VILLAGE OF HARTLAND

Village of Hartland Storm Water Management / TMDL Plan Update

May, 2017

Village of Hartland

Ruekert • Mielke

Ruekert • Mielke
Your Infrastructure Ally

W233 N2080 Ridgeview Parkway • Waukesha, WI 53188-1020 • Tel. (262) 542-5733

June 22, 2017

Mr. Michael Einweck, P.E.
Director of Public Works
Municipal Building
Village of Hartland
210 Cottonwood Avenue
Hartland, WI 53029

Re: Village of Hartland Storm Water Quality / TMDL Master Plan Update

Dear Mike:

The Village of Hartland's storm water quality master plan has been updated to guide the Village of Hartland in cost effectively managing, maintaining and improving the quality of the water resources in the Village. This plan will help the Village to progressively meet current and future storm water permit requirements in a stepped approach, and provide opportunities for individuals who live, work and play in the Village of Hartland to enjoy and benefit from the nearby lakes and rivers.

This report is intended to comply with many aspects of the Village's Municipal Separate Storm Sewer System (MS4) permit, including the Total Maximum Daily Load (TMDL) requirements. This includes revised mapping, modeling and planning requirements; ordinance revision and long-term maintenance program requirements; public works yard pollution prevention plan and updated village-wide MS4 map requirements. It also updates the water quality portion of the Village's 2010 Storm Water Quality Management Plan and revises the Illicit Discharge Detection and Elimination (IDDE) program. The updates to the Village's storm water quality master plan found in this report will:

1. Describe the Village's existing storm water quality management system.

2. Describe existing municipal storm water permit requirements, anticipated future permit requirements and subsequent water quality improvement efforts.

3. Describe the Rock River TMDL as it applies to the Village of Hartland; evaluated the Village's storm water system as compared to the goals of the TMDL.

4. Present alternative water quality best management practices which meet the requirements developed in items 1 and 2 above.

5. Provide a comparative evaluation of the technical, economic and environmental features of the alternative best management practices.

6. Recommend a cost-effective, comprehensive storm water quality master plan for the Village of Hartland.

7. Provide an updated MS4 map with TMDL "Reachsheds" shown on it.

8. Provide information on necessary maintenance of storm water facilities in the Village, along with a spreadsheet inventory of the storm water facilities in the Village that can be updated to track maintenance of storm water practices.

9. Provide a revised Storm Water Pollution Prevention Plan for public works yard activities at the municipal property at 701 Progress Drive.

10. Revise the existing Illicit Discharge Detection and Elimination program following the Department of Natural Resources' (WDNR) Priority Outfalls approach, as described in the WDNR Guidance Document # 3800-2012-01 dated March 15, 2012.

11. Revised erosion control and storm water ordinance to meet the updated requirements of NR 151, Wisconsin Administrative Code.

The recommended multi-year plan laid out in this report focuses on meeting the Total Suspended Solids (TSS) reductions required in the Rock River Basin TMDL. The recommended practices will control TSS and the pollutants attached to those sediment particles, including phosphorus. Additional research and information specifically regarding phosphorus control from urban storm water management practices is expected to come out over the next few years. This new information may present more cost-effective options to specifically control phosphorus in the future, as opposed to implementing many expensive traditional storm water practices that, individually, only capture a small amount of phosphorus.

MS4 Permit Requirements

The Village of Hartland initially received coverage under the Wisconsin Department of Natural Resources' (WDNR) Municipal Separate Storm Sewer System (MS4) General Permit no. WI-S050075-1 in November 2006. The Village is currently covered under the MS4 permit that was re-issued in May 2014 (permit no. WI -S050075-2). The MS4 permit requires the Village to complete a multitude of activities aimed at improving the quality of storm water runoff entering the nearby rivers, lakes and wetlands, including:

- Public Information and Education Program to inform the public of ways to reduce the amount of pollution in storm water runoff reaching the local lakes, stream and wetlands.

- Public Involvement Program to encourage individuals and groups to work on water quality improvements in the community
- Illicit Discharge Detection and Elimination Program to find and resolve instances of liquids and pollutants other than rain water and snow melt that flow at times through the Village's storm sewer system
- Construction Site Pollution Control Program to reduce the amount of sediment, nutrients and other pollutants that reach the local streams, lakes and wetlands during construction projects
- Post-Construction Storm Water Runoff Program to require new and re-development projects to install controls to reduce the amount of sediment, nutrients and other pollutants that reach the Village's storm sewer system over time after the project has been completed
- Pollution Prevention Activities to minimize the amount of pollutants that enter the local streams, lakes and wetlands from regular municipal operations such as leaf pick-up operations, winter road salting, DPW yard maintenance, fertilizing publicly owned spaces, maintenance of storm water treatment facilities, etc.
- MS4 Map to illustrate the Village' storm sewer system and the publicly and privately owned storm water treatment facilities that are included
- Source Reduction Modeling to evaluate the effectiveness of the storm water facilities that have been constructed in the Village and to quantify the amount of TSS and Phosphorus that is captured in these facilities, and not reaching the local waterways.

The re-issued MS4 permit of 2014 also included requirements for the Village to meet regarding the Rock River Basin Total Maximum Daily Load (TMDL) analysis, which was completed and approved by WDNR and the U.S. Environmental Protection Agency (EPA) in 2011. These requirements included:

- A MS4 Map update to show the TMDL reachsheds on the map
- An analysis of the Village's storm water treatment facilities and practices as compared to the pollutant reductions required in the TMDL
- A plan to achieve the pollutant reductions found in the TMDL, if the Village is not currently meeting these goals.

The MS4 permit requires an annual report to be submitted to the WDNR summarizing and quantifying the progress of these programs by March 31st of each year.

In preparation for the initial MS4 permit coverage, Village staff hired Strand Associates, Inc. to complete a storm water quality management plan to achieve the goals of the MS4 permit in 2005. The study identified actual and potential storm water capacity, flood

control and water quality concerns within the Village and recommended needed corrective measures. Capital, operation, and maintenance costs attendant to the recommended corrective measures were estimated, and a plan implementation program developed. The results of the water quality modeling effort completed as part of the 2009 storm water management plan, using WinSLAMM version 9.4.1, put the Village at 41.5% Total Suspended Solids (TSS) control and 32.3% Phosphorus (P) control Village-wide. The reported TSS control met the TSS reduction requirements of the past MS4 permit of 20% TSS control by 2008, Village-wide. The current MS4 permit requires the Village to maintain the previously reported TSS controls of 41.5% Village-wide as of June 2011.

Since 2006, the Village of Hartland has reduced the amount of pollution flowing into the local waterways by implementing measures such as requiring new and redevelopment projects to include long-term storm water pollution controls, by inspecting the erosion control measures during construction projects, through street sweeping and other similar measures. The current previously reported TSS controls of 41.5% from the 2010 storm water management plan update has since increased to 51% TSS control Village-wide. This shows the progress achieved in since the original 2005 storm water management study and the impacts the Village's efforts have produced to improve water quality in the area.

Rock River TMDL Requirements

Monitoring efforts over many years in the Rock River Basin have found many tributary rivers and the Rock River itself to be impaired by too much Total Suspended Solids (TSS) and Phosphorus to meet water quality standards and targets to support a fishable, swimmable river system.

The Rock River has been listed as an impaired water on the State's 303(d) list for many years. The primary pollutants of concern are phosphorus and sediment, which lead to nuisance algae growth, oxygen depletion, increased submerged aquatic vegetation, water clarity problems and degraded habitat. These impairments adversely impact fish and other aquatic life, water quality, recreation, navigation and can lead to public health concerns. The Rock River TMDL was completed and approved by EPA in September of 2011, addressing 62 segments of 39 of Wisconsin's impaired waters.

