Town of Vernon
Connecticut

Stormwater Management Plan

2014 Annual Report

July 24, 2014

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Executive Summary

This document presents 2014 Annual Report required by the Stormwater Management Plan (SWMP) for the Town of Vernon. The SWMP was developed to meet the requirements of the Connecticut Department of Environmental and Energy Protection's (CT DEEP) General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s). The DEEP developed this general permit for the State of Connecticut to comply with the United States Environmental Protection Agency's (EPA) National Pollution Discharge Elimination System's (NPDES) Phase II regulations.

Receiving Waters

The following is a list of the identified receiving water bodies within the Town of Vernon to which identified outfalls discharge.

Shenipsit Lake	Paper Mill Pond	Hockanum River	Ogden Brook
Eckert's Pond	Tankerhoosen River	Talcottville Pond	Dobsonville Pond
Tankerhoosen Lake West	Valley Falls Pond	Railroad Brook	Walkers Reservoir
Gages Brook East	Risley Reservoir	Clark's Brook	Walkers Reservoir
Upper Bolton Lake	Middle Bolton Lake	Lower Bolton Lake	

Stormwater Management Plan

The central focus of the DEEP General Permit for the Discharge of Stormwater from MS4s is the Stormwater Management Plan (SWMP). In order for the town to meet the regulations, it has developed an SWMP. Each permittee designs its own SWMP with the goal of reducing the discharge of pollutants from the MS4 to the maximum extent practicable to protect water quality. To meet the "maximum extent practicable" standard, the Town must develop and implement Best Management Practices (BMPs) for the following six minimum control measures:

- **Public Education and Outreach**
- **Public Participation/Involvement**
- **Illicit Discharge Detection and Elimination**
- **Construction Site Stormwater Runoff Control**
- **Post-Construction Stormwater Runoff Control**
- **Good Housekeeping**

Control Measure 1: Public Education & Outreach

The Town will "implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff". Educating the public about the importance of stormwater management can help lead to greater support for and compliance with the Stormwater Management Plan.

1-1 Develop Educational Brochure for public mailing – The Town has developed a brochure that explains nonpoint source pollution, the municipal stormwater management system, and solutions to the pollution (See the attached). Other potential future topics include a description of the hydrologic cycle, the impacts of increased development, pollutants from developed areas (including lawns) and the impacts to local water bodies from stormwater pollution. The Town will review the content. The brochure will be included in the local publication "Rockville Reminder", made available in the library, town hall, and other public places and be posted on the Town website.

Responsible Department: Engineering
Measurable Goal: Brochure will be distributed / published annually.
Status to Date: Brochure has been created (see attached) and is being distributed.

1-2 Provide semi-annual educational programs for the Planning & Zoning and Inland Wetland Commissions – Both commissions are encouraged to attend seminars regarding stormwater runoff.

Responsible Department: Engineering
Measurable Goal: Both commissions are encouraged to attend seminars regarding stormwater runoff.
Status to Date: Information is being presented to the members of the Planning & Zoning and Inland Wetland Commission about upcoming seminars as they are offered.

1-3 Train volunteer educators – We are now soliciting volunteers from the school system. Once volunteers are identified, they shall receive training once a year. Each year the training shall be in a different aspect of stormwater management.

Responsible Department: Engineering
Measurable Goal: Information will always be available.
Status to Date: The town is in the process of looking for volunteers and collecting and categorizing the information.

1-4 **Develop public school curricula –** The volunteer educators are in the process of developing lesson plans for grades K-5, 6-8, and 9-12. The Town of Vernon has obtained a working model that shows what happens during a rain event. It shows the rain cycle and how stormwater effects erosion and how drainage systems work. We are planning to set up this model at a different local school each year.

Responsible Department: Public Works / Engineering
Measurable Goal: Set up the model on a regular basis and explain how it works.
Status to Date: The town set up the model and explained the effects of stormwater to students at Skinner Road Grammar School in the past. We were not able to schedule a time or place in 2014.

1-5 **Develop Town Stormwater Website –** We are now collecting information as well as many links to stormwater related websites, including the Connecticut Departments of Transportation and Environmental Protection, which contain information on stormwater management. Discussion will be included of stormwater management issues. Website updates will be performed annually and this plan will be posted on the web, as well as the annual reports to the DEP.

Responsible Department: Engineering / Data Processing
Measurable Goal: Create Stormwater page for the Town website.
Status to Date: The town has collected much information and links to related websites. We are compiling the information and are planning to be ready to put it online during 2015.

1-6 **Develop and mail educational brochure for restaurants** - The Town has developed a brochure that explains nonpoint source pollution related to restaurants, and solutions to the pollution.

Responsible Department: Engineering
Measurable Goal: Brochure will be distributed and/or published annually.
Status to Date: Brochure has been created (see attached) and is in the process of being distributed.

1-7 **Develop and mail educational brochure for automotive uses –** The Town has developed a brochure that explains nonpoint source pollution related to the automotive industry, and solutions to the pollution.

Responsible Department: Engineering
Measurable Goal: Brochure will be distributed and/or published annually.
Status to Date: Brochure has been created (see attached) and is in the process of being distributed.

Control Measure 2: Public Participation & Involvement

To satisfy the requirements of this measure, the Town has developed a plan for a public participation and involvement program that includes the public in learning about proper stormwater management.

2-1 **Develop public involvement/participation program –** Over 80 businesses now participate in the Hockanum River Business Partner Program, which encourages local business owners to adopt some simple housekeeping practices designed to reduce pollutants from entering the Hockanum River.

Responsible Department: Engineering / NCCD
Measurable Goal: Encourage businesses to participate in the program.
Status to Date: This program is not in operation at this time.

2-2 **Comply with state and local public notice and FOI requirements –** Once completed, the town will make available for public review and comment a draft copy of the Stormwater Management Plan for a minimum period of thirty (30) days. Draft copies will be available at the Town Hall and through the Town website.

Responsible Department: Engineering / Data Processing
Measurable Goal: Create and make available the Stormwater Management Plan.
Status to Date: Plan is being drafted and should be complete in 2015.

2-3 **Create citizen stormwater public participation panel –** The Town of Vernon is in the process of soliciting volunteers for this panel. We have had little response, but will publicize more during the next year.

Responsible Department: Engineering
Measurable Goal: Create a panel to meet on a regular basis to discuss relevant topics.
Status to Date: No progress at this time.

2-4 **Train volunteers to locate outfalls/illicit discharges -** The Town of Vernon needs to solicit volunteers for this panel. We have had little response, but will publicize more during the next year.

Responsible Department: Engineering
Measurable Goal: Create a panel to meet on a regular basis to discuss relevant topics.
Status to Date: No progress at this time.

2-5 **Develop drain stenciling program and train volunteers –** Local Boy Scouts, members of the Conservation Commission and/or Town employees have been applying decals to catch basins each year. Brochures (see attached) were also given to residents of the streets where the stenciling occurred.

Responsible Department: Public Works
Measurable Goal: The goal is 100 per year.
Status to Date: This year, a member of the Public Works Department and volunteers have stenciled catch basins and distributed brochures.

2-6 **Develop clean-up program and train volunteers –** For the past few years, a local man has volunteered, not only to help clear and maintain many trails in town but also to coordinate a Hockanum River clean-up on an annual basis.

Responsible Department: Parks and Rec
Measurable Goal: Annual clean-up program.
Status to Date: The clean up program has been in place for the last few years.

2-7 **Develop and train neighborhood watch groups -** The Town of Vernon is in the process of soliciting volunteers for these groups. We have had little response, but will publicize more during the next year.

