 - Conduct post-construction compliance monitoring to aid in determining the effectiveness of the controls.
 - Prohibition of the connection of new sources of stormwater or wastewater to any combined sewer system if such connection would result in a net increase of stormwater or wastewater to the combined sewer.

-
- A requirement to establish and maintain a network (emphasis added) of precipitation recording stations.
 - Updating the design storm recommended as the basis for design from a 24-hour, 2.5 inch storm and a peak flow derived from a precipitation event of greater than 1.07 inches in one hour, to location-specific 24-hour and 1-hour design storms with a 5-year recurrence interval. For Montpelier, this would increase the 24-hour storm depth to 2.8 inches, and the 1-hour storm depth to 1.2 inches.

D.4 Water Quality Criteria for Chlorides

In 2014, Vermont promulgated water quality criteria for chlorides. Elevated chloride concentrations have been shown to have adverse impacts on aquatic biota. These effects are often most strongly felt in small streams in more densely developed areas or in close proximity to transportation corridors, where excess chloride from de-icing salts used on road surfaces and parking lots can have a demonstrable impact. Studies in New Hampshire have shown that as much as half of in-stream chloride loads can be traced to private roadways and parking lots.

The volume of the Winooski River as it passes through the City is such that chloride use in Montpelier is unlikely to cause a contravention of the chloride water quality standard in that water body. In smaller streams, such as the Stevens Branch or Blanchard Brook, chloride use could have a measurable impact. It is important to be aware of potential chloride concerns because in other cold weather states, including New Hampshire and Minnesota, Total Maximum Daily Load (TMDL) plans have been required to clean up water bodies that have deemed by the state to be chloride-impaired. Further, managing chloride in stormwater runoff is different and more challenging than managing other common stormwater pollutants such as sediment and phosphorus. Chloride is highly soluble and is conservative, meaning that once it is mixed into stormwater it generally cannot be removed using typical stormwater best management practices, such as swales, basins, or ponds.

D.5 Integrated Water Quality Planning

Integrated water quality planning is a voluntary option that EPA has made available nationally for regulated municipalities, which allows communities with numerous Clean Water Act (CWA) obligations to:

- Examine all of these obligations as a whole;
- Identify the community's relative priorities for addressing human health and water quality improvements (and what tools will be used preferentially, such as green infrastructure); and then
- Address these priorities through appropriate sequencing and scheduling of work based on implementing projects with the highest cost benefit (including non-water quality benefits) first.

The goal of integrated planning is to examine and evaluate, at a high level, the multitude of strategies that exist for achieving established watershed management goals. Integrated planning may be important for the City because the Lake Champlain Phosphorus TMDL is anticipated to require significant investments in municipal wastewater treatment facilities throughout the Champlain basin, and the Montpelier Water Resources Recovery Facility will be no exception. Resources invested in the wastewater treatment facility will, by definition, not be available for other water quality initiatives. Integrated water quality planning provides a framework for considering local priorities in achieving the human health and water quality objectives of the CWA that might, for example, delay investment in the WRRF in order to prioritize implementation of stormwater controls.

The integrated water quality planning process also allows permittees to undertake a financial capability analysis, which can be used to evaluate sustainable spending levels for the cumulative investment needed to meet all CWA obligations. The financial capability analysis can then feed into discussions and permitting timelines that may allow for longer compliance schedules than those typically dictated in State permits.

The City of Burlington is currently pursuing an integrated water quality planning initiative; it may be instructive for Montpelier to track this effort and consider whether a similar approach may be applicable to the City.

DRAFT

Appendix E. Concept Designs for Priority Stormwater Problem Areas

DRAFT



July 5, 2016

To: Mike Miller
Tom McArdle

From: Julie Moore, P.E.

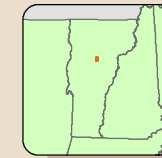
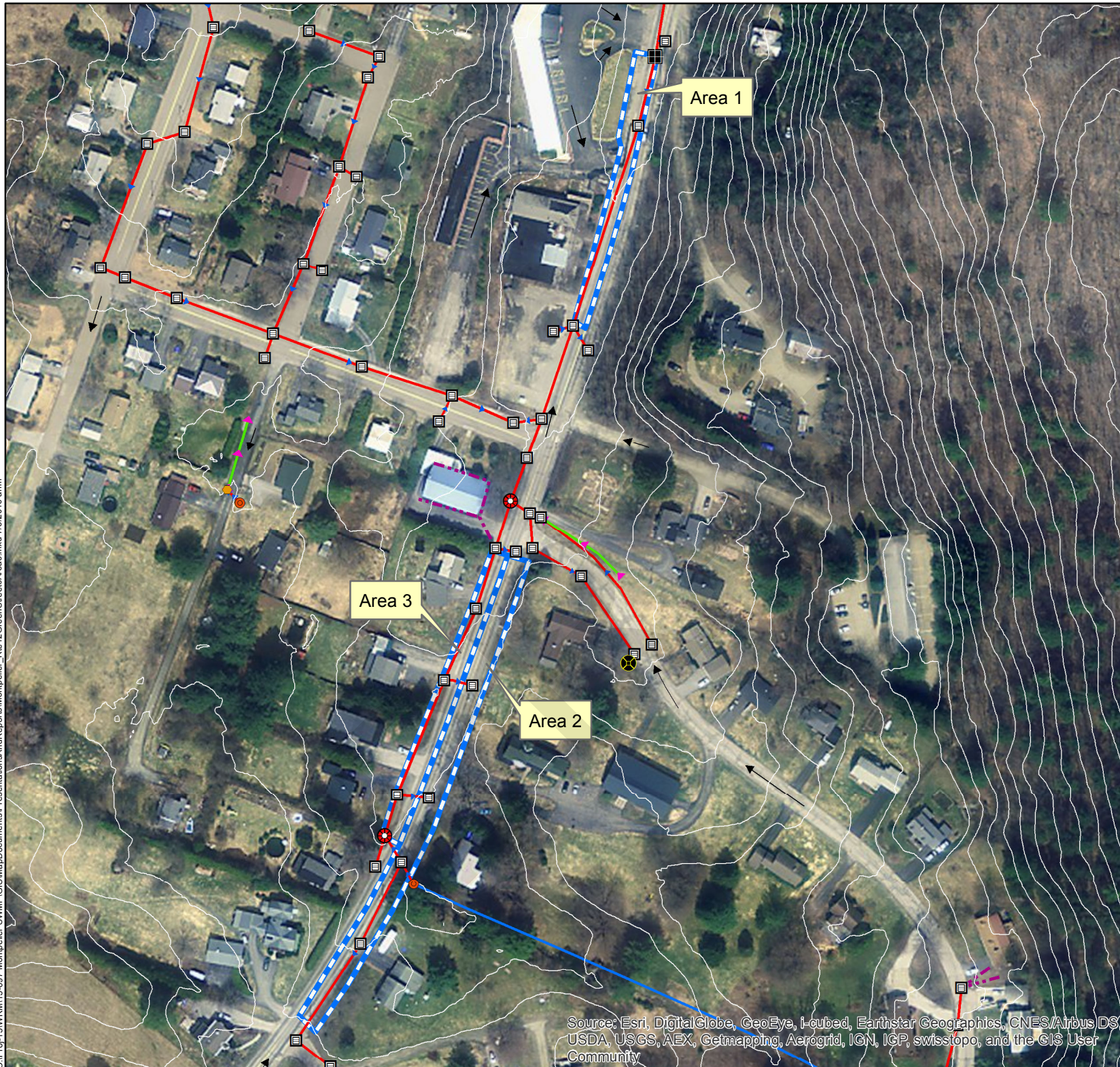
MEMO

Stone Project No. 15-097

Subject: Montpelier Stormwater Master Planning – Vermont Route 12 South, Green Streets opportunities

On June 21, 2016, Stone completed a field screening that identified three stormwater management opportunities associated with the upcoming full-depth reconstruction of Vermont Route 12 between the Memorial Drive intersection and Freedom Drive. Stone recorded observations about each area, including current conditions and areas for improvement, with particular attention to green stormwater infrastructure retrofits that could be opportunistically completed in coordination with the full-depth reconstruction work. The three primary areas of interest are highlighted on the attached map and further described on the following pages. This memo makes direct reference to previously-submitted design concepts developed by GPI for other areas in the City that would also have application in the Route 12 corridor.

Q:\Proj-15\WRM15-097 Montpelier SWMP\GIS\MapDocuments\Ppresentations\Reports\Montpelier_Rte12GreenStreetsAreas.mxd 7/5/2016 ann



0 80 160 Feet

- LiDAR Contours (2 ft. elevation)
- Drainage Area
- River or Stream

Sources: Stormwater Infrastructure: DEC and City of Montpelier; LiDAR, Roads: VCGI; Streams and Waterbodies: NHD Plus 2.

Note: Streamlines on this map were delineated by DEC using a 10-meter DEM (20-foot contour interval), and have not been corrected to the LiDAR-generated topographic contours.

STONE ENVIRONMENTAL INC.

VT Rte. 12
Green Streets
Opportunities

City of Montpelier
Stormwater Master Plan

Map # 1

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

1. Area 1: Econolodge Stormwater Swale

The western side of Northfield St. near the Econolodge, from roughly in front of the abandoned restaurant building to the catchbasin at the main entrance to the motel, currently drains to the catch-basin at the northeast corner of a curbed lawn island in front of the new motel building. The curbed lawn area appears to end at the City's right-of-way, which is entirely paved between the lawn and VT Route 12. This paved area could instead be made into a stormwater swale (similar to the College Street Stormwater Swale concept), with an underdrain tying back into the storm drainage system at the northern end of the facility. The success of this concept depends largely on potential conflicts with other underground infrastructure, particularly the water system.



Area 1, potential stormwater swale treatment area, looking south (left) and north (right).

2. Area 2: Stormwater Swales, Colonial Drive Loop

Along the eastern side of Northfield Street, between the northern and southern intersections with Colonial Drive, is a substantial opportunity to retrofit the existing three-foot-wide green strip between the pavement edge and the sidewalk into a stormwater swale. This concept would also be similar to the College Street Stormwater Swale concept, but with a narrower width to fit within the existing green strip (more like Stormwater Planters concept from the Heney-Jacobs Parking Lot opportunity sheet). The roadway in this area is not curbed, and catch basins on this side of the road already tie to the stormline on the west side, so underdrains in the retrofit stormwater swales could be tied back into the existing closed drainage system without disturbing the existing infrastructure.