While the Bark River is not officially designated as "impaired" in the immediate Hartland area, the Bark River is impaired for low dissolved oxygen (DO) approximately 9 miles downstream, upstream of the Village of Dousman. Phosphorus is listed as the primary pollutant of concern and the sources are listed as nonpoint and urban runoff. The TMDL requirements in the Village's permits are associated with pollutant reductions, specifically reductions in TSS and phosphorus, while the overall goal of the TMDL is to remove, or "de-list", waterways from Wisconsin's Impaired Waters List. Methods and practices to improve

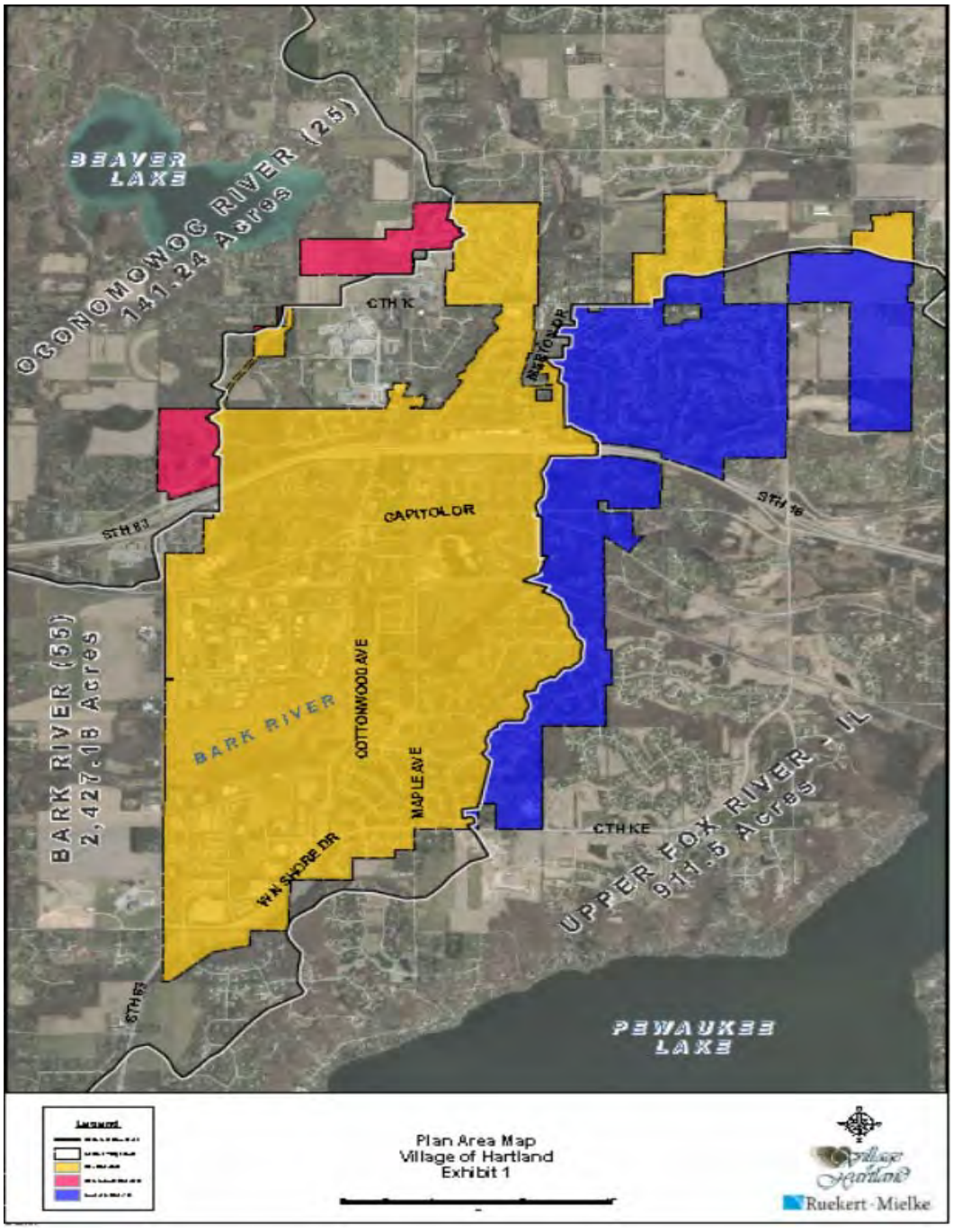
the dissolved oxygen levels along the Bark River, thus improving the quality of the river, can be included in the list of alternatives that the Village will evaluate and implement to meet the TMDL requirements under the MS4 permit.

The Rock River watershed (and corresponding TMDL boundary) is shown graphically on the following page.

Source: Rock River Basin TMDL Report, 2011

In accordance with the MS4 permit, the Village of Hartland is required to meet the TSS and phosphorus reductions shown in the Rock River TMDL report for the lands in the Village that drain to the Bark River (Reach 55) and the Oconomowoc River (Reach 25). While the majority of the Village drains to the Bark River, there is a portion of the northwest part of the Village that drains to the Oconomowoc River reachshed (Reach 25). A portion of the east side

of the Village also drains toward the (Illinois) Fox River Basin, which does not currently have a TMDL or specific wasteload allocations to meet in this area.



The pollutant reduction goals, or wasteload allocations, are based on actual in-stream monitoring data for the different waterways in the Rock River Basin. The results of the evaluation of the Village's existing storm water treatment system as compared to the pollutant reduction goals found in the TMDL report are:

Table 1. Existing Village of Hartland Storm Water Pollutant Control as compared to the Rock River TMDL TSS & Phosphorus Wasteload Allocations

(Represented in Percent Reductions compared to No Storm Water Practice Controls)

Waterway (Reach)	TSS % Reduction in TMDL	Phosphorus % Reduction in TMDL	Existing Village TSS % Reduction	Existing Village Phosphorus % Reduction
Bark River (Reach 55)	66%	77%	47%	38%
Oconomowoc River (Reach 25)	59%	74%	94%	70%

The Village is close to meeting the goals of the TMDL for TSS and approximately halfway to the phosphorus goal. This analysis is based on the traditional storm water facilities that can be modeled in the Windows Source Loading and Modeling Method (WinSLAMM) computer model, which has been used over the years to meet the MS4 permit requirements. The Village of Hartland routinely conducts other activities that do not fit into the computer model that capture and prevent additional pollutants from reaching the local surface waters. Alternative methods to quantify the pollutant control for these activities have been included in this plan.

Table 2. Non-Modelable Activities to Minimize Pollutants from reaching Local Lakes, Streams and Wetlands

Practice	Location/Frequency	Estimated Pollutant Load
Leaf Management Program	Village-wide / once per week during fall	1,000 Tons of Leaves Collected Annually
Nixon Park Pond Dredging	Nixon Park / approximately every 10 years	3,000 cubic yards of Sediment Removed every 10 years
Bark River Streambank Stabilization	Bark River / 2005 - 2015	1,350 Lineal Feet of Streambank

Leaf Management Program: The Village of Hartland has had a leaf collection and management program for many years, with Village crews picking up leaves from the curbside and storing the leaves at the Public Works yard. Village crews collect approximately 10 truckloads of leaves between mid-October and late November (weather dependent). Approximately 1,000 yards of leaves are collected from Village streets and disposed of annually at a local agricultural field, to be incorporated into the soil and used as fertilizer.

Collected leaves at Village of Hartland Public Works Yard
November 2016

Nixon Park Pond Dredging: Nixon Park Pond is an approximately ½ acre "on-line" pond, which means it is connected upstream and downstream to the Bark River in Nixon Park. Some water from the river flows into the pond and water from the pond flows out to the river on a constant basis. A walking trail connects the pond to trails along the Bark River and further throughout the Village. The pond has traditionally been managed to provide recreational opportunities such as fishing and aesthetic enjoyment of the pond for residents and others visiting Nixon Park. As sediment and nutrients from the Bark River flow into the pond and settles there, the Village has determined that dredging is needed approximately every 10 years to allow for continued enjoyment of the pond. Nixon Park Pond is functioning as a storm water quality treatment pond, capturing sediment and nutrients that would otherwise continue down the Bark River to be deposited in Nagawicka Lake and impact the Bark River further on.