Responsible Department: Engineering
Measurable Goal: Create and train groups to meet on a regular basis to discuss relevant topics.
Status to Date: Soliciting volunteers.

Control Measure 3: Illicit Discharge Detection and Elimination

To satisfy the requirements of this control measure, the Town will map outfalls, create a program to detect and eliminate illicit discharges, and sample and test six outfalls to see if they meet the acceptable requirements.

3-1 Map outfalls greater than 15" in urbanized areas – The Town of Vernon has worked with the Tolland County Agricultural Center, who have located all the outfalls along the Hockanum River and plotted them on a map (see Appendix A).

Responsible Department: Engineering
Measurable Goal: Create and maintain a map of stormwater outfalls greater than 15"
Status to Date: All outfalls along the Hockanum River have been plotted on a town map.

3-2 Map outfalls greater than 15" town-wide - The Town of Vernon has worked with the Tolland County Agricultural Center, who have located all the outfalls along the Hockanum River and plotted them on a map (see Appendix A).

Responsible Department: Engineering
Measurable Goal: Create and maintain a map of stormwater outfalls greater than 15"
Status to Date: All outfalls along the Hockanum River have been plotted on a town map.

3-3 Map outfalls greater than 12"in urbanized areas - The Town of Vernon has worked with the Tolland County Agricultural Center, who have located all the outfalls along the Hockanum River and plotted them on a map (see Appendix A).
Responsible Department: Engineering
Measurable Goal: Create and maintain a map of stormwater outfalls greater than 12"
Status to Date: All outfalls along the Hockanum River have been plotted on a town map.

3-4 Develop program to detect and eliminate illicit discharges – The Town will develop a program to address the elimination of illicit discharges. This program may include follow up visits and action based on unacceptable stormwater testing and public complaints.

Responsible Department: Engineering
Measurable Goal: Develop a program to address the elimination of illicit discharges.
Status to Date: No progress at this time.

3-5 Develop illicit discharge ordinance – The Illicit discharge ordinance is in the process of being prepared. The ordinance will be presented to the Town Council for their adoption into the Code of Ordinances.

Responsible Department: Engineering
Measurable Goal: Create an Illicit discharge ordinance.
Status to Date: No progress at this time.

3-6 **Develop town-wide stormwater system map –** The Town of Vernon is using GPS software to map stormwater outfalls. The results are being plotted onto a town-wide map. Once the outfalls are mapped, we will start mapping the drainage structures and systems.

Responsible Department: Public Works / Engineering
Measurable Goal: Create and maintain a map of town-wide stormwater system.
Status to Date: Currently obtaining outfall information and plotting the results on a town map.

3-7 **Develop program for recycling household hazardous wastes -** The Town of Vernon has a program for recycling household hazardous waste. This program is part of the Capitol Region East Operation Committee and serves several area towns. Household hazardous waste was collected on seven separate dates in 2014; April 12, April 26, May 10, September 6, September 20 and October 18.
October 11 - Stafford

Responsible Department: Public Works
Measurable Goal: Continue plan for recycling household hazardous wastes.
Status to Date: Seven separate dates were made available in 2014 for the public to recycle their household hazardous wastes (see attached flyer).

3-8 **Provide water testing at six outfall locations annually –** Water testing at the six outfall locations was completed and the test results are included in the attached Public Works Annual Report.

Responsible Department: Public Works
Measurable Goal: Sample and test six outfalls annually.
Status to Date: Completed on November 24, 2014.

Control Measure 4: Construction Site Runoff Control

The Town will develop, implement and enforce a program, or modify an existing program to reduce pollutants in stormwater runoff from a construction site. To comply with this measure, the Town of Vernon only needs to continue enforcing the Planning and Zoning and Inland Wetlands Regulations.

4-1 Review land use regulations to meet requirements of MS4 permit and E&S Guidelines – The existing Town regulations that cover all approved Wetlands and Planning & Zoning applications meet the requirements of these regulations.

Responsible Department: Engineering / Planning
Measurable Goal: Review requirements and regulations.
Status to Date: Completed.

4-2 Review and develop enforceable compliance regulations – The existing Planning and Zoning and Inland Wetlands Regulations are routinely enforced by Town staff for all approved Wetlands and P & Z applications that are under construction.

Responsible Department: Engineering / Planning
Measurable Goal: Review requirements and regulations.
Status to Date: Completed.

4-3 Review and develop performance/maintenance bonding – The Town presently requires erosion and sedimentation control bonding for all projects brought before the Planning and Zoning and the Inland Wetland Commissions.

Responsible Department: Engineering / Planning
Measurable Goal: Review and develop performance/maintenance bonding
Status to Date: Bonding procedure is currently in place.

4-4 Develop procedures for site inspections/enforcement – The Town of Vernon Wetlands Enforcement Officer, or his designee, inspects all construction sites a minimum of once a week. He inspects more often if necessary.

Responsible Department: Engineering
Measurable Goal: Inspect construction sites for compliance.
Status to Date: Wetlands Enforcement Officer inspects all construction a minimum of once a week.

4-5 Review and develop standards from State Stormwater Manual - The Town is in the process of preparing a stormwater management plan which will enforce the manual.

Responsible Department: Engineering
Measurable Goal: Create stormwater management plan.
Status to Date: Currently preparing the plan.

Control Measure 5: Post Construction Runoff Control

The Town will develop, implement and enforce a program to address stormwater runoff from new development projects that discharge into the municipal stormwater system or directly into waters of the State. To comply with this measure, the Town of Vernon only needs to continue enforcing the Planning and Zoning and Inland Wetlands Regulations.

5-1 Review land use regulations to meet requirements of MS4 permit and E&S Guidelines – The Town of Vernon will review the Planning & Zoning and Inland Wetland Regulations and ensure they meet the 2004 CT DEP Storm Water Quality Manual Guidelines.

Responsible Department: Engineering
Measurable Goal: Review Land use regulations
Status to Date: Regulations are currently under review.

5-2 Develop post-construction ordinance or regulation - The Town is in the process of preparing stormwater management regulations which will enforce the plan. Post-construction will be addressed in a section of these regulations.

Responsible Department: Engineering
Measurable Goal: Create stormwater management regulations.
Status to Date: Currently preparing the regulations.

5-3 Develop and implement post-construction BMP strategy – The Town is in the process of preparing a stormwater management regulation which will enforce the plan. Post-construction will be addressed in a section of these regulations.

Responsible Department: Engineering
Measurable Goal: Create stormwater management regulations
Status to Date: Currently preparing the regulations.

5-4 Develop a program to ensure long-term operation and maintenance of BMPs - The Town is in the process of preparing stormwater management regulations which will enforce the plan. Post-construction will be addressed in a section of these regulations.

Responsible Department: Engineering
Measurable Goal: Create stormwater management regulations.
Status to Date: Currently preparing the regulations.

5-5 Develop a program to encourage decreasing impervious surfaces – Low Impact Development (LID) concepts have been implemented into the Planning & Zoning Regulations.

Responsible Department: Engineering / Planning
Measurable Goal: Create regulation to encourage the decrease of impervious surfaces.
Status to Date: LID regulations have been incorporated into the P&Z regulations.

5-6 Develop a program to encourage infiltration practices – During the review process for planning and inland wetland applications, The Town staff currently looks to see if infiltration is a good alternative for stormwater management.

Responsible Department: Engineering
Measurable Goal: Develop a program to encourage infiltration practices.
Status to Date: Currently being done during review process for new applications.

5-7 Develop a program to encourage riparian buffering – Riparian buffers will be the focus on future brochures to be distributed to the public. The Town is compiling information to use for that brochure.

Responsible Department: Engineering
Measurable Goal: Develop a program to encourage riparian buffering.
Status to Date: The Town is currently collecting and compiling the information.