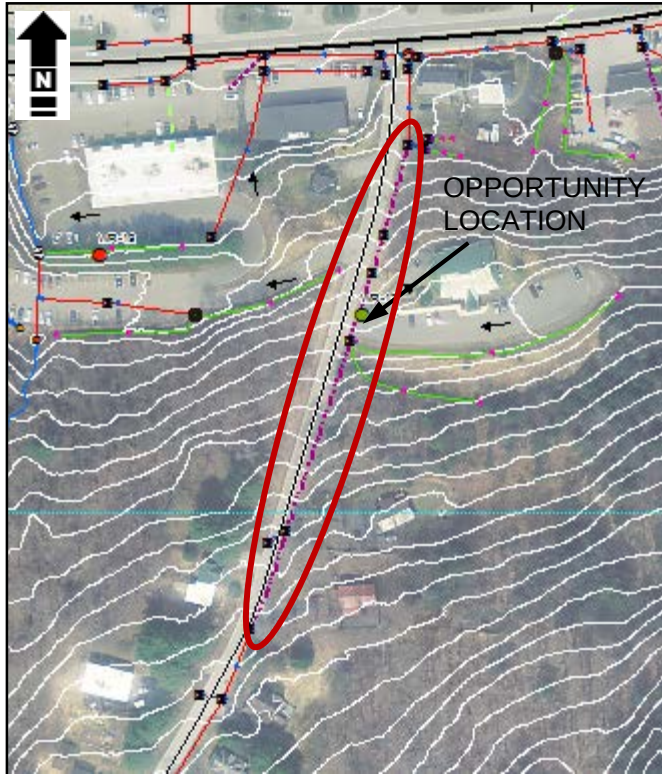
Area 2, potential stormwater swale treatment area, looking south (left) and north (right).

3. Area 3, Stormwater Swales, Derby Drive South

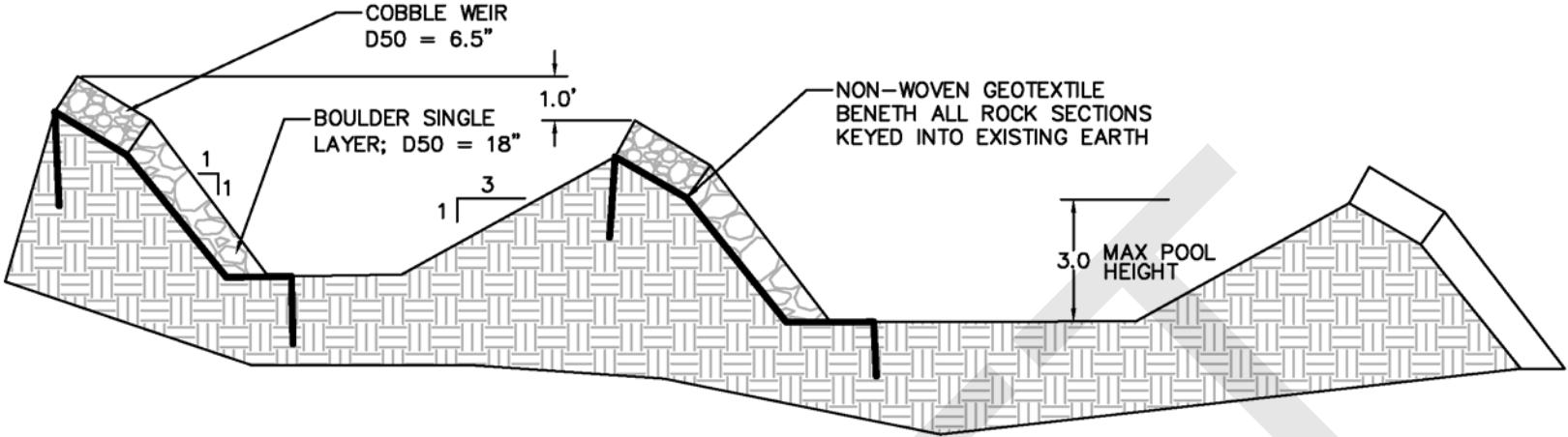
Along the west side of Northfield Street across from Area 2, there is an opportunity to retrofit existing grass swales into stormwater swales, particularly in front of the four houses south of the Lutheran Church. This concept would also be similar to the College Street Stormwater Swale concept, but modified as necessary to fit within the existing right-of-way. Based on parcel mapping, the right-of-way appears to be very constrained on this side of the road as compared to Area 2, and so this opportunity may require negotiation with the abutting landowners beyond what would be reasonable within the anticipated timeline for the roadway reconstruction project. At minimum, however, care should be taken to maintain sheetflow from the roadway into the grass swales, to minimize short-circuiting of runoff flowing down the road shoulder and directly to catch-basins rather than traveling into the grass swales.



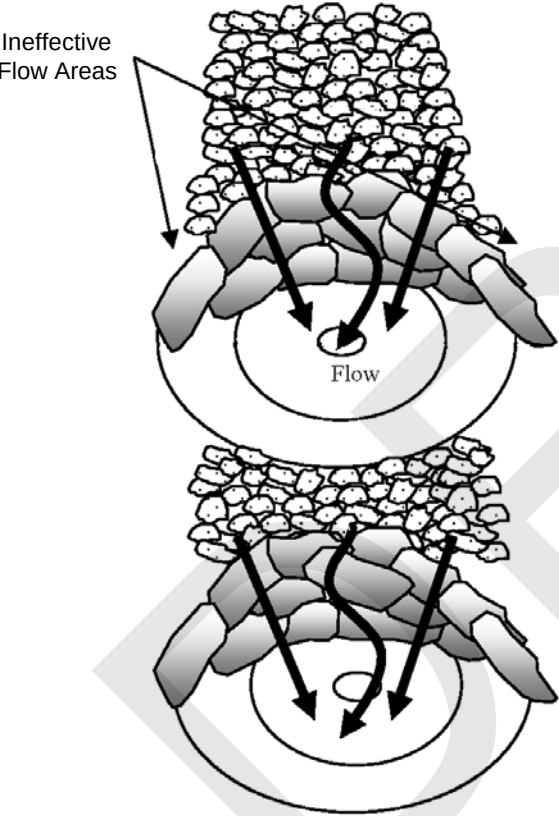
Area 3, potential stormwater swale treatment area, looking south.



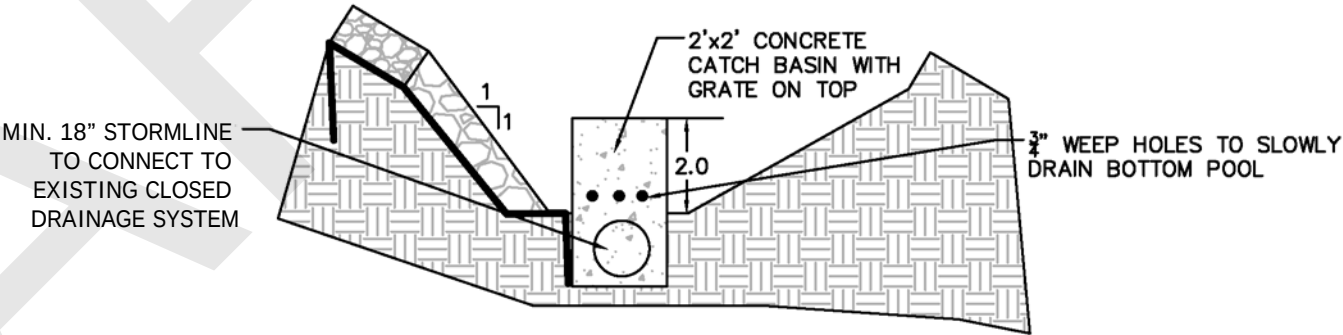
STEP POOL CONVEYANCE, CROSS-SECTION (TYPICAL)



RIFFLE-POOL SEQUENCE FOR STEP POOL CONVEYANCE, PLAN VIEW (TYPICAL)



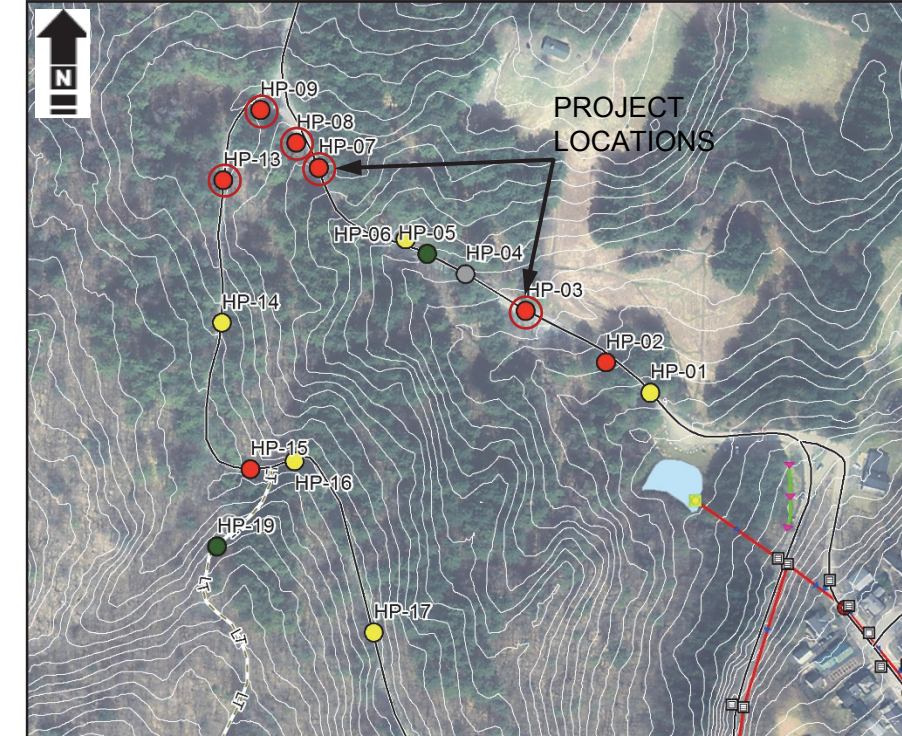
STEP POOL INLET RETURNING TO CLOSED DRAINAGE SYSTEM, CROSS SECTION (TYPICAL)



Step-Pool Conveyance Design Guidance

- AREAS OF THE EXISTING SWALE WHERE SLOPE IS >10% ARE RECOMMENDED FOR RETROFIT AS STEP-POOL CONVEYANCE
- A STEP POOL CONVEYANCE USES A SERIES OF SHALLOW POOLS AND RIFFLE OR CASCADE GRADE CONTROLS TO CONVEY STORM FLOW. IT CAN BE USED IN PLACES WEHRE STEEP SLOPES MAKE TRADITIONAL STORMWATER CONVEYANCES DIFFICULT TO IMPLEMENT AND MAINTAIN, ESPECIALLY DURING HIGH-INTENSITY STORMS.
- CONSTRUCTED DEPTH OF TYPICAL POOLS SHOULD NOT BE LESS THAN 18" AND SHOULD NOT EXCEED 3'.
- POOLS SHOULD BE CONSTRUCTED WITH A MINIMUM SIDE SLOPE OF 3:1 H:V TO ENSURE STABILITY.
- STEP POOLS SHOULD BE PARABOLIC IN SHAPE.
- NON-WOVEN GEOTEXTILE MAY BE PLACED BETWEEN COBBLE/ROCK SECTIONS AND EXISTING EARTH AND KEYED INTO BANK AS SHOWN. TO PREVENT UNDERCUTTING, A CONTINUOUS SHEET OF FILTER FABRIC SHOULD BE USED ALONG THE CROSS-SECTION.
- ROCK 'COBBLE WEIR' AT POOL SPILLOVER TO BE 1' THICK. ROCK SIZE IS D50 = 6". ROCK 'BOULDER LAYER' IN STEP POOL TO BE SINGLE LAYER THICK. ROCK SIZE IS D50 = 18".
- LINING THE BOTTOMS OF THE STEP POOLS WITH RECYCLED GRANITE CURBING IS RECOMMENDED TO FACILITATE CLEANOUT, ESPECIALLY WITHIN THE FIRST POOL IN A SERIES.
- IF POSSIBLE, IMPROVEMENTS TO THIS SWALE SHOULD ENCOMPASS INSTALLATION OF A NEW CATCHBASIN AND STONE LINING OF WESTERN 10 FT. OF DITCH AT THE ENTRANCE TO VERMONT NEA (PHOTO AT LEFT).
- AREAS OF THE EXISTING SWALE WHERE SLOPE IS 5-10%, IF ANY, MAY BE CONSTRUCTED AS STONE-LINED SWALES, FOLLOWING BETTER ROADS GUIDANCE AS PRESENTED IN CONCEPT DESIGN SHEET #E-3.