The Village dredges the pond approximately once every 10 years. The amount of sediment removed from the pond, and thus from the Bark River system is approximately 3,000 cubic yards. Without the benefit of this on-line pond, the 3,000 cubic yards of sediment and attached phosphorus that is collected in the pond would continue flowing downstream, contributing to the sediment and phosphorus loads in Nagawicka Lake and further down the Bark River system.

Bark River Streambank Stabilization: The Village of Hartland has proactively addressed streambank stabilization through the installation of vegetated bio-logs in over 1,350 feet of the Bark River. This was done over 5 years through 4 separate projects, with funding

from the Wisconsin Department of Natural Resources' Targeted Runoff Management grant program. Stabilization of the banks that were previously eroding has prevented additional sediment from the streambanks from compounding the problems of excess sediment loads in the Bark River, and ultimately the Rock River, system. Streambank stabilization projects also provide habitat and cover for birds and small animals, and enhance the natural aesthetics in the parks and along the walking paths.

Streambank stabilization with bio-logs planted with native vegetation along Bark River streambanks. Walking path along river in the Nixon Park in the background.

The Village's efforts to minimize the pollutant loads in storm water over the past 10 years has had significant impacts. The Village-wide WinSLAMM modeling results for TSS control have increased from 41% to 51% in 2016. Additional practices, including the Leaf Collection and Management Program, management of Nixon Park Pond, streambank stabilization improvements and more result the capture of additional sediment and phosphorus, beyond what is accounted for in the WinSLAMM model.

A plan to close the gap between the existing storm water treatment controls and the TSS pollutant reduction goals to bring the Village closer to the phosphorus reduction goals of the TMDL report is included in the Recommendations section at the end of this report. Detailed information including cost and construction feasibility for recommendations for storm water treatment facilities, revisions to storm water control practices such as ordinances and outreach efforts, and possible in-stream improvement projects are included. Information on practices

that are currently in the research and trial stages around the country have also been included for consideration by the Village in the future, as more information becomes available.

Alternatives Evaluated to Meet the MS4 Permit and TMDL Requirements

19 different sites have been identified as potential locations for traditional storm water treatment facilities to reduce the amount of TSS and phosphorus flowing into the local waterways via the storm sewer system. These options include grass swales, infiltration basins, biofilters, biofiltration islands in parking lots, and permeable paver systems at strategic locations throughout the Village.

Locations for Potential Storm Water Treatment Facilities

1. St. Charles Church Infiltration Basin (ALT-02)
2. Progress Drive Grass Swales (ALT-01)
3. Medline Industries Infiltration Basin (ALT-10)
4. 900 Walnut Ridge Drive Biofilter (ALT-13)
5. Mill Place Subdivision Biofilter (ALT-15)
6. Hartridge Subdivision Infiltration Basin (ALT-04)
7. Village Parking Lot Bioretention Islands (northeast of North Avenue and East Capitol Drive) (ALT-03)
8. Park River Estates Biofilter (ALT-12)
9. Hartbrook Park Biofilter (ALT-06)
10. Piggly Wiggly Parking Lot Biofilter (ALT-07)
11. North Avenue Biofilter (ALT-05)
12. River Reserve Drive Biofilter (ALT-09)
13. Sunnyslope Drive Permeable Pavers (ALT-06A)
14. Capitol Drive Permeable Pavers (ALT-11)
15. Chestnut Ridge Drive Permeable Pavers (ALT-05A)
16. Granary Circle Permeable Pavers (ALT-08)
17. Rae Drive Permeable Pavers (ALT-14)
18. Hartland North Elementary School Parking Lot (ALT-02A)
19. Hartbrook Park Parking Lot Permeable Pavers (ALT-06B)

The proposed storm water facilities were determined after consideration of existing soil conditions, land use, constructability concerns, planned capital improvement projects, and impact to the waterways based on conceptual designs. Storm water treatment improvements should be considered for any future road reconstruction projects, as adding the cost of a storm water treatment system to an existing project is typically much less expensive than completing a stand-alone project to create a storm water facility in an existing developed area. Anticipated costs, regulatory concerns, and constructability concerns are identified on a map and discussed in detail in Section 4, Alternatives Plan, of this report.

Potential grant funding was also considered in the development of the recommended list to control TSS and phosphorus in storm water in the Village. Most of the projects listed would be eligible for grant funding through the Department of Natural Resources' Urban Nonpoint Source and Storm Water Grant program. These competitive grants are currently offered every other year, and will reimburse a municipality 50% (up to $150,000) of the cost of constructing a storm water practice such as an infiltration basin or a biofilter.

Non-traditional water quality practices were also evaluated and recommended based on the potential benefit to the river and the cost-effectiveness of the options. These alternatives are not proposed storm water treatment construction projects; they include programs and practices that will reduce the pollutants flowing from the land to the waterways through the storm sewer system, or possible in-stream improvements that would directly improve the water quality in the Bark River and address the impairments that triggered the development of the TMDL report.

- Pollutant Trading with Upstream Agricultural Property Owners
- Pollutant Trading with local Wastewater Treatment Plant
- Revise Storm Water Ordinance to Include a 30% Phosphorus Reduction Requirement
- Road Crossing Inventory
- Eroding Streambank / Flow Impediment Inventory
- Permeable Pavement SPEC for Developers
- Reducing Chlorides in the River
- Pet Waste Stations
- River Monitoring Program
- Storm Water Technologies Currently Under Development

MS4 Map

The Village of Hartland Municipal Separate Storm Sewer System (MS4) Map was updated to include the boundaries of the TMDL reachshed areas and recently constructed storm water facilities. Maintaining a current MS4 map is a requirement of the MS4 Permit.

Storm Water Facility Maintenance Plan

A maintenance plan for existing publicly and privately owned storm water facilities has been developed. In addition, a template has been developed for Village staff to populate with information for the storm water facilities in the Village of Hartland. Maintaining an inventory of the storm water facilities and implementing an inspection and maintenance program for those facilities is a requirement of the MS4 permit (Sections 2.5.2, 2.5.3, 2.6.1 and 2.6.2). The storm water facilities are designed to be inspected and maintained on a regulated basis; without this, they will not function appropriately and will not capture the pollutants as they were

designed. The inspection and maintenance of these features should be tracked and documented for a minimum of 5 years per the MS4 permit.

Inspections of these facilities should be completed and documented at least once every 2 years, and especially after heavy rain events. Routine maintenance such as cutting or mowing of the vegetation, and removal of debris or materials clogging the inlets/outlets, should be completed regularly throughout the warm months.

Storm Water Pollution Prevention Plan (SWPPP) for Department of Public Works / Wastewater Treatment Plant Site

The Storm Water Pollution Prevention Plan for the Department of Public Works site was revised and submitted to WDNR early in 2016 to meet the MS4 Permit requirements. A site inspection form has been included for use by village staff.

Erosion Control and Storm Water Ordinance

The Village of Hartland Erosion Control and Storm Water Ordinance was revised early in 2016. Previously developed supporting documents to help implement the Village's construction site erosion control and post-construction storm water management programs have been included in this report. These documents could be reviewed and revised for consistency with other erosion control and storm water programs in the area. Forms, permits and policies that are similar to neighboring communities makes it easier for developers and site engineers to know what is expected under these programs, and reduces the number of questions village staff repeatedly answer on development projects. Revising the actual erosion control and storm water ordinance to follow a template similar to the State of Wisconsin's model ordinance or local ordinances would also make it easier for those using the ordinance in design and planning for future development. The current ordinance does not require post-construction storm water management to address the discharge of phosphorus from developed lands to the local rivers, lakes and wetlands; a 30% phosphorus control requirement for new and redevelopment sites would be similar to controls other local communities are beginning to consider to require. A 30% phosphorus control is feasible on new and re-development sites, given current storm water technology and options, especially in communities with good, infiltrative soils, like the Village of Hartland has.