Control Measure 6: Good Housekeeping

6-1 Develop a training program for municipal employees – A training program for municipal employees is implemented and being updated with continued training.

Responsible Department: Public Works
Measurable Goal: Develop a training program for municipal employees.
Status to Date: The Town is currently following a training program.

6-2 Sweep streets at least once a year as soon as possible after snowmelt – All roads were swept throughout the year. A total of (300) cubic yards of material was removed from the roadways.

Responsible Department: Public Works
Measurable Goal: Sweep all roads at least once a year
Status to Date: The Town completed sweeping all roads by (June).

6-3 Evaluate urbanized areas for possible sweeping more than once a year – The Rockville section of Vernon is continually being evaluated and swept as necessary.

Responsible Department: Public Works
Measurable Goal: Sweep roads in urbanized areas more than once if needed.
Status to Date: The Rockville area was swept several times as needed.

6-4 Develop a program to evaluate and clean stormwater structures at least once a year – Public Works Department currently has a program of cleaning and evaluating catch basins. This year, (325) catch basins were cleaned and evaluated. A total of approximately (53.5) tons of sediment were removed from these catch basins.

Responsible Department: Public Works
Measurable Goal: Clean and evaluate stormwater structures.
Status to Date: (325) basins were cleaned removing (53.5) tons of sediment.

6-5 Develop a program to evaluate and prioritize system for upgrade and/or repair – The Town of Vernon Public Works Dept. has recently developed a program to locate and inspect drainage structures.

Responsible Department: Public Works
Measurable Goal: Develop a program to upgrade the stormwater system.
Status to Date: Program has been developed. Information from this program will be addressed during 2015. In addition, road reconstruction resulted in new drainage systems for some roads.

Monitoring

S-1 Sample six outfalls once a year – The six outfalls have been tested. See the attached results.

Responsible Department: Public Works
Measurable Goal: Sample six outfalls annually.
Status to Date: All samples were taken on (November 24, 2014).

VERNON-CT.GOV ON THE MOVE

DEPARTMENT OF PUBLIC WORKS

TOWN OF VERNON

375 HARTFORD TURNPIKE, VERNON, CT 06066
Tel: (860) 870-3500
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TO: Craig Perry, Inland/Wetland Enforcement Officer, Town of Vernon Engineering

FROM: Jeff Schambach, Road Foreman

DATE: July 1, 2015

SUBJECT: STORM WATER II 2014 ANNUAL REPORT

This is the information that Public Works is responsible for implementing or annually attending to according to the Best Management Practice List and required on the 2014 Annual Report.

The Town of Vernon has a program for recycling household hazardous waste. This program is part of the Capitol Region East Operation Committee and serves several area towns. Household hazardous waste was collected on seven separate dates; April 12, April 26, May 10, September 6, September 20, October 18, and October 11- Outreach in Stafford.

Water testing at the six outfall locations per BMP ID 3-8 was completed November 24, 2014. Two (2) outfalls representative of each of the three (3) required land use categories (residential, commercial, and industrial) were sampled. Additionally, a rainfall pH sample was collected and analyzed in the field. Samples were collected in accordance with the General Permit requirements.

This year the Public Works Department hosted a Shred Event and Touch-A-Truck open house. During this event the DPW setup and displayed a Storm Water outreach model display. This display showed the public how rain water flow is shed across the land to brooks and ponds and also how the rain is collected on the street through catch basins and deposited through pipes to outfalls and into bodies of water. Approximately 150 people passed through this event.

The yearly street sweeping program was conducted. A total of approximately 300 cubic yards of road sediment was picked up. The public works department is currently using different anti icing products and has eliminated the use of sand being used for winter operations except for emergency use or severe ice conditions. Per BMP 6-2.

The Rockville Downtown and surrounding areas are evaluated and swept several times a year per BMP ID 6-3.

The Town of Vernon Public Works Department has a current program to clean and evaluate storm water structures per BMP ID 6-4. This year we implemented a new inspection and documentation program for inspection of catch basins. This year approximately 1150 catch basins were thoroughly inspected and documented. This program allows us to inspect for condition, type, sediment level, pipe size & type, record maintenance problems, GIS information and pictures. The information is input into a program that can be searched for any of the data needed. For the year 2014, approximately 125 catch basins were cleaned during regular maintenance and approximately 200 were cleaned during repairs, replacements and road construction. Approximately 53.50 tons of sediment were collected and disposed of in accordance with applicable regulations. With the anti-icing products being used during winter operations and no sand being used a reduction in sediment collection is being noticed. As part of the cleaning process each structure is evaluated and documented for its condition for repair or upgrade per BMP ID 6-5.

C: David Smith, Town Engineer
Robert Kleinhans, Director of Public Works

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APPENDIX A

HOCKANUM RIVER OUTLETS REPORT

Summary Report
NCCD NPS Management Project 08-04b
Task 1.c Conceptual Stormwater Retrofit Design Narrative

As outlined in the Scope of Work in the North Central Conservation District NPS Management contract 08-04b, outfalls in the town of Vernon were evaluated and prioritized for repair, retrofit or upgrade in accordance with the MS4 General Permit's Minimum Control Measure Item 6, which requires development and implementation of a program to evaluate conveyances, structures, and outfalls for repair and retrofit. Discharges were categorized into low, moderate, and high priority based on several factors including: the expected pollutant load, the condition of the infrastructure, sedimentation and/or erosion, fish passage, the relative value of the receiving wetland or waterbody as a resource, and the extent of its degradation. In total, district staff identified six moderate priority discharges and five high priority discharges.

A number of the outfalls, especially those in the vicinity of Tri-City Plaza, receive drainage from both private and public drainage systems. In some cases, more extensive mapping of the collection area is required to determine the precise location of all contributing catch basins. In addition, four of the high priority discharges are not shown on the stormwater system maps provided by the Vernon Engineering Department. The outfalls were identified by staff during trackdown surveys along the main stem of the river and are located on private property. Collaboration with business owners will be necessary to pursue retrofitting projects.

For two of the high priority discharges (VR041, and VR051), the District recommends additional characterization of the pollutant load with water quality testing. There are several reasons for this, including: the size of the outlet pipe and high level of imperviousness of the associated drainage basin make it likely that the discharge carries a significant pollutant load, the surrounding landscape may allow for advanced treatment methods (treatment wetlands, ponds etc.) to be used, the cost of advanced treatment methods requires that the benefits of such a system are warranted based on the extent of pollution.

Moderate Priority

Outfalls rated as a moderate priority had one or two issues with erosion, sedimentation, trash, or failing infrastructure. These outfalls were clustered around one of two areas: Paper Mill Pond and an area along the main stem of the Hockanum River in Rockville, adjacent to River Street. Individual outfalls may not have exhibited conditions to warrant a retrofit, however the combined impact of several discharges to the receiving water warranted the moderate priority rating.

Paper Mill Pond

Paper Mill Pond is a body of water west of Shenipsit Lake, the headwaters of the Hockanum River. The pond is just over 9 acres and has eight stormwater discharges that

empty into it. Three of these discharges, VR002, VR004, and VR005, were identified as moderate priorities due to sedimentation. All three outfalls discharge a significant amount of road sediment, creating large deltas that extend 10 to 15 feet into the pond. In addition, VR004 and 005 have infrastructure issues: the pipe at VR004 is degraded and buried, and VR005 is submerged below the level of the pond and stormwater is unable to discharge properly. VR001, one of the high priority outfalls, also discharges into Paper Mill Pond and also has a large sediment delta.