Plan view image source: http://www.dep.wv.gov/WWE/Programs/stormwater/MS4/Documents/Specification_4.2.7_Regenerative_Stormwater_Conveyance_WV-SW-Manual-11-2012.pdf



Construction Guidance:

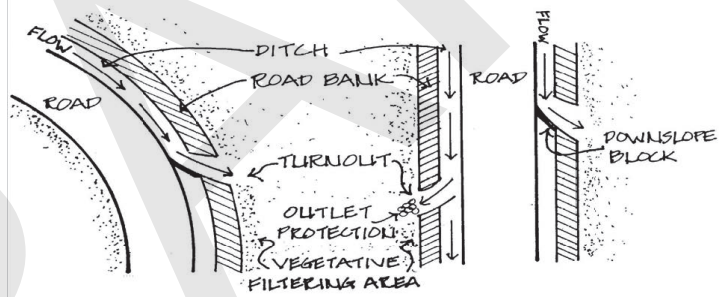
- PLUNGE POOL / SEDIMENT BASIN CAPACITY, BETTER BACKROADS GUIDANCE:
 - <200 FT BETWEEN CROSS CULVERTS = 100-200 CF BASIN VOLUME
 - RECOMMEND MAXING OUT VOLUME FOR THE AVAILABLE SPACE WHERE FEASIBLE
 - MINIMUM 6" RIPRAP DEPTH AS ARMORING AT BASIN INLETS AND AT OVERFLOW/OUTLET POINTS
 - LANDSCAPE SETTING POTENTIALLY ALLOWS FOR LARGER BASINS AT CULVERT OUTLETS AT HP-03, HP-08 AND HP-09. LARGER BASIN NOT NECESSARY AT HP-13.
- CONSTRUCT PLUNGE POOLS / SEDIMENT BASINS TO MINIMUM DIMENSIONS AS FOLLOWS:
 - HP-03: EXCAVATE AND CONSTRUCT BASIN AT OUTLET OF EXISTING CULVERT. MINIMUM DIMENSIONS: 28" DEEP, 56" WIDE, 112" LONG; ADJUST AS NECESSARY OR DESIRED TO FIT AVAILABLE SPACE AND EXISTING SLOPE. PLACE RIPRAP AT OUTFALL AND DOWNSLOPE OVERFLOW POINT. USE BASIN AT HP-04 AS MODEL.
 - HP-07: CREATE TURNOUT APPROXIMATELY HALFWAY BETWEEN TOP OF DITCH/SLOPE AND OUTLET TO STREAM. EXCAVATE AND CONSTRUCT BASIN AT TURNOUT, MINIMUM DIMENSIONS AND RIPRAP PLACEMENT AS FOR HP-03. SEE SHEET 2 FOR ROCK APRON DETAIL AT TURNOUT.
 - HP-08: CLEAN OUT AND DEEPEN/RE-SHAPE EXISTING SEDIEMNTATION BASIN, USING HP-03 DIMENSIONS AS GUIDE. INSTALL RIPRAP AT OVERFLOW POINT. SEE SHEET 2 FOR ENDWALL AND STONE-LINED DITCH DETAILS.
 - HP-09: EXCAVATE AND CONSTRUCT BASIN AT OUTLET OF EXISTING CULVERT. MINIMUM DIMENSIONS AS FOR HP-03. PLACE RIPRAP AT OUTFALL AND DOWNSLOPE OVERFLOW POINT.
 - HP-13: LOCATE AND CLEAN OUT DOWN-SLOPE END OF CULVERT. INSTALL HEADWALL AND CONSTRUCT PLUNGE POOL AT DOWN-SLOPE END OF CULVERT. MINIMUM DIMENSIONS: 18" DEEP, 36" WIDE, 72" LONG. SEE SHEET 2 FOR CULVERT ENDWALL DETAILS.

Materials Estimate: Plunge Pools/Sedimentation Basins (per basin)

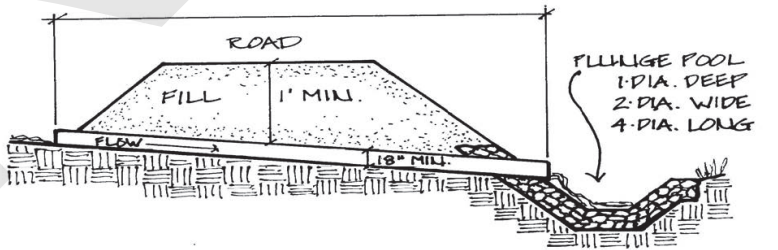
Item	Quantity	Unit
Excavation	4	CY
#4 riprap, placed	1	CY



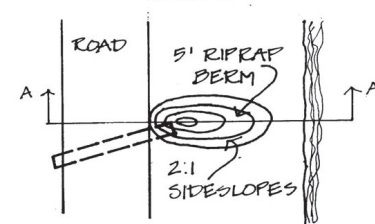
DITCH TURNOUT, TYPICAL



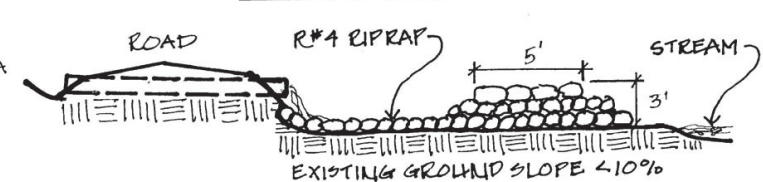
CULVERT AND PLUNGE POOL CROSS SECTION, TYPICAL
PIPE LENGTH = ROAD + SHOULDERS + 4 x COVER + PIPE DIA.)



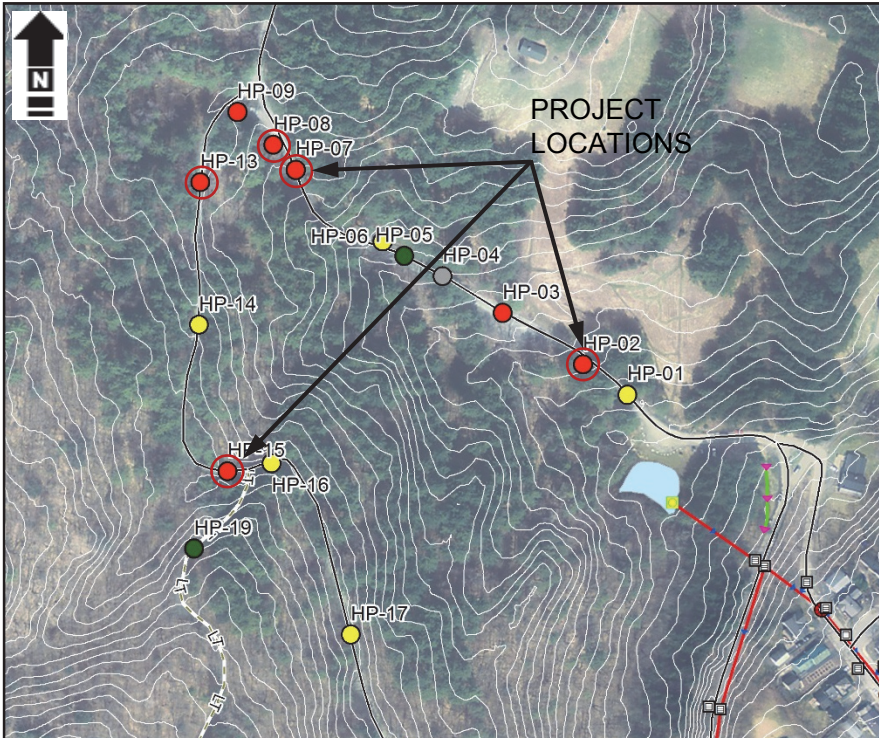
SPLASH/PLUNGE POOL, TYPICAL
PLAN



SECTION A-A



Schematics from the Better Backroads Manual, 2009. http://vttransengineering.vermont.gov/sites/aot_program_development/files/2009%20Better%20Backroads%20Manual.pdf



Construction Guidance:

- HP-02: CLEAN OUT AND DEEPEN TURNOUTS PER TYPICAL DETAIL.
- HP-07: INSTALL ROCK APRON ON SLOPE BETWEEN DITCH TURNOUT AND STREAM. ROCK APRON DIMENSIONS: 18" DEEP, 4.5' WIDE AT TOP OF APRON, 14.5' WIDE AT BOTTOM OF APRON, 10' LONG. ADJUST LENGTH AS NECESSARY IF DISTANCE BETWEEN DITCH TURNOUT AND STREAM IS LESS THAN 10 FEET.
- HP-08: REPAIR CULVERT ENDWALL PER HEADER TYPICAL DETAIL. RESHAPE AND STONE LINE DITCH ON UPSLOPE SIDE OF CULVERT. STONE LINED DITCH VOLUMES:
 - EXCAVATION: 3' DEEP, 2' BOTTOM WIDTH, 2:1 SIDES.
 - ASSUME AGGREGATE VOLUME AT MIN MUST BE EXCAVATED, SO:
 - 21 CF PER LF X 50 LF = 1050 CF = 39 CY
 - STONE LINED DITCH MATERIAL:
 - EROSION CONTROL STONE
 - 1 FT DEPTH X 14 FT WIDTH =14 CF/LF X 50 LF = 700 CF = 26 CY
- HP-13: LOCATE AND CLEAN OUT DOWN-SLOPE END OF CULVERT. REPAIR CULVERT ENDWALL (OR INSTALL ENDWALL) PER TYPICAL DETAIL. SEE SHEET 1 FOR PLUNGE POOL DESIGN DETAILS.
- HP-15: REPAIR CULVERT ENDWALL PER TYPICAL DETAIL. INSTALL ROCK APRON AT DOWN-SLOPE END OF CULVERT, USING DIMENSIONS FROM HP-07.