Illicit Discharge Detection and Elimination (IDDE) Program

The Village of Hartland's Illicit Discharge Detection and Elimination (IDDE) Program was revised to identify "priority" outfalls, or outfalls that have the greatest probability of having substances other than rain and snow melt discharge from the storm sewer system. The

designation of priority outfalls was based on land use, information on previous complaints or inspections that recorded illicit discharges in the outfalls, per the Wisconsin Department of Natural Resources Illicit Discharge Detection and Elimination Guidance Document #3800-2012-01 dated March 2012. The priority outfalls identified in the revised program should be inspected at least once per year, with the remainder of the previously identified "major" outfalls inspected at least once per MS4 permit term (5 years).

Very truly yours,

RUEKERT & MIELKE, INC.

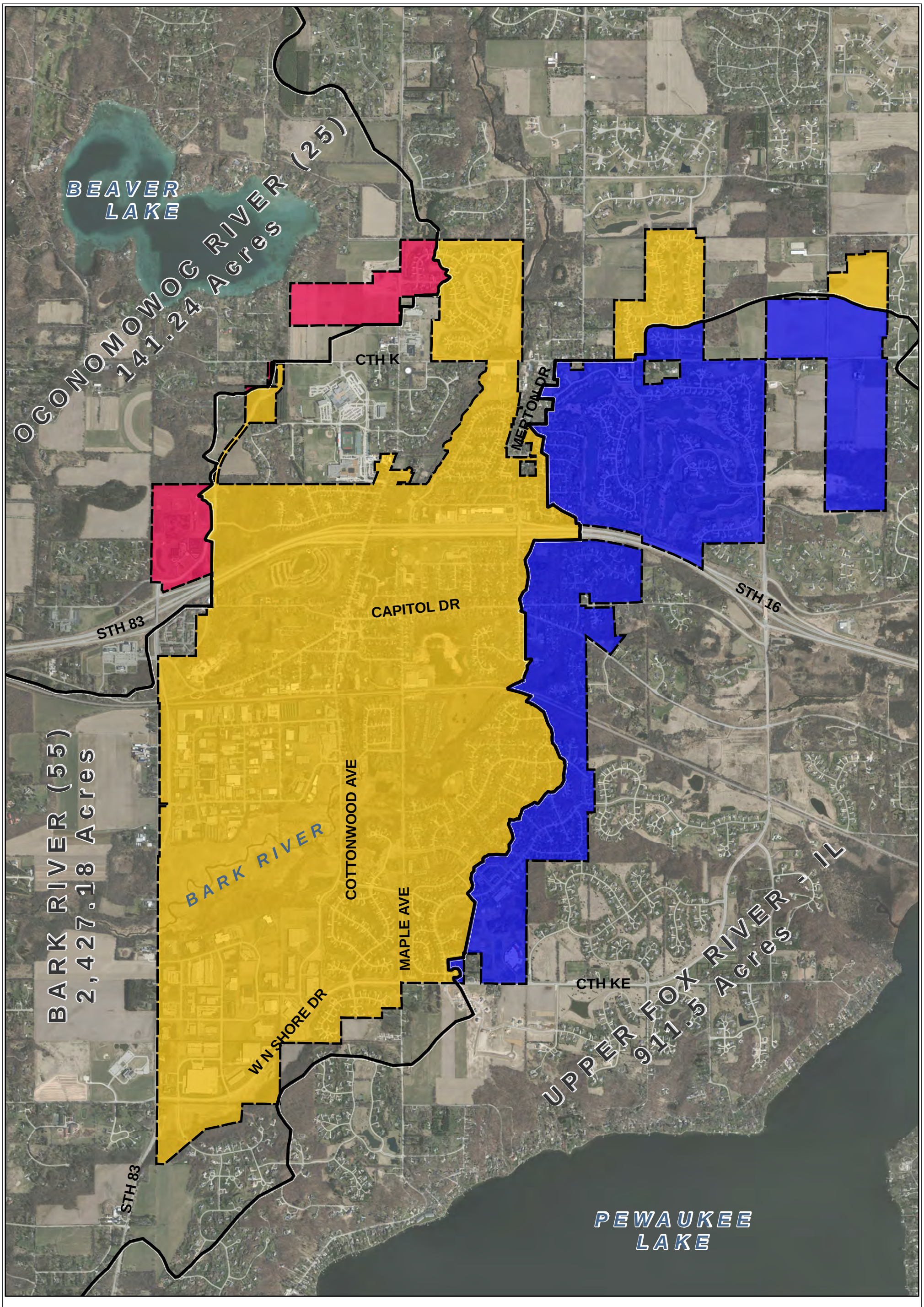
Maureen A. McBroom
Environmental Coordinator
mmcbroom@ruekert-mielke.com

MAM:jkc

cc: File

APPENDIX A

PLAN EXHIBITS



Legend

- Reachshed Boundaries
- Hartland Village Limits
- Bark River (55)
- Oconomowoc River (25)
- Upper Fox River - IL