Collectively, all of the discharges into Paper Mill Pond represent a significant sediment load. The accumulated sediment degrades the habitat value of the pond, and reduces recreational and aesthetic value. In addition, during large storm events, the sediment deposits may be re-suspended and transported downstream. Recommended remediation measures include sediment removal, outfall protection, and sediment control measures. In addition, in the Watershed Report, load reductions are provided for replacing the existing catch basins with deep sumps and installing a hydrodynamic separator.

River Street

River Street in Rockville has three outfalls within 300 feet of each other that are rated as moderate priorities for retrofit. Two of these, VR019 and VR021, are attached to catch basins that do not contain a sediment-trapping sump, so sand is allowed to run through the basin and directly into the river. This, in addition to River Street's location at the bottom of a large hill, contributes a large amount of runoff and road sediment to the Hockanum River. Erosion is also a problem at these two outfalls and VR017, an outfall 100 feet upstream. All three pipes discharge into the river several feet above its normal water level, causing bank erosion. The river bends as it flows underneath River Street, and this, in conjunction with a log obstruction, causes pooling and settling of a large amount of sediment. This sediment deposit may be re-suspended during large storm events and transported downstream.

The three outfalls are contributing a large amount of both road and bank sediment to this stretch of the Hockanum River. It is recommended that the two outdated outfalls, VR019 and VR021, be updated with modern catch basins with sediment sumps to intercept winter road sand being applied to River Street and the areas up the hill from the river. Additional water quality improvements may be obtained by installing a hydrodynamic separator. In the Watershed Report, load reductions are provided for replacing the existing catch basins with deep sumps and installing a hydrodynamic separator. Additional sediment contributions can be limited by lining the area where all three pipes discharge with rip rap to minimize bank erosion.

High Priority

VR001 – Cemetery Road

The outfall carries water from an intermittent stream through a culvert underneath Cemetery Road. Two catch basins in the road above the culvert take drainage and

discharge through a small (8") pipe, located above a 40"culvert. Both pipes discharge onto a concrete splash pad which is cracked and undercut from soil erosion. The discharge then falls 12-15 feet down an unconsolidated rock and rip rap drop into the eroded bed of the stream. Both the bed and the banks of the stream are severely eroded and have slopes 10-15 feet from the bed to the top-of-slope. The stream extends approximately 200 feet down a gradual slope where it empties into Paper Mill Pond. The bed of the stream is subject to active erosion and there is an observable sediment load within the stream. At the confluence with the pond, there is a sediment delta extending 30 feet into the pond. The delta is partially vegetated, indicating that it has been there for some time.

Due to the extent and nature of erosion, remediation would involve complete reconstruction of the outfall and outlet stream. This would require raising the elevation of the streambed and rip-rapping the entire length of stream. Rip rap may also be used to create a sediment forebay ten to twenty feet past the base of the outfall. However, in-stream erosion appears to be the main source of sedimentation.

VR035 – Countrywood at Vernon Apartments

The outfall takes drainage from several parking lots in the Countrywood at Vernon Apartments complex on Talcottville Road. The pipe (~20") is obscured by sediment. The ditch leading from the pipe to the river has become completely clogged with sediment, the material reaching a depth of up to 2 feet. Water from the pipe does not have enough velocity to scour the ditch. A large amount of the sediment has entered the Hockanum River channel from the ditch, degrading water quality.

Remediation would involve sediment removal and installation of sediment storage B.M.P.'s. Further investigation is necessary to determine where the sediment originates. If the source of the sediment is found to be from winter sand applications in the adjacent parking lots, a hydrodynamic separator may useful in minimizing the amount of sand discharged into the river. Another approach may be to modify the existing stream channel to include a sediment forebay which would trap some, if not all, of the sediment discharged from the pipe. The structure would require regular maintenance to remove trapped sediment. Load reductions are calculated for both measures in the Watershed Report.

This outfall has been deemed a high priority due to the significant pollution load and direct discharge into the river.

VR036 – Behind Staples in Tri-City Plaza

The outfall takes discharge from a large area of impermeable pavement in Vernon Center. Measuring 54", the concrete pipe discharges onto a concrete splash pad and then over an 8" drop and into a rip-rap lined plunge pool. It appears that the area surrounding the discharge was originally constructed as a basin to detain flow. However, there is no longer a berm at the downstream end of the basin, so flows pass without obstruction into

an outlet channel. The area just downstream of the pipe is moderately eroded. There is a large wetland further downstream of the outlet. Sediments and trash are widespread throughout the wetland.

The wetland is formed in part by a large berm (possibly a former road) that separates it from the river. The outlet stream flows through what appears to be an eroded breach in the berm.

Recommended remedial measures would include reconstruction of the plunge pool and rip-rap stabilization of the outlet channel. Since all sediment sources have not been identified, further investigation is required before other corrective action is recommended. Erosion of the outlet channel may account for observed sediments in the wetland, or there may be a significant load in the discharge. Additional discussion regarding recommendations for future action is found in the introduction.

This outfall has been deemed a high priority due to the observable sediment and floatables within the wetland downstream of the outfall, the expected pollutant load of the discharge, and infrastructure instability. It is presumed that this outfall is privately owned as it does not appear on the Vernon Engineering Department's stormwater maps.

VR041 – Behind Tri-City Plaza

The outfall takes discharge from the majority of Tri-City Plaza's parking lots. The pipe is approximately 36" and, upon inspection, was discharging water with no recent rainfall. There is a damaged trash rack over the end of the pipe. Water flows into a shallow plunge pool with large sediment deposits directly opposite the discharge. The banks of the pool are covered with iron bacteria. Standing water in the pool has a bluish-green hue. Algae and/or bacteria cover the rock in pool, indicating nutrient enrichment. . In addition, an oil-like sheen was observed on the surface of the pool, most highly concentrated toward the banks. The pool discharges into a small outlet stream which flows 30 feet before emptying into the Hockanum River.

This outfall has been deemed a high priority due to water quality concerns and degradation of the Hockanum River. It is presumed that this outfall and the piping associated with it are privately owned as it does not appear on the Vernon Engineering Department's stormwater maps. The District recommends additional water quality sampling in order to determine possible future remedial action. The discharge is adjacent to a large (probably man-made) wetland that may be suitable for water quality treatment. Due to the extent of alterations that this would require, the District recommends further investigation.

VR052 – Commercial Lot, Talcottville Rd.

The outfall is located in the northwest corner of an oversized parking lot. The lot slopes down to the outfall area, transporting large amounts of runoff during storm events. Bordering the northwest side of the lot is a steep slope of twenty to thirty feet. Erosion of

the slope has caused a failure of the parking lot and catch basin. The parking lot pavement has cracked and the underlying fill is unstable. With the curb gone, runoff flows down the slope causing erosion and undercutting the pavement, resulting in further failure. The catch basin is no longer effective and the pipe to the discharge has become disconnected. The area is full of trash, brush, sediment and debris. The slope is actively eroding and will continue to degrade the parking lot with every major rainstorm. Runoff from the parking lot now flow uninterrupted down the slope of the parking, carrying large amounts of sediment. It then intercepts a small stream and enters the Hockanum.

Considering the severity of the failure and the active erosion, the District recommends a complete infrastructure reconstruction for the corner of the parking lot. This outfall has been rated as a high priority due to water quality concerns and active erosion on the parking lot slope. It is presumed that this outfall and the pipes associated with it are privately owned as they do not appear on the Vernon Engineering Department's stormwater maps.