Materials Estimates:

Item	Quantity	Unit
Rock Apron (HP-07 and HP-15, per outlet)		
#4 riprap, placed	5	CY
Stone-Lined Ditch (HP-08)		
Excavation	39	CY
#4 riprap, placed	26	CY



HP-02: Existing turnout



HP-07: Existing outlet to stream



HP-08: Existing endwall

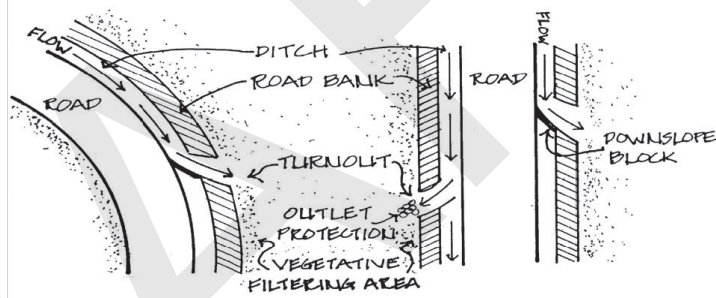


HP-13: Existing culvert outlet

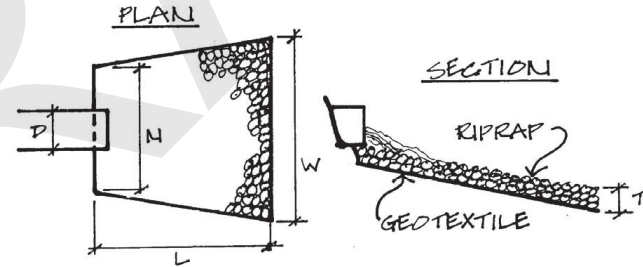


HP-15: Existing culvert outlet

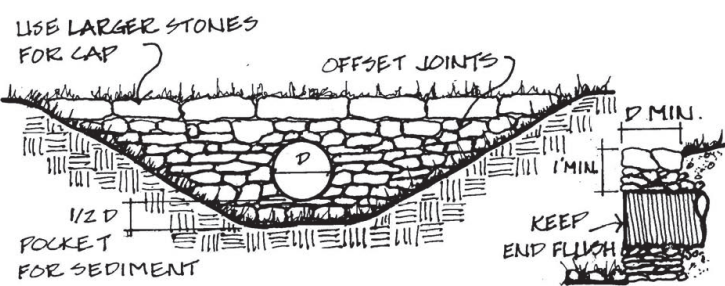
DITCH TURNOUT, TYPICAL



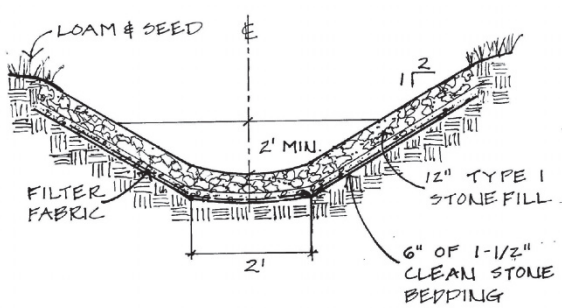
ROCK APRON PLAN AND CROSS SECTION, TYPICAL



CULVERT HEADER, TYPICAL



STONE LINED DITCH, TYPICAL



Schematics from the Better Backroads Manual, 2009. http://vtransengineering.vermont.gov/sites/aot_program_development/files/2009%20Better%20Backroads%20Manual.pdf



STONE ENVIRONMENTAL

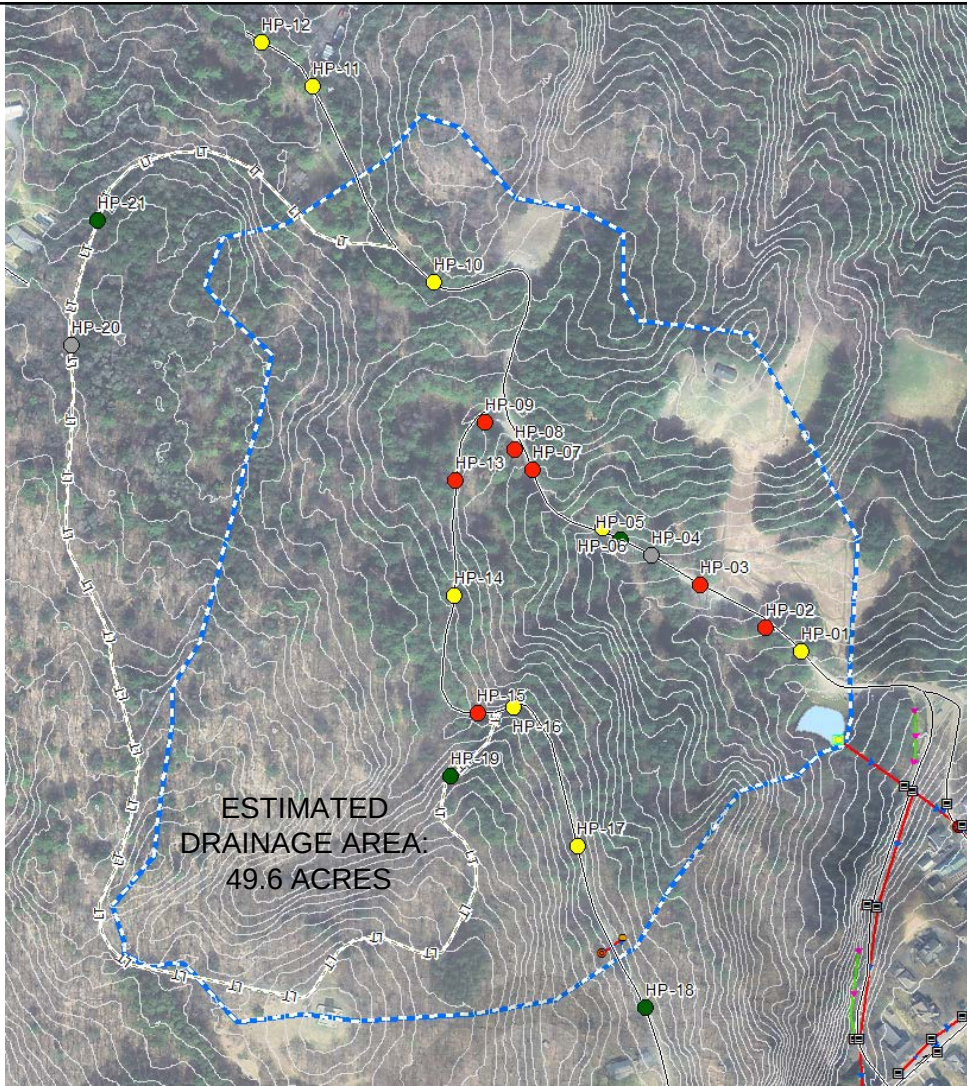
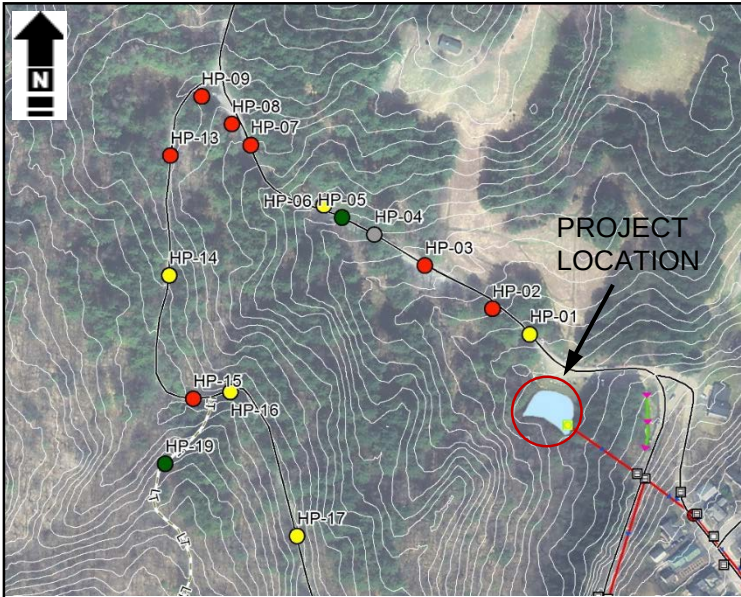
535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / Info@stone-env.com / www.stone-env.com

Montpelier Stormwater Master Plan

**Hubbard Park:
Turnouts, Stone-Lined Ditches, Culvert Headers,
and Stabilized Outfalls**

DESIGNED BY: ANM DATE: 6/22/2016
DRAWN BY: ANM DATE: 7/1/2016
CHECKED BY: JSM DATE: 7/5/2016

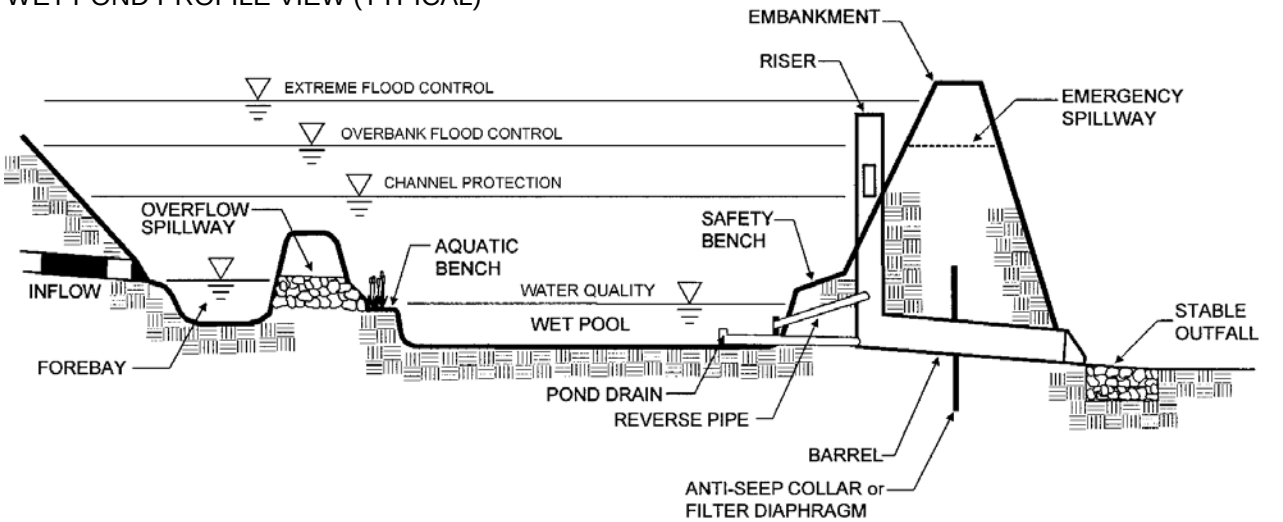
SHEET:
E-3
PROJECT NO.:
15-097



Design Guidance:

- IMPROVEMENTS AT THE POND SHOULD BE IMPLEMENTED AFTER THE HIGH PRIORITY AREAS OF EROSION ALONG PARKWAY STREET AND CORSE STREET/TOWER LOOP ARE STABILIZED (SEE FIGURES E-2 AND E-3) .
- IMPROVEMENTS IN CERTAIN UPSTREAM AREAS THAT REQUIRE ADDITIONAL ENGINEERING DESIGN , ESPECIALLY POSSIBLE STEP POOL CONVEYANCE AT HP-05, MAY BE CONSTRUCTED AT THE SAME TIME AS IMPROVEMENTS TO THE POND.
- DESIGN IMPROVEMENTS TO THE EXISTING POND RECOMMENDED AS FOLLOWS:
 - EXCAVATE SEDIMENT ACCUMULATION TO RESTORE POND GEOMETRY. CONSIDER EXTENDING POND FOOTPRINT SLIGHTLY TO THE NORTHWEST/INLET END TO INCREASE AVAILABLE AREA FOR SEDIMENT STORAGE.
 - ESTIMATED WATER QUALITY VOLUME (WQV) FOR THE AREA DRAINING TO THE POND IS 0.24 ACRE-FEET (78,200 GALLONS, 10,450 CU. FT.).
 - CURRENT POND SURFACE AREA IS ~5,900 SQ. FT.
 - CONSTRUCT SEDIMENT FOREBAY AT EXISTING POND INLET. THE FOREBAY SHOULD BE SIZED TO CONTAIN AT LEAST 10% OF THE WQV (OR ~1,000 CU. FT.). THE FOREBAY OUTLET SHOULD BE DESIGNED WITH NON-EROSIVE CONDITIONS AND PLACED TO MAXIMIZE THE FLOW PATH OF WATER THROUGH THE FOREBAY.
 - LINING THE BOTTOM OF THE FOREBAY WITH RECYCLED GRANITE CURBING IS RECOMMENDED TO FACILITATE CLEANOUT. ENSURE THAT VEHICLE ACCESS CAN BE MAINTAINED TO THE FOREBAY FOR EASE OF MAINTENANCE.
 - REPLACE THE EXISTING POND OUTLET STRUCTURE. IF POND VOLUME IS SUFFICIENT, CONSIDER INSTALLING A RISER WITH MULTIPLE OUTLET LEVELS TO RETAIN A PERMANENT POOL AND SOME AMOUNT OF EXTENDED-DETENTION STORAGE FOR LARGER STORMS, WHILE RETAINING A PROTECTED, OPEN RISER TOP FOR RETURN OF LARGER STORM FLOWS TO THE CITY'S CLOSED DRAINAGE SYSTEM.