Plan Area Map
Village of Hartland
Exhibit 1

1,900 950 0 1,900 3,800

Feet

N W E S

Village of Hartland

Ruekert · Mielke

Date: January, 2017

BEAVER LAKE

OCONOMOWOC RIVER (25)
141.24 Acres

CTH K

MERTON DR

STH 16

STH 83

BARK RIVER (55)
2427.18 Acres

BARK RIVER

COTTONWOOD AVE

MAPLE AVE

W N SHORE DR

CTH KE

UPPER FOX RIVER - IL
911.5 Acres

PEWAUKEE LAKE

0 950 1,900 3,800 5,700

Feet

Legend

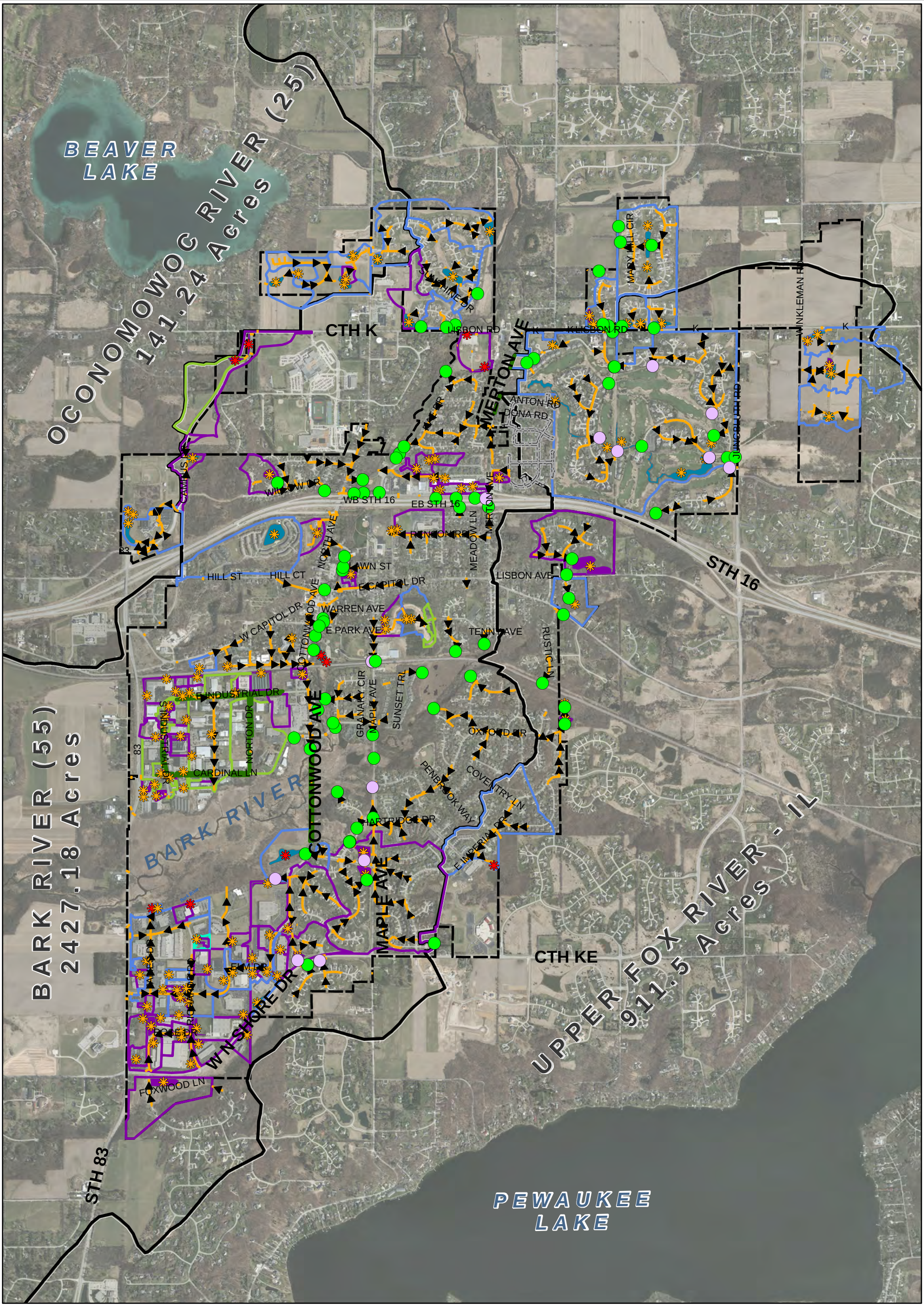
- Res - Low Density
- Res - Med Density
- Res - High Density
- Commercial-Downtown
- Commercial - Office Park
- Commercial-Strip
- Industrial - LI
- Industrial - MI
- Institutional
- Park & Open Space
- Transportation
- Reachshed Boundaries
- Hartland Village Limits

Existing Land Use Map
Village of Hartland
Exhibit 2

N W E S

Village of Hartland

Ruekert · Mielke



Legend

- Major Outfall
- Minor Outfall
- Public BMP
- Private BMP
- Storm Sewer
- Grass Swales
- No Curb
- Infiltration Pond
- Wet Detention Pond
- Grass Swale Basin
- Infiltration Basin
- Wet Pond Basin
- Filter Strip Basin
- Reachshed Boundaries
- Hartland Village Limits

Exisiting Storm Water System Map
Village of Hartland
Exhibit 3

0 950 1,900 3,800 5,700
Feet

N W E S

Village of Hartland

Ruekert · Mielke

Date: January, 2017

APPENDIX B

MS4 MAP

2016 MS4 Map
Village of Hartland, Waukesha County, Wisconsin

OCONOMOWOC RIVER (25)
141.24 Acres

BARK RIVER (55)
2,427.16 Acres

Upper Fox River - IL
911.5 Acres

Legend

- Major Outfall
- Minor Outfall
- Public BMP
- Private BMP
- Public Works Facility
- Storm Sewer
- Grass Swales
- No Curb
- Streams Rivers
- Reachshed Boundaries
- Grass Swale Basin
- Infiltration Basin
- Wet Pond Basin
- Filter Strip Basin
- Waters of the State
- Infiltration Pond
- Wet Detention Pond
- Wetlands
- WPDES Permit Holders
- Village Owned Land
- Open Water
- Parcels
- Hartland Village Limits

0 300 600 1,200 1,800
Feet

Village of Hartland

Ruekert · Mielke

Date: January, 2017

WPDES PERMIT HOLDERS

ID#	SITE NAME	FIN	PERMIT	FID	SITE
ID-1	Hartman Controls Inc	851	S067857	268213530	604 Progress Ave
ID-2	The Sullivan Corporation	10871	S067858	268442460	460 Cardinal Lane
ID-3	Bohrman Mfg Inc	11017	S067859	368004560	330 Pawling Ave
ID-4	Genesis Machining Inc	10890	S067860	268254690	300 Pawling Ave
ID-5	Meyer Material Company Hartland YD 48	20364	S067861	268315630	701 Capitol Drive
ID-6	Neosho Trompler Inc	31988	S067862	268156570	580 Industrial Drive
ID-7	Tomahawk Manufacturing Inc -Hartland Plant	32860	S067863	268248200	501 Progressive Drive
ID-8	Veolia ES Solid Waste Midwest LLC-Hartland Transfer Station	701	S067864	268146230	559 Progressive Drive
ID-9	Dorner Mfg Corp	650	S067857	368006760	975 Cottonwood Ave
ID-10	East Shore Specialy Foods	11025	S067857	268035240	643 Cardinal Lane
ID-11	Parker Printing of Hartland, Inc	50	S067857	268038430	505 S. Industrial Drive
ID-12	Rapco Inc.	937	S067857	368010940	445 Cardinal Lane
ID-13	ADS Solid Waste Midwest LLS	701	S067857	268146230	599 Pregoress Drive
ID-14	Camtronics Medical Systems LTD	11017	S049158	368010830	900 Walnut Ridge Drive #950
ID-15	Heraeus Electro-Mite Co. LLC	55378	S067857	268524740	541 S Industrial Drive
ID-16	Ozinga Ready Mix	20364	S067857	268315630	701 W Capitol Drive
ID-17	Wisconsin Cement Group	9276	S049158	368011270	701 W Capital Drive

APPENDIX C

EXISTING STORM WATER CONTROLS CONDITIONS SUMMARY

CHAPTER 3 -- EXISTING CONDITIONS

In any storm water system planning effort, definitive knowledge is required of the existing storm water management system. Inventories and analyses are required of such factors as the land use conditions, existing storm water ordinances, topography, drainage patterns, geology, conditions of receiving waters, and existing storm water facilities within the Village of Hartland.

Land Use

The existing land use pattern is an important consideration in the preparation of a storm water management systems plan and is the primary data input in the water quality modeling efforts completed as part of this analysis. The Village of Hartland utilizes the Southeastern Wisconsin Regional Planning Commissions (SEWRPC) land use information, and this data is shown on Exhibit 2.

Existing Storm Water Ordinance

The Village's current storm water management ordinance (Chapter 76 of the Village of Hartland Municipal Code) incorporates elements of Chapters NR 151 and NR 216, Wisconsin Administrative Code, as required by the MS4 permit. The Village's ordinance requires significant water quality controls on new and re-development projects, (80% sediment reduction for new development, 40% sediment reduction for redevelopment, infiltration considerations, etc.) to prevent further degradation of the local waterways, including the Bark River and Nagawicka Lake, which the Bark River flows into. The Village's ordinance also requires storm water quantity controls in the form of the following peak runoff discharge rate requirements for pre-development conditions compared to post-development conditions:

a. The 10-year post-developed conditions peak flow rate will be reduced to the 2-year pre-developed peak flow rate.

b. The 100-year post-developed peak flow rate will be reduced to the 10-year pre-development peak flow rate.

In accordance with this ordinance, the redevelopment of lands currently built without storm water facilities may be expected to reduce pollutant loadings within the corresponding storm water runoff.

Topography and Surface Drainage Patterns

As already noted, the Village of Hartland is located completely within the Rock River watershed, with most of the Village draining via storm sewer or directly to the Bark River. Drainage basins for the storm water planning effort were carried forward from the 2010 analysis and updated as appropriate to reflect recent private and public drainage system modifications.