Selective Update to NCCD Summary Report

NCCD NPS Management Project 08-04b
Between 2009-2010, the North Central Conservation District (NCCD) evaluated stormwater outfalls that discharged to the main-stem Hockanum River, and prioritized them for repair, retrofit or upgrade in accordance with the MS4 General Permit's Minimum Control Measure Item 6, which requires development and implementation of a program to evaluate conveyances, structures, and outfalls for repair and retrofit. Discharges were categorized into low, moderate, and high priority based on several factors including: the expected pollutant load, the condition of the infrastructure, sedimentation and/or erosion, fish passage, the relative value of the receiving wetland or waterbody as a resource, and the extent of its degradation. In total, district staff identified six moderate priority discharges and five high priority discharges.

In 2015, NCCD was asked by the Town of Vernon to reevaluate two of the high priority stormwater outfall locations, at which improvements had been made since the original evaluation. In both cases, it was evident that infrastructure improvements had been made, significant enough to downgrade the level of priority at both locations, although further work was warranted to provide additional improvement in both areas. Below are updated descriptions for each site.

VR001 – Cemetery Avenue
The outfall carries water from an intermittent stream through a culvert underneath Cemetery Avenue. Two catch basins in the road above the culvert take drainage and discharge through a small (8") pipe, located above a 40"culvert. Both pipes discharge onto a concrete splash pad. Upon original inspection in 2009, a concrete extension of the main flared outlet was cracked and undercut from soil erosion, below which was a 12-15 foot drop down an unconsolidated rock and rip rap gully into the eroded bed of the stream. Both the bed and the banks of the stream were severely eroded, with slopes of 10-15 feet vertically from the bed to the top-of-slope. The stream extended approximately 200 feet down a gradual slope where it empties into Paper Mill Pond. The bed of the stream was subject to active erosion, causing an observable sediment load within the stream.

NCCD revisited the site in October 2010 after learning that the Town of Vernon had made improvements to the site. The cracked splash pad had been removed, and very large rip rap had been used to stabilize the area surrounding the culvert and outfall and to elevate the base of the previously eroded gully to the level of the culvert. The large rip rap was used to armor a segment of the stream bed following the culvert, and tapered off to the level of the existing stream bed, at a more stable portion of the stream. At that time, conditions appeared relatively stable, and sediment load within the stream bed appeared to be reduced.

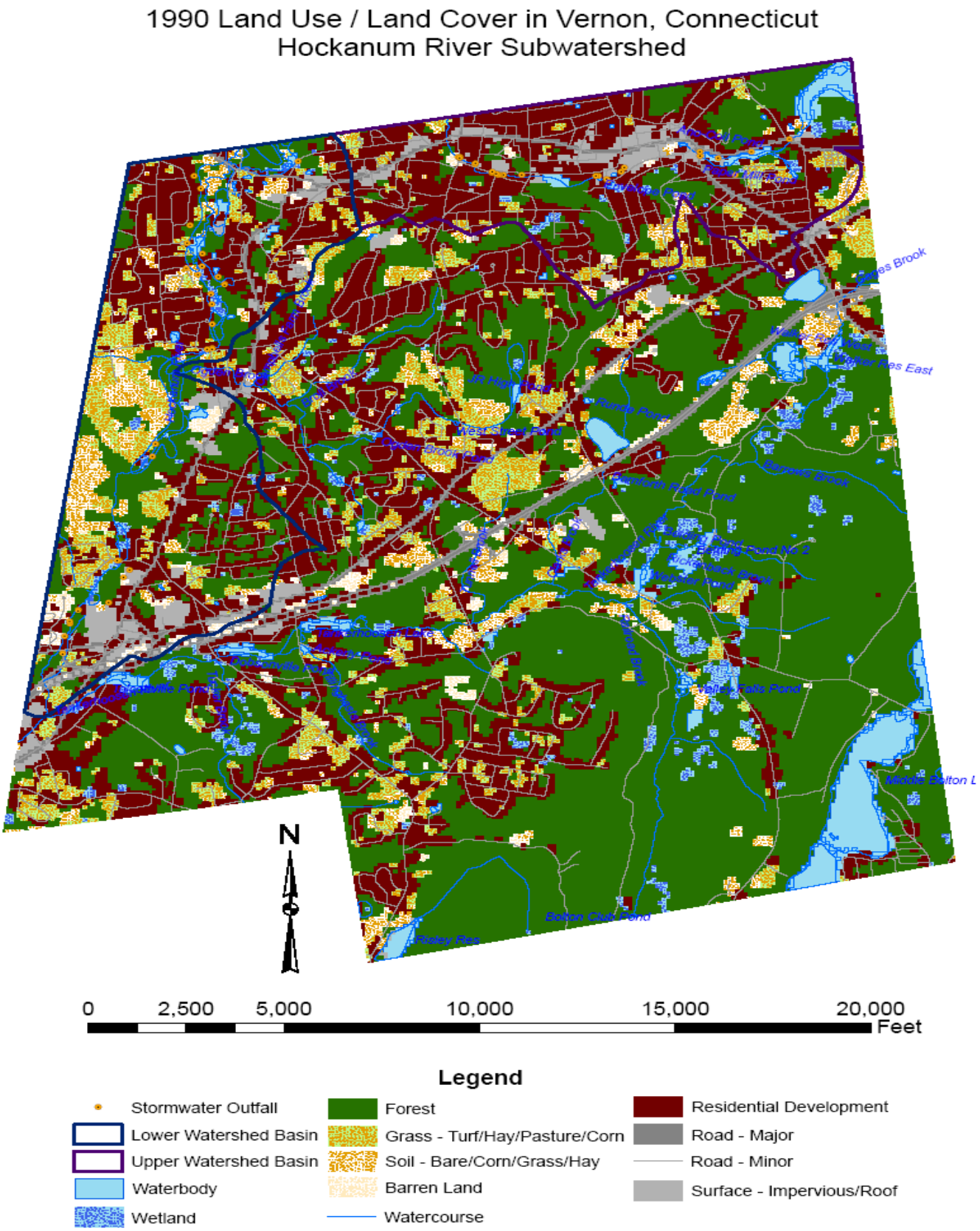
NCCD again revisited the site in June of 2015 in preparation for this update. Conditions immediately surrounding the culvert and outfall were relatively stable, as they appeared after corrective measures were taken in 2010. A new erosion issue had developed, however, immediately downstream of the large rip-rap on the western side of the stream bank. This active erosion of the stream bank is significant in size, and is contributing a large volume of sediment to the stream, and to Paper Mill Pond. The increased sedimentation is evident in the downstream bed. The erosion appears to begin at the approximate end of the large rip-rap that was deposited. Appended photos provide greater clarity.

Rip-rap or other stream bank stabilization practice should extend further through the gully to stabilize the remaining steep banks of this stream leading to Paper Mill Pond.