WET POND PROFILE VIEW (TYPICAL)



- NOTES:
- THE EXISTING POND OUTLET STRUCTURE RETURNS STORM FLOWS TO THE CLOSED DRAINAGE SYSTEM. THERE IS NO SEPARATE EMERGENCY SPILLWAY OR STABLE OUTFALL. THIS DESIGN CONCEPT DOES NOT ENVISION THE CONSTRUCTION OF NEW OUTFALLS OR EMERGENCY SPILLWAYS SUCH AS THOSE SHOWN IN THE SCHEMATIC.
 - THE AREA AND GEOMETRY AVAILABLE FOR IMPROVEMENTS TO THE EXISTING POND WILL LIMIT THE POSSIBILITIES FOR EXTENDED DETENTION OF STORM FLOWS GREATER THAN THE WATER QUALITY VOLUME. WHILE THE SCHEMATIC SHOWS THE FULL RANGE OF POSSIBILITIES FOR EXTENDED DETENTION, DETAINING THESE VOLUMES IS NOT LIKELY TO BE FEASIBLE.

Schematic from the Vermont Stormwater Management Manual, 2002. http://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Resources/sw_manual-vol1.pdf

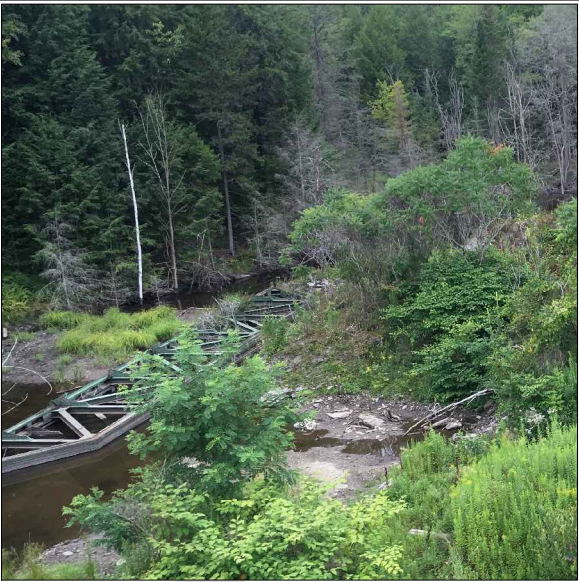


BASIS OF DESIGN

- FR-01: THE STREAM EXITING THE SITE HAS TAKEN ON A RUST COLOR. IT SHOULD BE INVESTIGATED FURTHER TO DETERMINE THE CAUSE OF THE DISCOLORATION. IT IS LIKELY THAT THE BRIDGE TRUSS AT FR-02 IS A CONTRIBUTING FACTOR.
- FR-02: REMOVE THE BRIDGE TRUSS FROM THE STANDING WATER AND FIND A MORE SUITABLE STORAGE LOCATION.
- FR-03: EXCAVATE AND CREATE A SEDIMENTATION BASIN TO ALLOW SUSPENDED SOLIDS TO SETTLE AND VELOCITIES TO SLOW PRIOR TO ENTERING THE ESTABLISHED WATERWAYS.
- FR-04: EXCAVATE AND CREATE A STONE-LINED DITCH TO CONVEY RUNOFF FROM THE ROAD SURFACE TO THE SEDIMENTATION BASIN.
- FR-05: FR-05 COVERS DITCHING OPPORTUNITIES ACROSS THE ENTIRETY OF THE SITE. THERE IS A SUBSTANTIAL AMOUNT OF SEDIMENT TRANSPORT - DITCHES WITH CHECK DAMS THAT CAN BE REGULARLY CLEANED SHOULD BE INSTALLED. WATER BARS CAN BE CONSTRUCTED TO DIRECT RUNOFF. WATER BARS SHOULD BE CONSTRUCTED IN SUCH A WAY THAT THEY CAN BE EASILY DRIVEN OVER AND WILL WITHSTAND HEAVY VEHICULAR TRAFFIC. TURNOUTS AND SETTLING BASINS CAN ALSO BE INSTALLED IN DITCHES WHERE SPACE ALLOWS.
- FR-06: THE LOCATION THAT IS BEING USED AS AN OFFLOADING SITE FOR MATERIAL PULLED FROM THE STREET SWEEPER AND CATCH BASIN SUMPS NEEDS TO BE CONTAINED. SILT FENCE SHOULD BE INSTALLED ALONG THE NORTHERN AND EASTERN PORTIONS OF THE DUMPING AREA.
- FR-07: ALL ORGANIC MATTER SHOULD BE STORED IN A SINGLE LOCATION. THE LOCATION SHOULD HAVE A THREE-SIDED FENCED-IN AREA THAT CAN OPERATE AS A HOLDING STRUCTURE. IF BUILT OUT OF WOODEN SLATS. THIS AREA CAN OPERATE AS A LARGE COMPOSTING FACILITY. 2-3' SHOULD BE EXCAVATED WITHIN THE ENCLOSURE TO HELP RETAIN AND SLOW RUNOFF FROM THE DECOMPOSING ORGANIC MATTER.
- FR-08: EMBANKMENTS ACROSS THE SITE HAVE BEGUN TO SLUMP. THE TOE SHOULD BE STABILIZED IN ACCORDANCE TO THE VEGETATED STONE OR GABION WALL DETAILS. SILT FENCE SHOULD BE PLACED BEYOND THE TOE TO HELP PROTECT AGAINST ANY FURTHER SLUMPING. AT THE TOP OF THE EMBANKMENT, FENCING OR BALLARDS SHOULD BE INSTALLED TO DETER INDIVIDUALS FROM DRIVING OR PARKING TOO CLOSE TO THE EDGE. THIS WILL ALSO RESTRICT DUMPING OVER THE EMBANKMENT TO RETAIN THE EXISTING DRAINAGE AREAS AT THE TOE.



FR-01: STAINING IN THE STREAM



FR-02: BRIDGE TRUSS IN STANDING WATER



FR-03/04: DITCHING/SEDIMENT BASIN OPPORTUNITY



FR-05: DITCHING/WATER BAR/TURNOUT AND SETTLING BASIN OPPORTUNITIES



FR-06: VACUUM TRUCK DUMPING SITE



FR-07: ORGANIC MATERIAL DUMPING SITE

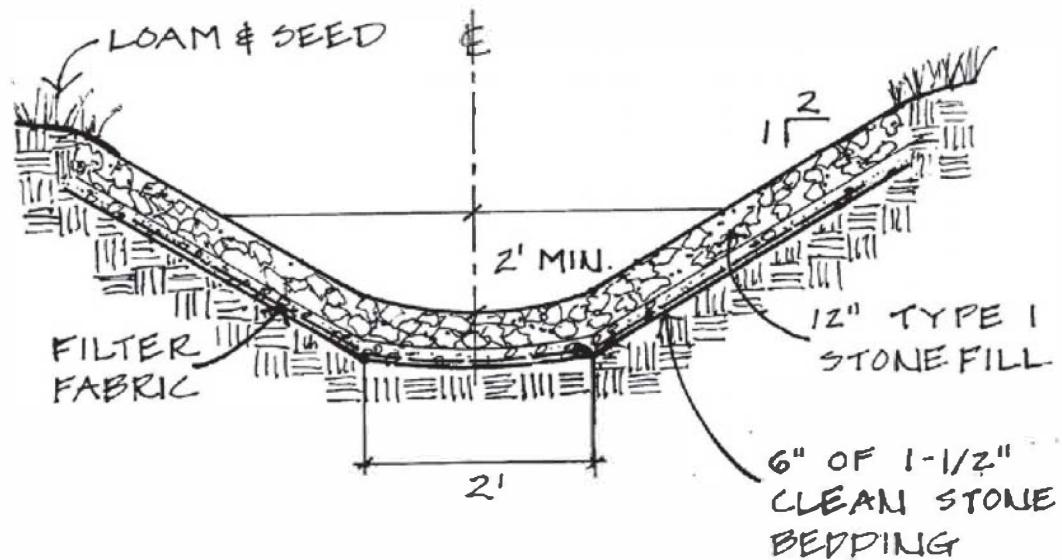


FR-07: ORGANIC MATERIAL DUMPING SITE

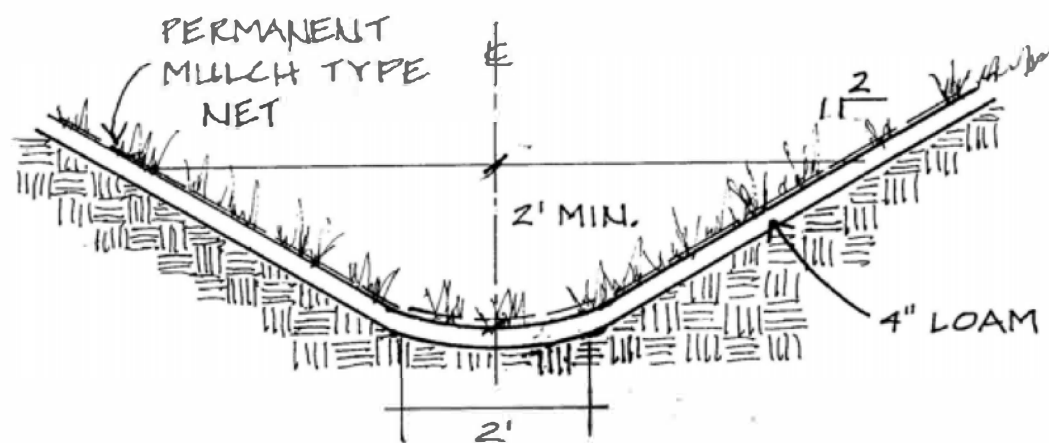


FR-08: STABILIZE BANK

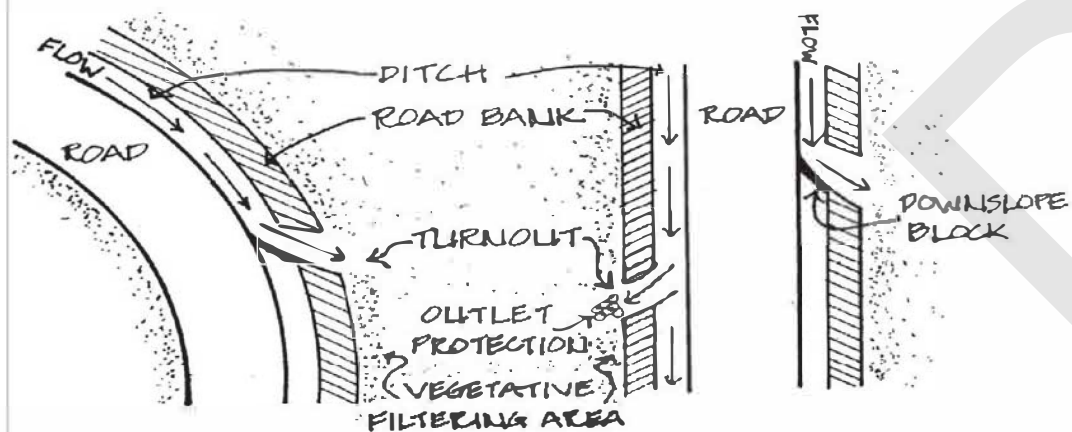
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	4					
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REVISIONS	1					
	2					
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	4					
	5					
	6					