Soil Conditions, Geology and Depth to Bedrock

The geologic conditions of an area, including depth to bedrock and depth to the groundwater table, are important considerations in any storm water management system planning effort. The dominant overlying hydrologic soil group in the Village is type "B", which generally indicates soil types that have moderate infiltration. The bedrock depth for the Village is also generally deep. The Village generally has moderate to good suitability for on-site infiltration, with areas of concern primarily due to high groundwater or unsuitable soil in or around the primary waterways.

The Village is also located in an area of generally shallow depths to the groundwater table with high recharge potential. The groundwater reservoir provided by the glacial till deposits and underlying undifferentiated limestone bedrock formations is the source of supply for the municipal wells used within the Village as a source of potable water.

Conditions of Receiving Waters

The Bark River enters the Village of Hartland just north of County Trunk Highway K and flows south through the downtown area of the Village. The river then turns southwest where it exits the Village under State Highway 83 just north of Walnut Ridge Drive. From there the Bark River flows southwesterly into Nagawicka Lake. Approximately 7.5 miles downstream of the Village, the Bark River is considered "impaired", from upstream of State Highway 67 to just upstream of Gramling Road in the Village of Dousman. The Bark River in this area is listed on the Wisconsin Department of Natural Resources (WDNR) Impaired Waters List for Low Dissolved Oxygen (DO) due to excess Total Phosphorus from rural and urban nonpoint sources (storm water runoff).

The Bark River is considered a warm mainstem stream under the state's Natural Community Determinations, with a current and attainable use designation listed as Warm Water Sport Fishery. The river is currently only partially meeting this designated use due to low dissolved oxygen levels, caused in part by the excess phosphorus entering the system.

The Bark River is used by the general public for fishing, kayaking/canoeing, and along walking / biking paths. Tree falls and excess deposits of sediment can be impediments to navigation in the river. Strategic removal of these structures could improve the ease of navigating the river, while leaving material that is suitable for fish and aquatic species habitat. Controlling invasive species both in the water and along the banks can also stabilize banks and provide habitat and food sources for animals native to the area.

Tributaries to the Bark River, as well as the Bark River itself, have been historically straightened and channelized in various areas to support development and agricultural practices. Efforts to naturalize or restore the stream back to its original condition have resulted in improved in-stream habitat and the restoration of adjacent wetland habitat near the river. The re-created meanders now found in these sections of the stream along with the restored wetlands provide natural buffers between runoff from agricultural or urban runoff sources and the river, improving the water quality of the river. Other projects to naturalize or restore the river and improve water

quality include installing buffers between agricultural fields and the river and restoration of wetland areas that are adjacent to the river. Significant efforts have been made to control invasive species and protect the existing wetlands in the Village of Hartland, in particular on properties owned by the Ice Age Park and Trail Foundation, Waukesha County Land Conservancy, and the Village of Hartland.

Existing Storm Water Management System and Water Quality Best Management Practices (BMPs)

The existing storm water management system within the Village of Hartland consists of a network of pipes, inlets, catch basins, detention and infiltration ponds, culverts, drainage ditches and associated overland flow paths. Within this network is approximately 131 individual water quality devices and 2 large grass swale drainage basins. The location and configuration of this storm water system is shown on Exhibit 3.

The Village of Hartland is acutely aware of the need to protect the valuable natural resource base located throughout the planning area, while also complying with their MS4 storm water discharge permit. To reach this goal, the Village is actively involved in numerous best management practices designed to protect water quality. The current activities include:

- Street Sweeping - the Village owns a high efficiency street sweeper, which is run throughout the Village and specifically the downtown area from spring through fall. Material picked up with the street sweeper is taken to the public works yard and hauled away by John's Disposal.

- Leaf Collection and Management - The Village offers a leaf collection program during the fall. Leaves that are raked into the street are picked up by Village crews and taken to the public works yard. The leaves are then taken to a local agricultural field for incorporation in to the field annually.

- Inspection of Storm Water Facilities – Village staff inspect publicly-owned storm water devices on a regular basis. Maintenance is completed as needed based on the inspections. Privately owned storm water facilities are required to be inspected and maintained by the property owners, per the long-term maintenance agreements and the Village's storm water ordinance.

- Erosion Control and Storm Water Management Program - Village staff review, issue permits, and complete erosion control and storm water management inspections on new and redevelopment construction projects throughout the Village.

- Illicit Discharge Detection and Elimination Inspections - The Village completes an annual illicit discharge inspection program, including follow-up inspections on any complaints that they might receive.

- Catch Basin Inspections - The Village inspects and maintains storm sewer catch basins on an annual basis and as needed after rain events.

- Public Education and Outreach - the Village is a member of the public information, education and involvement program administered through Waukesha County.

Existing Conditions Water Quality Modeling

Water quality modeling within the Village of Hartland was originally completed in 2010 using the Source Loading and Management Model (WinSLAMM), Version 9.4.1 The modeling was updated as part of this planning effort to reflect recent development, new storm water best management practices, and WDNR's TMDL modeling guidance "TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance", dated October 20, 2014. This updated water quality analysis was completed using WinSLAMM, Version 10.2.

Parameter files for WinSLAMM were used following WDNR's guidance, including use of the Milwaukee five-year rainfall data which has been determined by the WDNR to be representative of a typical period of rainfall within the developed area of the Village of Hartland.

The land use was based on SEWRPC's 2010 land use data and updated to reflect recent development. The multitude of land use codes from SEWRPC were synthesized down to align with the more general standard land use categories found within WinSLAMM. To replicate the Village's existing development and build-out patterns, WinSLAMM standard land use files that are representative of the Village's land use categories were utilized to generate pollutant loadings for the existing conditions. The standard land used files used in the modeling process are as follows:

- Low Density Residential (LDR)
- Medium Density Residential No Alleys (MDRNA)
- High Density Residential No Alleys (HDRNA)
- Downtown Commercial
- Hospital
- Institutional
- School
- Light Industrial
- Medium Industrial
- Other Urban (Open Space)
- Other Urban (Parks)

All areas within the municipal boundary were included within the water quality model except for the following areas:

- Lands zoned for agricultural use and currently being utilized as such.
- Riparian areas that directly drain to waters of the state without passing through the Village's MS4.
- State and County highways that are not maintained by the Village and any lands that drain to these highways.

These excluded areas are represented as the areas without land use overlays on Exhibit 2.

All storm water facilities were included in the existing conditions model, regardless of ownership. The Village recognizes that they will need to enforce maintenance provisions on those facilities which it does not own.

In-field infiltration testing was completed at 12 locations throughout the Village. Of these 12 locations 8 of them were utilized as part of this study. One of the four unused tests were in an area where it was determined that it should not be modeled as a grass swale. Another two of the four unused tests were performed in preparation for an alternative in that location which was determined to not be needed as part of this study. The one remaining of the four unused infiltration rate tests had to be stopped short making the test invalid. Of the locations tested, 3 tests were in grass swale drainage basins and five of the tests were within infiltration basins. The resulting infiltration rates from the tests were divided in half to represent the dynamic infiltration rate for each grass swale for use within the modeling. This dynamic infiltration rate for each test location was used in the model for that specific swale drainage area. For example, a measured infiltration rate of 2.5 inches per hour would result in a modeled dynamic infiltration rate of 1.25 inches per hour of infiltration for that grass swale in the WinSLAMM model. The infiltration rate tests within the infiltration basins were not made dynamic. In the instance of modeling an infiltration basin in WinSLAMM which had an infiltration rate test performed, the lowest incremental rate was taken and utilized as the infiltration rate for that particular device. The detailed infiltration rate field test reports and location map can be found at the end of this section.