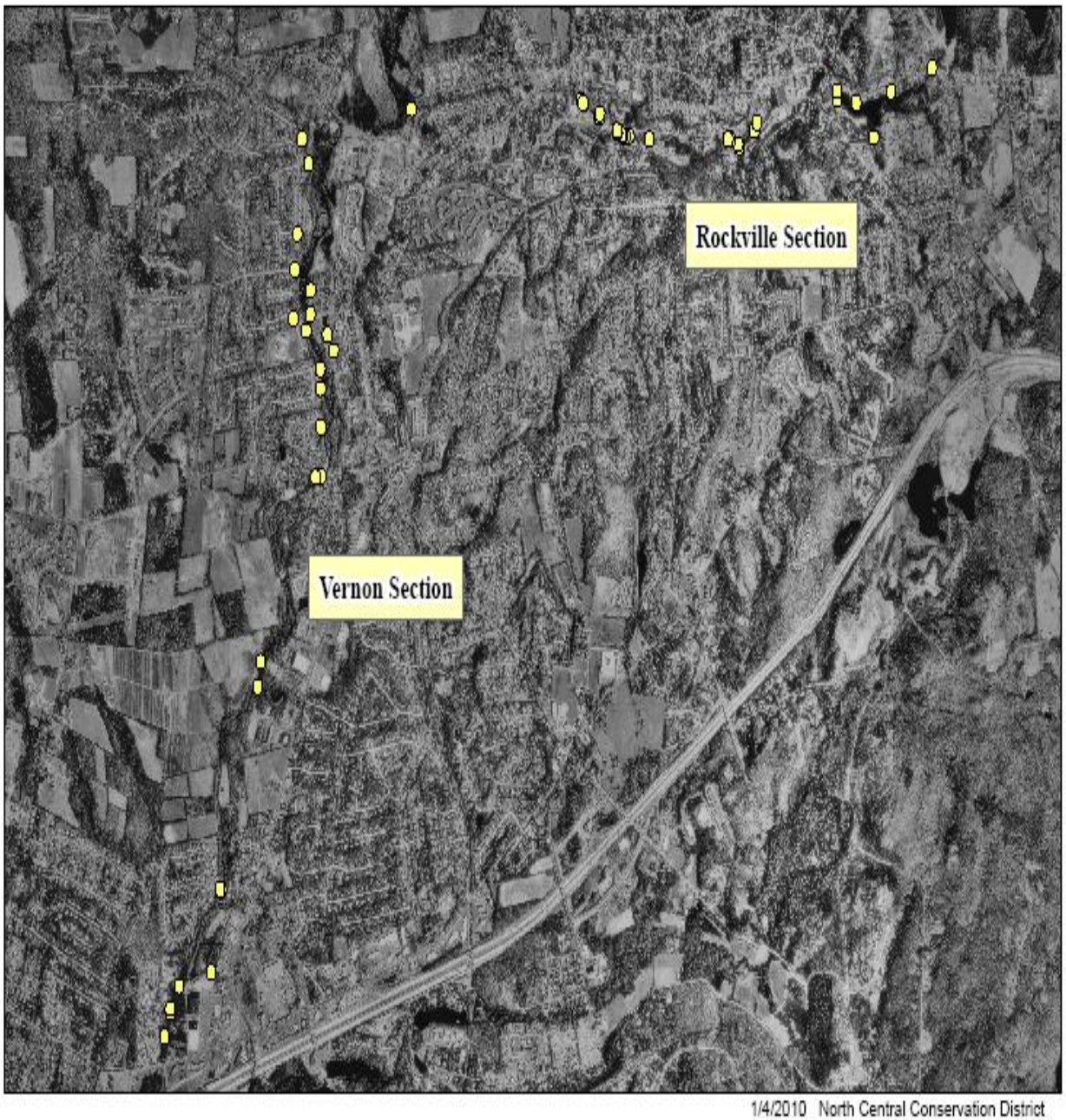
VR052 – Commercial Lot, Talcottville Rd.

The outfall is located in the northwest corner of an oversized parking lot. Upon initial inspection in January of 2010, the lot was observed to slope down toward the corner of the lot, conveying large amounts of stormwater runoff toward this corner during storm events. Bordering the northwest side of the lot was a steep slope, approximately twenty to thirty feet in height. Erosion of the slope had caused a failure of the parking lot and catch basin. The parking lot pavement was cracked and the underlying fill was unstable. With the curb gone, runoff flowed down the embankment, causing erosion and undercutting the pavement, resulting in further failure. The catch basin was no longer effective and the pipe to the discharge had become disconnected. The area was full of trash, brush, sediment and debris. The slope was actively eroding, and the parking lot deteriorating with every major rainstorm. Runoff from the parking lot flowed uninterrupted down the slope of the parking, carrying large amounts of sediment. It then joins a small stream before entering the Hockanum River.

Upon re-inspection in April 2015, initiated by a proposed redevelopment within the adjacent parcel, NCCD staff observed some improvements to the site, yet noted room for further improvement. The edge of the parking lot appeared to have been improved structurally, with the discontinued catch basin removed, although pieces of asphalt pavement beyond the limit of the parking lot were visible. NCCD staff viewed the site from the parking lot, and did not enter the stream corridor. In addition, NCCD staff attempted to visit the site again in June of 2015, but dense vegetation precluded a follow-up visit. Based on our visual assessment in April of 2015, stormwater appears to overtop the curbed parking lot, and erodes down the embankment, creating a rill with more deeply eroded inclusions, discharging to the stream below. A significant amount of garbage and debris was present within the embankment as well. Stormwater management continues to be of concern at this site. While the former catch basin was completely undermined and ineffective, some form of stormwater management is needed. A new catch basin and carefully designed discharge point, or other stormwater management practice, may be necessary to reduce the erosion being caused by untreated and unmanaged stormwater running off the corner of this lot.


1990 Land Use / Land Cover in Vernon, Connecticut
Hockanum River Subwatershed
N
0
2,500
5,000
10,000
15,000
20,000
Feet
Legend
Stormwater Outfall
Lower Watershed Basin
Upper Watershed Basin
Waterbody
Wetland
Forest
Grass - Turf/Hay/Pasture/Corn
Soil - Bare/Corn/Grass/Hay
Barren Land
Watercourse
Residential Development
Road - Major
Road - Minor
Surface - Impervious/Roof

Vernon Hockanum River Stormwater Outfall Locations



1/4/2010 North Central Conservation District

OUTLET INFORMATION ALONG THE HOCKANUM RIVER

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR001	Cemetery Ave	41.8649	72.4388	8	PVC	Fair	Concrete flared end	Erosion from outfall and attached culvert. Large sediment delta extending well into the pond. Bank slopes of "stream" steep and erodible.	No	Bank stabilization	Moderate	High	Moderate
VR002	Grove St.	41.8666	72.4421	22	PVC	Fair	PVC pipe for 8', then concrete. Outfall integrated into bridge structure. Rip rap functional	Large sediment delta extending into PMP. Presumed road sediment.	Yes	Sump or Hydrodynamic separator	Low	High	Moderate
VR003	Grove St.	41.8669	72.4421	~22	Conc.	Fair	Steep drop after outfall, protected by functional rip rap. Integrated into concrete retaining wall	Large sediment delta extending into PMP. Presumed road sediment. May take runoff from Amerbelle parking lot into two CB's down hill	Yes	Catch basin maintenance	Moderate	High	Low
VR004	East Main St.	41.8664	72.4404	Unknown	Conc.	Poor	Pipe deteriorating, rebar exposed. Blocked by vegetation.	Large sediment delta extending into PMP. Pipe blocked by tree and other vegetation.	Yes	Sump or Hydrodynamic separator	High	High	Moderate
VR005	East Main St.	41.8669	72.4373	~24	Conc.	Unknown	Pipe is submerged ~4" below water level. Only top half of pipe is open for flow. Iron leaching bacteria in outlet stream. Pipe discharging without recent rain.	Sediment delta extending into PMP, which is extremely shallow in this area (~2' deep)	Yes	Sump or Hydrodynamic separator	Moderate	High	Moderate