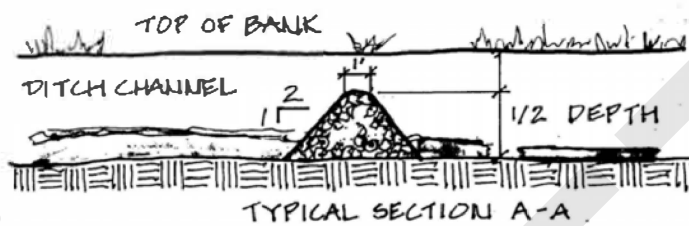
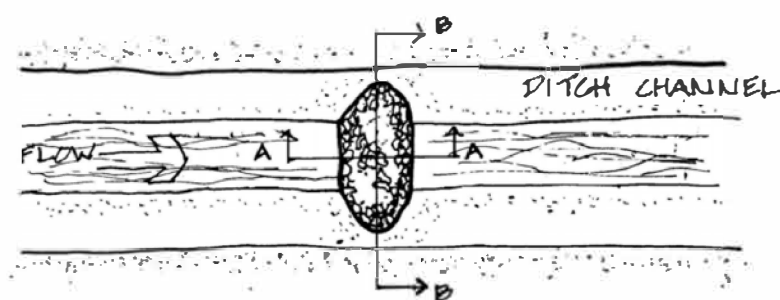
STONE LINED DITCH (TYP.)



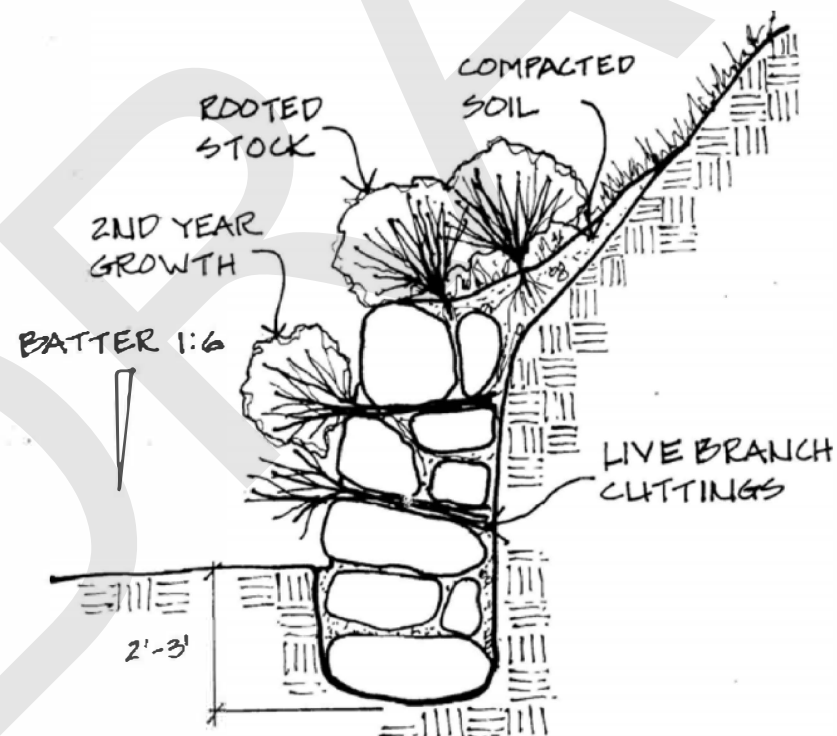
GRASS LINED DITCH (TYP.)



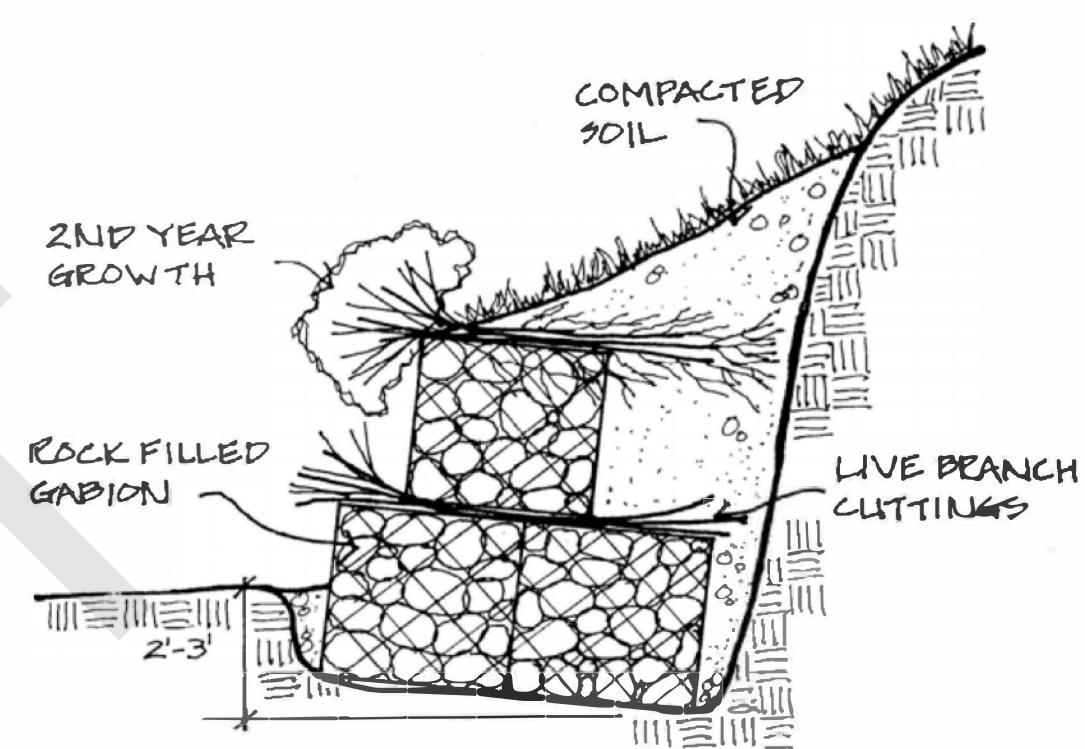
DITCH TURNOUT (TYP.)



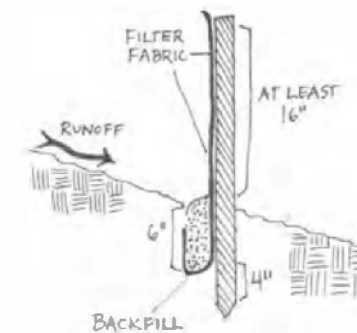
STONE CHECK DAM (TYP.)



VEGETATED ROCK WALL (TYP.)



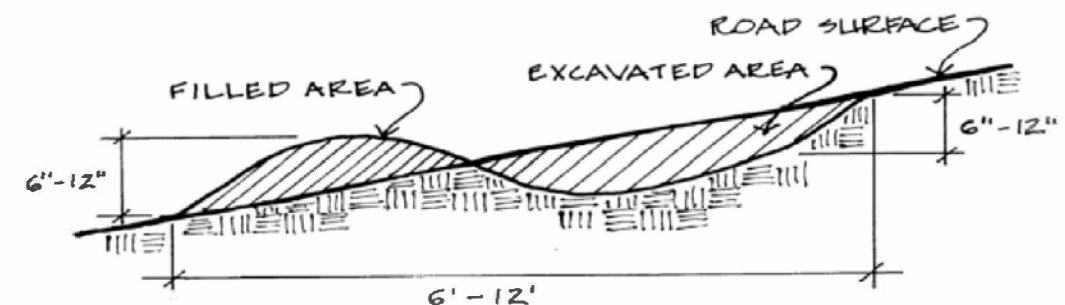
VEGETATED GABION WALL (TYP.)



ATTACHING 2 SILT FENCES:

- PLACE END POST OF 2ND FENCE INSIDE END POST OF 1ST FENCE
- ROTATE BOTH POSTS AT LEAST 180° TO CREATE SEAL
- DRIVE BOTH POSTS 10" INTO GROUND

SILT FENCE (TYP.)



WATER BAR CROSS SECTION (TYP.)

DETAILS FROM THE VERMONT BETTER BACKROADS MANUAL: <http://vtrans.vermont.gov/sites/aot/files/highway/2009%20Better%20Backroads%20Manual.pdf>

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2					Drawn By: BAM
3					Checked On: Date
4					Checked By: Initials
5					Project No.: 15-097

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2					Drawn By: BAM
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STONE ENVIRONMENTAL

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Stormwater Improvements

Finch Road

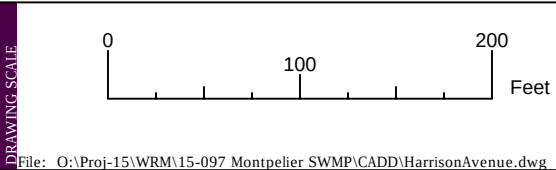
Montpelier Stormwater Master Plan

Montpelier Vermont

E-6



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						Drawn By: BAM
						Checked On: Date
						Checked By: Initials
						Project No.: 15-097



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HA-03: BEGINNING OF EXISTING DRAINAGE SWALE



HA-07: EXISTING LOW POINT, CONSTRUCT SEDIMENT TRAP



HA-03: LOOKING NORTH UP THE EXISTING DRAINAGE SWALE



HA-05: ESTABLISH A GRASS SWALE ALONG THE EDGE OF ROAD



HA-01--HA-04: DURING ROAD RECONSTRUCTION, RELOCATE SIDEWALK, CAP EXISTING DRAINAGE GRATES, INSTALL NEW SUBSURFACE DRAINAGE TO THE SOUTH SIDE OF THE NEW ROAD, AND INSTALL A DITCH ALONG THE NORTH ROAD EDGE.