The WinSLAMM model was used to calculate the probable pollutant loadings under existing land use conditions with no storm water controls. The resultant total suspended solids (TSS) and phosphorus (P) loadings were then compared to the corresponding reductions calculated when accounting for all the existing water quality controls within the Village (street sweeping, storm water facilities, etc.).

When available, the pollutant loading reductions for storm water quality devices were taken from approved storm water management plans for each corresponding facility. The phosphorus loadings for these water quality devices was determined by utilizing the other device control in WinSLAMM, allowing a TSS reduction percentage to be entered for the contributing land use acreage. This sediment reduction percentage is then used by the model to determine a phosphorus loading reduction for the same contributing land use area. For water quality devices that did not have the support of a storm water management plan, performance was calculated by using the other device control to enter the reduction that was originally calculated and approved as part of the Village's 2010 WinSLAMM analysis. This sediment reduction percentage is then used by the model to determine a phosphorus loading reduction for the same contributing land use area. In the instance where a water quality device was developed after the original study's cutoff date of October 1st 2004, leaving that device without an approved reductions from the original study, nor does an approved storm water management plans exist, the physical parameters of the water quality device were then entered and the WinSLAMM model was allowed to calculate the reductions achieved by that device within the corresponding drainage basin.

The pollutant loadings are provided in pounds and are equal to the amount of each pollutant that may be expected to be generated in storm water runoff from the area concerned over a typical

calendar year. Generally, pollutant loadings increase when the amount of critical land use (industrial, commercial, high density residential, governmental, institutional, and highways) increases; the length of curb increases; the length of grass swales decreases; the number of times catch basins are cleaned decreases; and the number of times streets are swept decreases. With the construction of best management practices, particulate solids loadings may be expected to decrease for the drainage areas that are tributary to the control measures. The results of the modeling are summarized in Table 3.

Table 3: Summary of Village -Wide TMDL Modeling Results

Village of Hartland

TMDL Reachsheds	Area (acres)	Total Suspended Solids			Total Phosphorus		
		Discharge No Controls (pounds)	Discharge With Controls (pounds)	TSS Reduction (%)	Discharge No Controls (pounds)	Discharge With Controls (pounds)	Phosphorus Reduction (%)
Oconomowoc River #25	95.70	16770.37	969.92	94.22%	68.92	20.49	70.27%
Upper Bark River #55	1540.82	400202.06	208243.38	47.97%	1111.63	677.52	39.05%
Subtotal	**1636.52**	**416972.43**	**209213.30**	**49.83%**	**1180.55**	**698.01**	**40.87%**
Non TMDL Reachshed	Area (acres)	Total Suspended Solids			Total Phosphorus		
		Discharge No Controls (pounds)	Discharge With Controls (pounds)	TSS Reduction (%)	Discharge No Controls (pounds)	Discharge With Controls (pounds)	Phosphorus Reduction (%)
Upper Fox River	726.46	112580.07	40597.59	63.94%	449.84	244.86	45.57%
Subtotal	**726.46**	**112580.07**	**40597.59**	**63.94%**	**449.84**	**244.86**	**45.57%**
Overall	**2362.98**	**529552.50**	**249810.89**	**52.83%**	**1630.39**	**942.87**	**42.17%**

Infiltration Rate Field Test -- Data Summary

Test #	Air Temp: 70	Water Temp: 70.8	Outer ring: 24" Diameter
Date: 10/03/2016	Testers Initials: MB1	Weather: Partly Cloudy	Inner ring: 12" Diameter
Client: Village of Hartland		Test Location: 401 Campus Dr. Lake Country Luthern Basin	

Time of Day (Military)		Incremental Time (hours)	Cumulative Time (hours)	Water Level Before Filling (inches)		Water Added (inches)		Water Level After Filling (inches)		Cumulative Infiltration (inches)		Inner Ring Infiltration Rate (inches/hour)	
Hrs.	Min.			Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Incremental Rate	Cumulative Rate
12	20		0.00	6.00	6.00			6.00	6.00				
12	35	0.25	0.25	5.00	5.00	1.00	1.00	6.00	6.00	1.00	1.00	4.00	4.00
12	50	0.25	0.50	5.00	5.00	1.00	1.00	6.00	6.00	2.00	2.00	4.00	4.00
13	5	0.25	0.75	5.00	5.00	2.00	2.00	7.00	7.00	3.00	3.00	4.00	4.00
13	20	0.25	1.00	6.00	6.00	1.00	1.00	7.00	7.00	4.00	4.00	4.00	4.00
13	35	0.25	1.25	6.00	6.00	1.00	1.00	7.00	7.00	5.00	5.00	4.00	4.00
13	50	0.25	1.50	6.50	6.50	0.50	0.50	7.00	7.00	5.50	5.50	2.00	3.67
14	5	0.25	1.75	6.00	6.00	0.00	0.00	6.00	6.00	6.50	6.50	4.00	3.71

Infiltration Rate Field Test -- Data Summary

Test #	Air Temp: 70	Water Temp: 70.6	Outer ring: 24" Diameter
Date: 10/03/2016	Testers Initials: MB1	Weather: Partly Cloudy	Inner ring: 12" Diameter
Client: Village of Hartland		Test Location: 455 E. Industrial Basin	

Time of Day (Military)		Incremental Time (hours)	Cumulative Time (hours)	Water Level Before Filling (inches)		Water Added (inches)		Water Level After Filling (inches)		Cumulative Infiltration (inches)		Inner Ring Infiltration Rate (inches/hour)	
Hrs.	Min.			Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Incremental Rate	Cumulative Rate
14	30		0.00	8.00	8.00			8.00	8.00				
		0.33											
14	50		0.33	6.00	5.00	2.00	3.00	8.00	8.00	2.00	3.00	9.00	9.00
		0.25											
15	5		0.58	5.00	5.00	3.00	3.00	8.00	8.00	5.00	6.00	12.00	10.29
		0.33											
15	25		0.92	5.00	4.50	3.00	3.50	8.00	8.00	8.00	9.50	10.50	10.36
		0.33											
15	45		1.25	5.00	5.00	3.00	3.00	8.00	8.00	11.00	12.50	9.00	10.00
		0.33											
16	5		1.58	5.00	4.50	3.00	3.50	8.00	8.00	14.00	16.00	10.50	10.11
		0.33											
16	25		1.92	5.00	5.00	0.00	0.00	5.00	5.00	17.00	19.00	9.00	9.91

Infiltration Rate Field Test -- Data Summary

Test # 2	Air Temp: 88	Water Temp: 77.5	Outer ring: 24" Diameter
Date: 7/26/2016	Testers Initials: MB1	Weather: Mostly Clear-Humid	Inner ring: 12" Diameter
Client: Village of Hartland		Test Location: 540 Norton Dr.	Slope: .75':6'

Ruekert·Mielke
engineering solutions for a working world

Time of Day (Military)		Incremental Time (hours)	Cumulative Time (hours)	Water Level Before Filling (inches)		Water Added (inches)		Water Level After Filling (inches)		Cumulative Infiltration (inches)		Inner Ring Infiltration Rate (inches/hour)	
Hrs.	Min.			Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Incremental Rate	Cumulative Rate
12	40		0.00	12.00	12.00			12.00	12.00				
12	55	0.25	0.25	12.00	12.00	0.00	0.00	12.00	12.00	0.00	0.00	0.00	0.00
13	10	0.25	0.50	11.50	11.50	0.50	0.50	12.00	12.00	0.50	0.50	2.00	1.00
13	30	0.33	0.83	12.00	12.00	0.00	0.00	12.00	12.00	0.50	0.50	0.00	0.60
13	45	0.25	1.08	11.50	11.50	0.50	0.50	12.00	12.00	1.00	1.00	2.00	0.92
14	5	0.33	1.42	12.00	12.00	0.00	0.00	12.00	12.00	1.00	1.00	0.00	0.71
14	30	0.42	1.83	12.00	12.00	0.00	0.00	12.00	12.00	1.00	1.00	0.00	0.55
14	45	0.25	2.08	11.50	11.50	0.00	0.00	11.50	11.50	1.50	1.50	2.00	0.72