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR006	East Main St.	41.8679	72.4337	~15	Conc.	Excellent	Integrated into concrete retaining wall / culvert structure. Outlet has a built-in trash rack with chicken wire inlay. Both racks empty.	Small amount of sediment downstream. Entire area is fenced off and inaccessible.	Yes	N/A	Low	Low	Low
VR007	West Main St.	41.8652	72.4494	~20	Conc.	Fair	Pipe juts out of side of bank, 40' down and 5' above stream. Extender no longer attached and has been fitted with rudimentary cap, most likely purposely discontinued. Rip rap, natural or manmade, protecting outlet.	Runoff cascading down the hill as well as water from pipe may further erode soil from around mouth of pipe.	No	Construct headwall	Low	Low	Low
VR008	West Main St.	41.8656	72.4492	~10	Conc.	Excellent	Pipe protrudes from adjoining parking lot, where gutter pipe is submerged. Most likely roof runoff.	Pipe is precariously supported by retaining wall of culvert. Discharges water from 20' above stream level	Yes		Low	Low	Low
VR009	Brooklyn St.	41.8645	72.4508	~16	Conc.	Excellent	Flared pipe. Long rip-rap swale with built-in detention pool appx. 60 feet down slope.	Detention pool is full of sediment, requires removal and regular maintenance. Otherwise, structure working perfectly	No	Regular maintenance	High	High	Low

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR010	Brooklyn St.	41.8646	72.4509	~36	Conc.	Excellent	Integrated into bridge structure. Flowing with no rain in 4-5 days. Discharges 15' directly into Hockanum	No outlet protection	No	Outlet protection	High	High	Low
VR011	West Main St.	41.8649	72.4517	~24	Corrugated Metal	Fair	Plastic pipe flare attached to corrugated pipe. Rip rap swale leading to Hockanum. Appears to be a completed retrofit.	No real problems; rip rap functional, sediment at mouth appears to be bed sediment.	No	N/A	High	High	Low
VR012	West Main St.	41.8649	72.4518		N/A			Tunnel: brick lined, appears to be discharging ground water. Requires revisit. See EXCEL sheet for more information.	No		High	High	Low
VR013	West Main St.	-	-	-	Conc.		Flared pipe end	Barbed wire prevents access. Seen from across river. Requires revisit. See EXCEL for more information	No		High	High	Low
VR014	West Main St.	41.8649	72.4588	16	Conc.	Fair	Flared pipe end, rip rap swale	Outfall is downstream from active construction. Only associated CB is in dirt parking lot surrounded by E&S hay bales. About 2" of sediment line the mouth of the pipe. Rip rap appears functional in catching sediment before Hock.	No	Sediment maintenance; will most likely solve itself after construction ceases	High	High	Low
VR015	West Main St.	41.8650	72.4605	20	Conc.	Fair	Stone headwall, flared end, rip rap swale	No outlet protection. Requires rip rap. Some sediment along swale and at river bank.	No	Outlet protection	High	High	Low

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR016	River St.	41.8650	72.4609	12	Terra Cotta	Fair	Pipe made of clay. No other structures. Catch basins appear old and small (undersized?)	Scour pool occurring at discharge, sediment collecting. No outlet protection. Bank is lined with concrete blocks (old bank stabilization measure?)	No	Outlet protection : flared pipe fitting or a circle of rip rap to act as a detention pool.	High	High	Low
VR017	River St.	41.8650	72.4611	15	Conc.	Fair	Headwall, flared end (slightly cracked on left side.) Large 3' dropoff after flare, no outlet protection. Outfall discharges water from the right side of Morrison Street Hill	Needs outlet protection. Sediment visible around catch basin and at discharge point.	No	Outlet protection : energy dissipatin g steps or rip rap under 3' dropoff	High	High	Moderate
VR018	River St.	41.8651	72.4612	18	Terra Cotta	Fair	Clay pipe. No other structures. Catch basins old, small. Many CB's along left side of Morrison St. Hill.	Scour pool behind concrete blocks. Sedimentation probable, although not visibe because pipe discharges directly into stream.	No	Outlet protection : circle of rip rap to act as detention pool	High	High	Low
VR019	West Main St.	41.8659	72.4632	13	Plastic	Fair	Plastic pipe. No CB associated, just a pipe leading to outfall.	Some sedimentation and erosion. No catch basin means sediment discharges directly into stream.	No	Sump or Hydrodyn amic separator, Outlet protection	High	High	Moderate
VR020	Maple St.	41.8660	72.4631	~36	Brick	Poor	Brick structure, possibly a culvert. Most likely mill architechture. Double-barrelled. Falling apart near end. Connects to at least one CB.	Large amounts of sediment along inlet stream. Structure deteriorating.	Yes	Constructi on of detention pool in inlet stream	High	High	Low

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR021	River St.	41.8652	72.4616	12	Terra Cotta	Poor	Pipe is cracked and broken. Built into retaining wall of bridge structure. Catch basin is old and undersized.	Large island of sediment directly underneath outfall, unclear whether sediment originates from pipe or stream blockage upstream.	Yes	Sump or Hydrodynamic separator, Outlet protection	Moderate	High	Moderate
VR022	West Main St.	41.8653	72.4616	12	Terra Cotta	Unknown	No catch basin, inlet contains pipe that discharges directly into stream. Outfall is obscured by vegetation.	Large amounts of sediment in front of inlet pipe to outfall.	No		High	High	Low
VR023	River St.	41.8665	72.4646	15	Conc.	Fair	Pipe is part of a bridge structure with retaining wall.		No		High	High	Low
VR024	West St.	41.8665	72.4647	16	Conc.	Fair	Concrete bridge-integrated pipe. 2' drop from pipe to stream level.	No outlet protection	No	N/A	Low	Low	Low
VR025	West St.	41.8666	72.4648	16	Conc.	Fair	Concrete bridge-integrated pipe.	No outlet protection	No	N/A	Low	Low	Low
VR026	Franklin St.	41.8662	72.4798	Unknown	Unknown	Unknown			No		High	High	Low
VR027	Dart Hill Rd.	41.8503	72.4879	22	Conc.	Fair	Concrete headwall / pipe combo.	No outlet protection. Sediment in pipe and delta at outlet. Bank eroded away, exposing tree roots. Needs rip rap.	Yes	Outlet protection necessary. New catch basin may be necessary, or sump may need cleaning and maintenance.	High	High	Low

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR028	Dart Hill Rd.	41.8503	72.4884	~30	Corrugated Metal	Poor	Metal pipe degrading and may need replacement. Discharges directly into stream. Paved swale adjacent to OF	No outlet protection. Small amount of erosion.	Yes	Outlet protection necessary (rip rap)	High	High	Low
VR029	Naek Rd.	41.8412	72.4935	~24	Conc.	Fair	Standard concrete pipe in fair condition	Large amounts of sediment at discharge location. Small winding stream catches sediment, but some still reaches stream. Takes drainage from industrial park which is privately owned and sanded.	Yes	Catch basin maintenance, Hydrodynamic separator, line small stream with rip rap	Moderate	High	Low
VR030	Wolcott	41.8593	72.4902	43	Conc.	Fair	Concrete headwall-integrated pipe. Splash pad underneath outfall, but undersized and ineffective. Rip rap scattered	Large amounts of sediment and erosion of the banks of the discharge stream. Needs more outfall protection, discharges a large amount of water.	Yes	Hydrodynamic separator, line small stream with rip rap	High	High	Low
VR031	Neill / Barbara Rd.	41.8549	72.488	12	Conc.	Poor	Pipe has become disjointed, now in two segments.	Difficult to determine sedimentation and trash due as the discharge is in equilibrium with the Hockanum.	No	Pipe maintenance	High	High	Low
VR032	Countrywood at Vernon Apartments	41.8558	72.4867	36	Conc.	Fair	Flared end. Pipe drains into vegetated wetland area about 300-400 feet from the Hockanum.	Area of sediment at mouth of the outfall. Drains majority of adjacent apartment complex's southern parking lots. No major problems.	No	N/A	High	High	Low