BRIDGE OVER EXISTING DRAINAGE SWALE AT SOUTH EDGE



HA-08: UNKNOWN COLLECTION / OUTLET STRUCTURE IN SWALE

DRAWING CREDITS

Drawn On: 8-25-16
Drawn By: BAM
Checked On: Date
Checked By: Initials
Project No.: 15-097

#	Date	Drwn	Chk'd	App'd	Description

DRAWING SCALE

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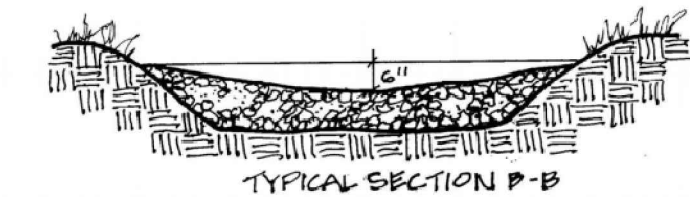
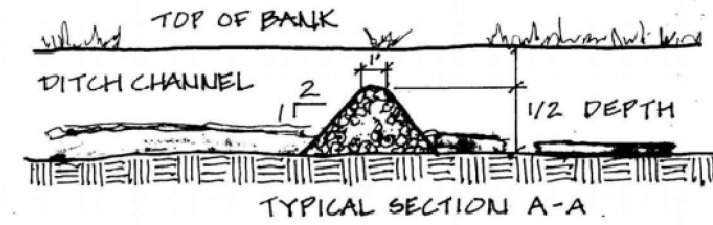
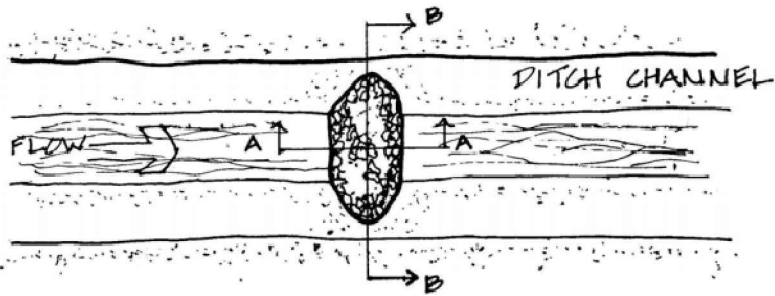
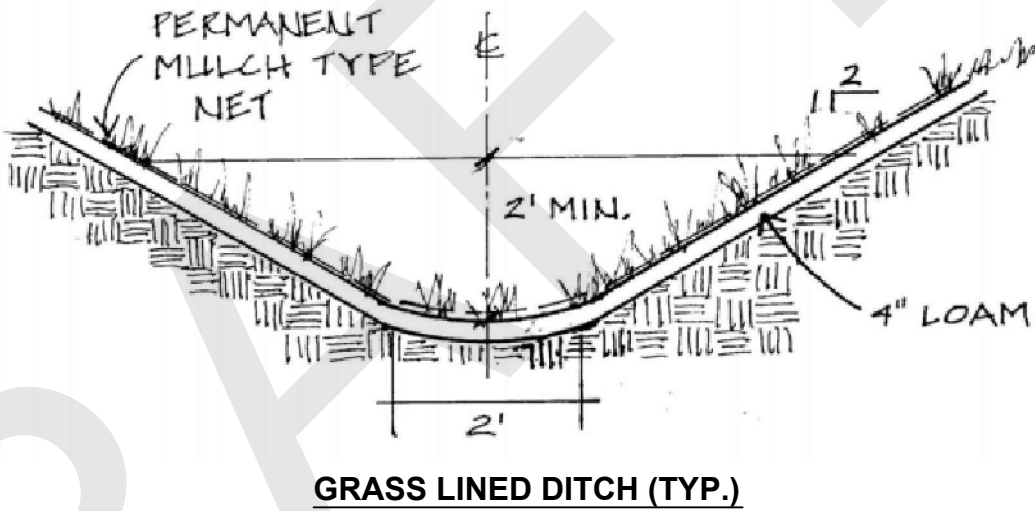
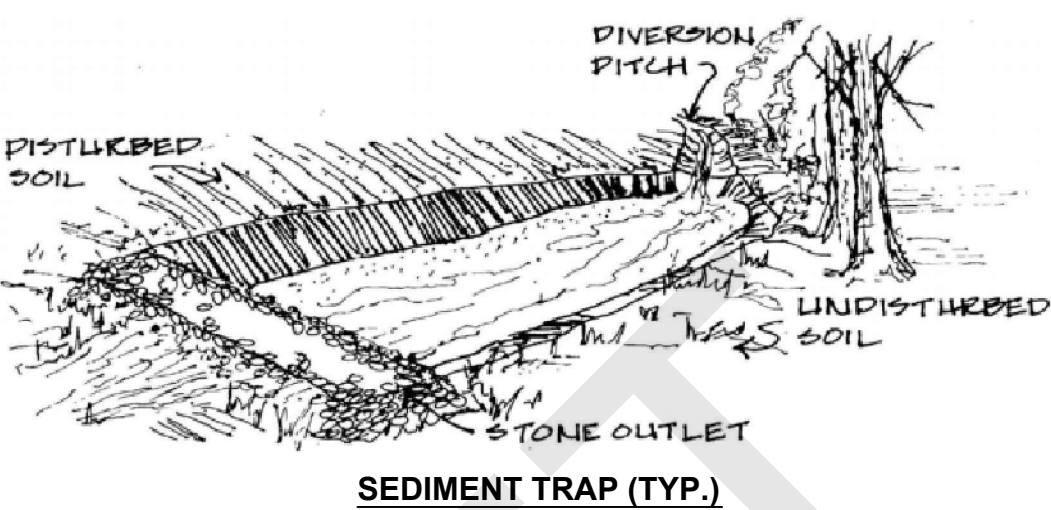
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Harrison Avenue Stormwater Improvements
Location Definitions
Montpelier Stormwater Master Planning
Montpelier Vermont

FIGURE NO.

E-8



STONE CHECK DAM (TYP.)

GRASS LINED DITCH (TYP.)

BASIS OF DESIGN

- HA-01: RELOCATE EXISTING SIDEWALK TO THE SOUTH SIDE OF HARRISON AVENUE
- HA-02: CAP EXISTING SUBSURFACE DRAINAGE AND CATCH BASINS ON HARRISON AVENUE.
- HA-03: INSTALL NEW SUBSURFACE DRAINAGE AND CATCH BASINS TO THE SOUTH SIDE OF HARRISON AVENUE.
- HA-04: INSTALL A GRASS-LINED DITCH AND DRIVE CULVERTS TO THE NORTH SIDE OF HARRISON AVENUE. OUTLET THE DITCH TO THE CATCH BASIN ON THE CORNER OF HARRISON AVENUE AND LOOMIS STREET.
- HA-05: ESTABLISH A GRASS SWALE BETWEEN THE SOUTH EDGE OF HARRISON AVENUE AND THE RECREATION FIELD. THE SWALE WILL ULTIMATELY DRAIN TO A SEDIMENT TRAP AT THE WEST EDGE OF THE RECREATION FIELD.
- HA-06: RESHAPE EXISTING DRAINAGE SWALE THAT RUNS ALONG THE EAST AND SOUTH EDGES OF THE RECREATION FIELD. OUTLET THE NEW SUBSURFACE DRAINAGE TO THE HEAD OF THE SWALE.
- HA-07: INSTALL A SEDIMENT TRAP AT THE WEST EDGE OF THE RECREATION FIELD. DISCHARGE NEW SUBSURFACE DRAINAGE TO THE SEDIMENT TRAP. TRAP TO OUTLET TO HA-08.
- HA-08: DETERMINE OUTFALL LOCATION AND REPLACE WITH A HORIZONTAL ORIFICE AND TRASH RACK.

DETAILS FROM THE VERMONT BETTER BACKROADS MANUAL: <http://vtrans.vermont.gov/sites/aot/files/highway/2009%20Better%20Backroads%20Manual.pdf>

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						Drawn By: BAM
						Checked On: Date
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REVISIONS						Project No.: 15-097

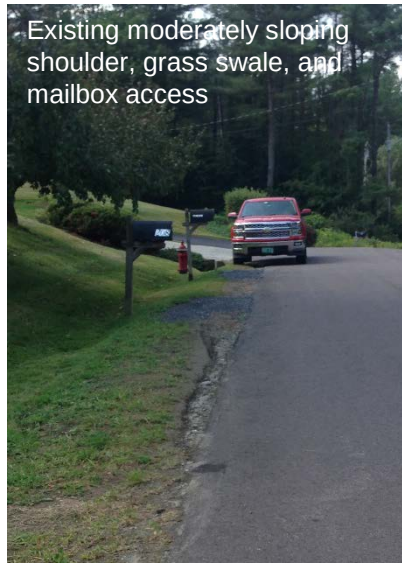
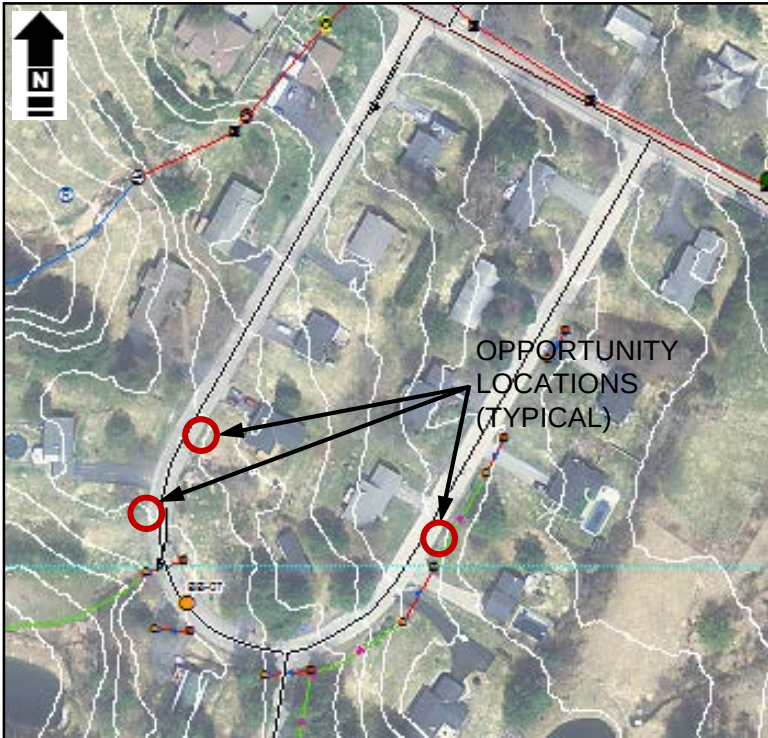
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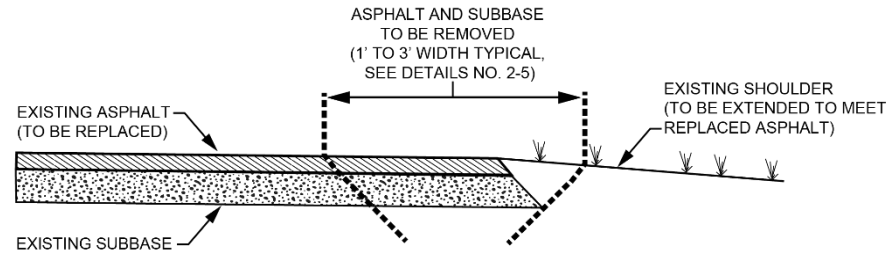
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Harrison Avenue Stormwater Improvements
Details & Notes
Montpelier Stormwater Master Planning
Montpelier Vermont

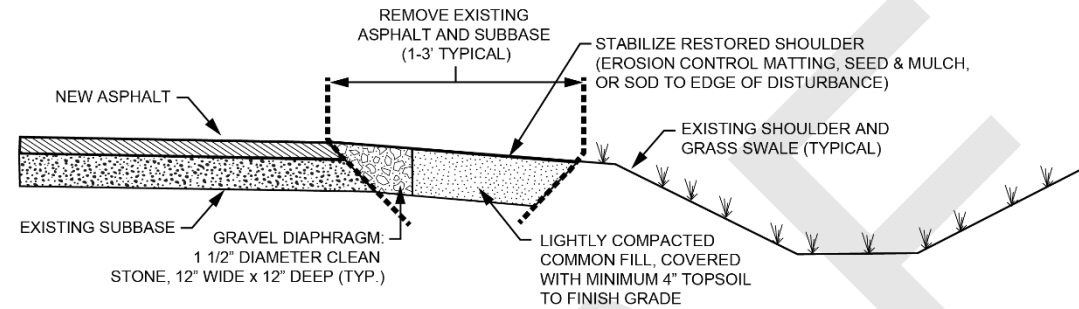


Shoulder Restoration Construction Guidance

DETAIL 1: EXISTING CONDITION, PRIOR TO ROADWAY NARROWING AND REPAVING (TYPICAL)

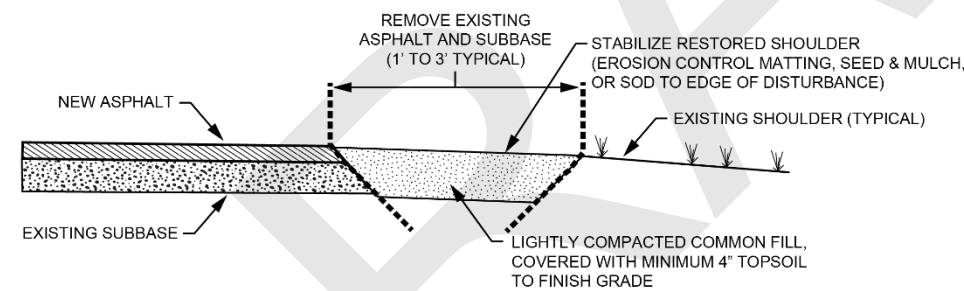


DETAIL 2: SHOULDER RESTORATION, MODERATELY SLOPING ROADWAY AND SHOULDER, AFTER ROADWAY NARROWING AND REPAVING (TYPICAL)



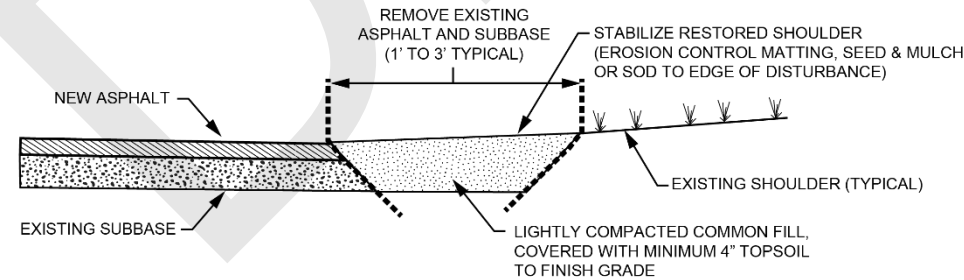
DETAIL 2 NOTES:
1. UP TO 1" VERTICAL DROP FROM EDGE OF PAVEMENT TO TOP OF GRAVEL DIAPHRAGM DESIRABLE TO MAINTAIN SHEETFLOW.
2. ENSURE NO SOIL BERM EXISTS BETWEEN NEW PAVEMENT AND EXISTING LAWN OR SWALE.
3. RUNOFF SHOULD TRAVEL FROM PAVEMENT INTO GRAVEL DIAPHRAGM AND THEN SHEETFLOW INTO DOWN-SLOPE AREA.

DETAIL 3: SHOULDER RESTORATION, SLIGHTLY SLOPING ROADWAY AND SHOULDER, AFTER ROADWAY NARROWING AND REPAVING (TYPICAL)



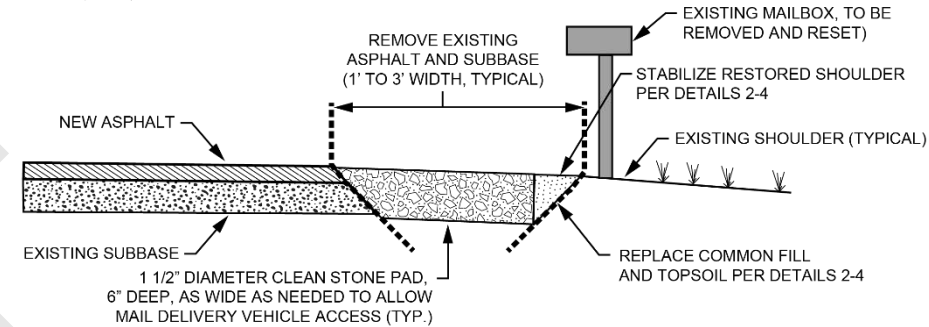
DETAIL 3 NOTES:
1. UP TO 1" VERTICAL DROP FROM EDGE OF PAVEMENT TO TOP OF RESTORED SHOULDER DESIRABLE TO MAINTAIN SHEETFLOW.
2. ENSURE NO SOIL BERM EXISTS BETWEEN NEW PAVEMENT AND EXISTING LAWN OR SWALE.
3. RUNOFF SHOULD TRAVEL FROM PAVEMENT ONTO RESTORED SHOULDER AND THEN SHEETFLOW INTO DOWN-SLOPE AREA.

DETAIL 4: SHOULDER RESTORATION, SHOULDER SLOPING DOWN TO ROADWAY, AFTER ROADWAY NARROWING AND REPAVING (TYPICAL)

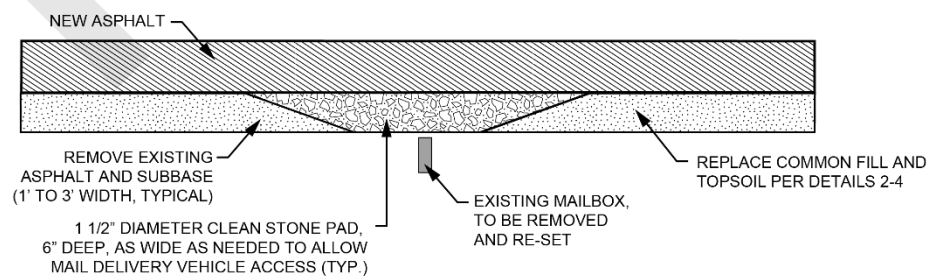


DETAIL 4 NOTES:
1. ENSURE NO SOIL BERM EXISTS BETWEEN NEW PAVEMENT AND EXISTING LAWN OR SWALE.
3. RUN-ON, IF ANY, SHOULD TRAVEL FROM RESTORED SHOULDER ONTO PAVEMENT BY SHEETFLOW.

DETAIL 5A: SHOULDER RESTORATION, MAILBOX ACCESS (PROFILE VIEW, TYPICAL)



DETAIL 5B: SHOULDER RESTORATION, MAILBOX ACCESS (PLAN VIEW, TYPICAL)



DETAIL 5A AND 5B NOTES:
1. ENSURE THAT RUNOFF CAN TRAVEL VIA SHEETFLOW INTO AND PAST THE MAIL DELIVERY VEHICLE ACCESS.
2. CLEAN STONE PAD MAY BE REPLACED WITH ASPHALT EXTENSION AND SHOULDER RESTORATION PER DETAILS 2-4.
3. RUNOFF SHOULD TRAVEL FROM PAVEMENT ONTO RESTORED SHOULDER AND THEN SHEETFLOW INTO DOWN-SLOPE AREA.
4. CLEAN STONE PAD OR ASPHALT EXTENSION SHOULD STOP 6-8" FROM MAILBOX FACE PER USPS GUIDELINES.

- NOTES APPLICABLE TO ALL DETAILS:
- ONE WAY TO REDUCE STORMWATER RUN-OFF IS TO REDUCE THE AMOUNT OF IMPERVIOUS SURFACES.
 - MONTPELIER'S DEPARTMENT OF PUBLIC WORKS LOOKS FOR OPPRTUNITIES TO DECREASE ROADWAY WIDTH (WHERE APPLICABLE) TO REDUCE THE AMOUNT OF IMPERVIOUS SURFACE, AND THEREFORE REDUCE STORMWATER RUN-OFF.
 - NARROWING ROADWAYS NOT ONLY REDUCES RUN-OFF BUT ALSO USES FEWER RESOURCES TO CONSTRUCT AND MAINTAIN, RESULTING IN INCREASED SAVINGS.
 - FOR MAXIMUM WATER QUALITY BENEFIT, ROADWAY NARROWING SHOULD BE COUPLED WITH ROAD SHOULDER PROTECTION AND RESTORATION FOLLOWING PAVEMENT AND SUBBASE REMOVAL.
 - GRANDVIEW TERRACE IS USED HERE AS A GENERIC EXAMPLE, TO ILLUSTRATE HOW SHOULDER RESTORATION OPTIONS MAY BE APPLIED IN FUTURE PROJECTS IN THE CITY OF MONTPELIER. PAVEMENT NARROWING AND SHOULDER RESTORATION WERE COMPLETED ON GRANDVIEW TERRACE AND SPRING HOLLOW LANE IN 2016.

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CITY COUNCIL Agenda Item #__16-274__

Date: September 21, 2016

Consent __ Discussion X Time Sensitive__

SUBJECT: Presentation of draft Stormwater Master Plan by Julie Moore of Stone Environmental

SUBMITTING DEPARTMENT: Public Works and Planning & Community Development

RECOMMENDED ACTION: Council should vote to accept draft report and to open a period of time for public review and comment. The Staff suggests scheduling a hearing for October 26th to hear comment and, if desired, adopt the Stormwater Master Plan.

RELATED COUNCIL GOAL/PRIOR ACTION: Maintain a Clean and Healthy Environment; Provide effective stormwater management; *complete stormwater plan*

EXPENDITURE REQUIRED: None at this time

SOURCE OF FUNDS: Project was funded generously by Vermont DEC- Ecosystem Restoration Program (\$40,000).

LEGAL REQUIREMENTS: None.

BACKGROUND INFORMATION: Stone Environmental was awarded the contract after an RFP process and a contract signed in July 2015. The consultant set out to complete 7 tasks:

1. Collect and review existing plans and documents
2. Identify problem areas
3. Identify and map projected growth areas and anticipated capital projects
4. Interpret and project future pollutant reduction requirements and supporting practices
5. Define implementation alternatives
6. Refine identified opportunities based on physical inspection
7. Create a draft stormwater master plan for the city

Stone Environmental will give a summary of the project tonight and take questions as a part of their Task 7.

SUPPORTING DOCUMENTS: Attached is an ftp link to the report (due to its size it cannot be emailed). Here is a link to a compiled draft of the City's stormwater master plan; the file is approximately 48MB in size, so be forewarned when downloading:

<https://dl.dropboxusercontent.com/u/748187/Montpelier%20SWMP-DRAFT%202016%2009%2012.pdf>

INTERESTED PARTIES: None

CITY MANAGER'S APPROVAL: 