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR033	Countrywood at Vernon Apartments	41.8565	72.4873	~16	Conc.	Fair	Flared end. Pipe is slightly buried by sediment. Discharge once lined with rip rap which has now also become buried.	Outfall empties into small stream coming from dammed pond. Two swales (one intentional) emptying into pond.	No	Pipe excavation	High	High	Low
VR034	Countrywood at Vernon Apartments	41.8573	72.4888	20	Conc.	Fair	Flared end. Catch basin is covered with debris, impeding water flow.	Heavily sedimentated. Outfall opens to a delta of sediment.	Yes	Pipe excavation, rip rap detention area	High	High	Low
VR035	Countrywood at Vernon Apartments	41.8584	72.4888	~20	Conc.	Fair	Pipe itself in fair condition.	Outfall completely choked with sediment. 40' discharge stream to Hockanum is full of large amounts of road sediment. Water is unable to discharge from the pipe. Sediment 2.5' deep in some places.	Yes	Hydrodynamic Separator, grass-lined swale	High	High	High
VR036	Tri-City Plaza	41.8288	72.4977	54	Conc.	Fair	Pipe is in fair condition. Rip rap detention structure needs to be rebuilt.	Banks of large plunge pool undergoing severe erosion. Sedimentation minimal. Banks appear to be a built-up berm, but are being eroded away.	Yes	Characterize pollutant load, bank stabilization	High	High	High
VR037	Hockanum Boulevard	41.8423	72.4932	25	Conc.	Fair	Flared concrete pipe with 25'+ grass swale leading to Hockanum.	Outfall appears new and to be functioning properly.	No	N/A	High	High	Low

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR038	Vernon Village	41.8261	72.5018	15	Conc.	Fair	Outfall is protected by cinderblocks that appear to be maintaining stability of the bank and catching trash / sediment. Bank is lined with concrete slabs.	Outfall is not in good condition but appears to be functioning well. Difficult to determine amount of sediment and trash discharge as it discharges directly into the stream.	No	Pipe maintenance / outfall protection	High	High	Low
VR039	Vernon Village	41.8271	72.5013	~ 5	PVC	Fair	Small pipe protruding from bank. Elevated about three feet above the stream.	Unable to find a concrete pipe where Vernon's Engineering Department indicated there would be one. Assuming this is the pipe, it appears vastly undersized.	No	New pipe installation	High	High	Low
VR040	Vernon Village	41.8272	72.5014	~ 5	PVC	Fair	Small pipe protruding from bank. Elevated about three feet above the stream.	Unable to find a concrete pipe where Vernon's Engineering Department indicated there would be one. Assuming this is the pipe, it appears vastly undersized.	No	New pipe installation	High	High	Low
VR041	Behind Tri-City Plaza	41.8282	72.5005	~36	Conc.	Fair	Large pipe from direction of Tri-City Plaza. Discharging. Banks of plunge pool are eroding. Some sediment.	Large quantities of iron-leaching bacteria. Water is a blue-green color. Bacteria-laden rocks in plunge pool, appear "fuzzy". Oil-like sheen on surface of pool to the left of the OF.	Yes	Characterize pollutant load, bank stabilization	High	High	High
VR042	Sunset Ter.	41.8324	72.4967	11	Conc.	Fair	Pipe discharges directly into stream above stream level, but has rip rap protection.	No significant problems.	No	N/A	High	High	Low

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR043	Sunset Ter.	41.8324	72.4969	~15	Corrugated Metal	Fair	Pipe discharges directly into stream above stream level with no outlet protection	No outlet protection.	No	Outlet protection: energy dissipating steps or rip rap	High	High	Low
VR044	Hayes Dr.	41.8566	72.4892	~48	Conc.	Fair	Flared end. Pipe takes drainage from Skinner Road School. No CB on street, continuation of pipe.	Sediment present at mouth of outfall. No CB means road sediment from Hayes Drive discharging directly out pipe with no control measure.	Yes	New CB	High	High	Low
VR045	Hayes Dr.	41.8572	72.4903	24	Conc.	Fair	Headwall-integrated pipe. Pipe takes drainage from Skinner Road School	Banks of small inlet stream (dry) are eroding. Fallen branches are keeping sediment contained, but sediment is visible throughout length of stream.	Yes	New CB / Hydrodynamic separator	High	High	Low
VR046	Gerald Dr.	41.8639	72.4889	~28	Conc.	Fair	Headwall-integrated pipe. Only half of the outfall is visible, the rest is buried in sediment.	Despite being buried, outfall appears to be functioning properly.	Yes	Rip rap for sediment capture/retention	High	High	Low
VR047	Gerald Dr.	41.8649	72.4895	~36	Conc.	Fair	Pipe is in fair condition.	Large pipe empties into "detention pool", not designed as such. Access road alongside inlet stream. Sedimentation evident downstream, large deposits at bends.	Yes	Detention Pool / Ditch modified into functional sediment control structure	High	High	Low
VR048	Neill Rd.	41.8541	72.4879	~28	Conc.	Fair	Partial headwall structure in fair/poor condition	Large amounts of trash (plastic bags, tires), sedimentation. Erosion around the mouth of the outfall.	Yes	Rip rap / other sediment control measure	High	High	Low

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR049	Lawler Rd.	41.8525	72.4879	~18	Conc.	Fair	Pipe obscured by sediment	Pipe is at least half full of sediment, impeding discharge flow. Sediment is in bars where land flattens, and in large amounts.	Yes	Pipe cleaning / excavation	High	High	Low
VR050	Gerald Dr.	41.8608	72.4899	~36	Conc.	Fair	Headwall-integrated pipe in fair condition. Culvert entering side of "basin", culvert for draining adjacent above-ground pool directly into stream / Hock	Similar situation as VR047. Pipe discharging into small stream acting as a detention area. Water pooling throughout, may be at equilibrium with Hockanum. Large quantities of sediment filling "basin", erosion of banks.	No	Detention Pool / Ditch modified into functional sediment control structure	High	High	Low
VR051	Gerald Dr.	41.8647	72.4894	~18	Conc.	Fair	Headwall-integrated pipe in fair condition.	Erosion present but minimal, banks of outlet stream eroding. Erosion increases downstream. Stream empties onto floodplain of Hockanum Marsh area.	Yes	Bank stabilization	High	High	Low
VR052	Talcottville Rd.	41.8316	72.4957	N/A	N/A	Poor	Water sheets from parking lot into the area and cascades down steep slope, carrying sediment, garbage, and vegetation. Catastrophic failure.	Erosion, garbage, invasive plants. System no longer functioning properly. Sediment being carried down the slope and into small stream that empties into Hockanum	Yes	Complete reconstruction of corner of parking lot. New, larger capacity CB and piping, slope stabilization, trash removal, parking lot reconstruction.	High	High	Moderate

ID #	Nearest Street	GPS N	GPS W	Dia. (in)	Pipe Material	Condition	Infrastructure Comments	Issues / Concerns	Resource Degradation	Retrofit / BMP	Access	Feasibility	Priority
VR053	Talcottville Rd.	41.8310	72.4963	~18	Metal	Fair	Pipe once had a metal energy spreader attached, now detached.	Minimal sedimentation and erosion, outfall appears to be functioning properly.	No	Reattach energy spreader	High	High	Low
VR054	Quail Crossing	41.8470	72.4924	48+	Plastic	Fair	Part of detention basin system. Functioning properly	Functioning properly	No	N/A	High	High	Low
VR055	Hockanum Boulevard	41.8366	72.4973	~28	Conc.	Fair	Part of detention basin system. Functioning properly	Functioning properly	No	N/A	High	High	Low
VR056	Kelly Rd.	41.8246	72.5021	~24	Conc.	Fair	Unknown where the discharged water comes from. Water is at equilibrium but flowing.	Evidence of outlet channel overflowing, some sedimentation	Yes	N/A	High	High	Low