Infiltration Rate Field Test -- Data Summary

Test # 3	Air Temp: 88	Water Temp: 77.5	Outer ring: 24" Diameter
Date: 7/26/2016	Testers Initials: MB1	Weather: Partly Cloudy-Humid	Inner ring: 12" Diameter
Client: Village of Hartland		Test Location: 581 E. Industrial	Slope: 1.5':6'

Ruekert·Mielke
engineering solutions for a working world

Time of Day (Military)		Incremental Time (hours)	Cumulative Time (hours)	Water Level Before Filling (inches)		Water Added (inches)		Water Level After Filling (inches)		Cumulative Infiltration (inches)		Inner Ring Infiltration Rate (inches/hour)	
Hrs.	Min.			Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Incremental Rate	Cumulative Rate
12	50		0.00	12.00	12.00			12.00	12.00				
		0.25											
13	5		0.25	10.00	11.00	2.00	1.00	12.00	12.00	2.00	1.00	4.00	4.00
		0.25											
13	20		0.50	7.50	10.50	4.50	1.50	12.00	12.00	6.50	2.50	6.00	5.00
		0.33											
13	40		0.83	9.00	11.00	3.00	1.00	12.00	12.00	9.50	3.50	3.00	4.20
		0.25											
13	55		1.08	9.00	11.00	3.00	1.00	12.00	12.00	12.50	4.50	4.00	4.15
		0.25											
14	10		1.33	9.00	11.00	3.00	1.00	12.00	12.00	15.50	5.50	4.00	4.13
		0.42											
14	35		1.75	7.00	10.00	4.00	2.00	11.00	12.00	20.50	7.50	4.80	4.29
		0.25											
14	50		2.00	9.00	11.00	0.00	0.00	9.00	11.00	22.50	8.50	4.00	4.25

Infiltration Rate Field Test -- Data Summary

Test # 4	Air Temp: 88	Water Temp: 82.0	Outer ring: 24" Diameter
Date: 7/26/2016	Testers Initials: MB1	Weather: Mostly Clear-Humid	Inner ring: 12" Diameter
Client: Village of Hartland		Test Location: 1225 Walnut Ridge Dr. No Outlet Found	

Ruekert·Mielke
engineering solutions for a working world

Time of Day (Military)		Incremental Time (hours)	Cumulative Time (hours)	Water Level Before Filling (inches)		Water Added (inches)		Water Level After Filling (inches)		Cumulative Infiltration (inches)		Inner Ring Infiltration Rate (inches/hour)	
Hrs.	Min.			Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Incremental Rate	Cumulative Rate
15	35		0.00	12.00	12.00			12.00	12.00				
16	5	0.50	0.50	9.00	11.00	3.00	1.00	12.00	12.00	3.00	1.00	2.00	2.00
16	20	0.25	0.75	11.00	12.00	1.00	0.00	12.00	12.00	4.00	1.00	0.00	1.33
16	40	0.33	1.08	11.00	11.00	1.00	1.00	12.00	12.00	5.00	2.00	3.00	1.85
17	0	0.33	1.42	11.00	12.00	1.00	0.00	12.00	12.00	6.00	2.00	0.00	1.41
17	30	0.50	1.92	10.00	11.00	2.00	1.00	12.00	12.00	8.00	3.00	2.00	1.57
17	45	0.25	2.17	11.00	12.00	0.00	0.00	11.00	12.00	9.00	3.00	0.00	1.38

Infiltration Rate Field Test -- Data Summary

Test #	Air Temp: 49 F	Water Temp: 66.3 F	Outer ring: 24" Diameter
Date: 10/25/2016	Testers Initials: MB1	Weather: Partly Cloudy	Inner ring: 12" Diameter
Client: Village of Hartland		Test Location: A362 Basin	3- 24" Concrete Outlet Pipe

Ruekert·Mielke
engineering solutions for a working world

Time of Day (Military)		Incremental Time (hours)	Cumulative Time (hours)	Water Level Before Filling (inches)		Water Added (inches)		Water Level After Filling (inches)		Cumulative Infiltration (inches)		Inner Ring Infiltration Rate (inches/hour)	
Hrs.	Min.			Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Incremental Rate	Cumulative Rate
9	50		0.00	10.00	10.00			10.00	10.00				
10	5	0.25	0.25	8.00	8.50	2.00	1.50	10.00	10.00	2.00	1.50	6.00	6.00
10	25	0.33	0.58	8.00	8.50	2.00	1.50	10.00	10.00	4.00	3.00	4.50	5.14
10	40	0.25	0.83	8.00	8.50	2.00	1.50	10.00	10.00	6.00	4.50	6.00	5.40
11	0	0.33	1.17	8.00	8.50	2.00	1.50	10.00	10.00	8.00	6.00	4.50	5.14
11	20	0.33	1.50	8.00	8.50	2.00	1.50	10.00	10.00	10.00	7.50	4.50	5.00
11	35	0.25	1.75	8.50	9.00	1.50	1.00	10.00	10.00	11.50	8.50	4.00	4.86
11	50	0.25	2.00	8.50	9.00	1.50	1.00	10.00	10.00	13.00	9.50	4.00	4.75

Infiltration Rate Field Test -- Data Summary

Test #	Air Temp: 54	Water Temp: 69	Outer ring: 24" Diameter
Date: 10/03/2016	Testers Initials: MB1	Weather: Clear	Inner ring: 12" Diameter
Client: Village of Hartland		Test Location: Anton Rd. Cul de Sack Swale	Swale slope- .75':6'

Time of Day (Military)		Incremental Time (hours)	Cumulative Time (hours)	Water Level Before Filling (inches)		Water Added (inches)		Water Level After Filling (inches)		Cumulative Infiltration (inches)		Inner Ring Infiltration Rate (inches/hour)	
Hrs.	Min.			Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Incremental Rate	Cumulative Rate
9	0		0.00	9.00	9.00			9.00	9.00				
9	25	0.42	0.42	8.50	8.50	0.50	0.50	9.00	9.00	0.50	0.50	1.20	1.20
9	50	0.42	0.83	9.00	9.00	0.00	0.00	9.00	9.00	0.50	0.50	0.00	0.60
10	5	0.25	1.08	8.50	8.50	0.50	0.50	9.00	9.00	1.00	1.00	2.00	0.92
10	30	0.42	1.50	8.50	8.50	0.50	0.50	9.00	9.00	1.50	1.50	1.20	1.00
10	45	0.25	1.75	9.00	9.00	0.00	0.00	9.00	9.00	1.50	1.50	0.00	0.86
11	0	0.25	2.00	9.00	9.00	0.00	0.00	9.00	9.00	1.50	1.50	0.00	0.75

Infiltration Rate Field Test -- Data Summary

Test #	Air Temp: 56	Water Temp: 69	Outer ring: 24" Diameter
Date: 10/03/2016	Testers Initials: MB1	Weather: Mostly Clear	Inner ring: 12" Diameter
Client: Village of Hartland		Test Location: N.E. corner of Memory Ln. and Sunny Slope Dr. 1':6'	

Ruekert·Mielke
engineering solutions for a working world

Time of Day (Military)		Incremental Time (hours)	Cumulative Time (hours)	Water Level Before Filling (inches)		Water Added (inches)		Water Level After Filling (inches)		Cumulative Infiltration (inches)		Inner Ring Infiltration Rate (inches/hour)	
Hrs.	Min.			Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Incremental Rate	Cumulative Rate
9	20		0.00	9.00	9.00			9.00	9.00				
		0.25											
9	35		0.25	7.50	7.50	1.50	1.50	9.00	9.00	1.50	1.50	6.00	6.00
		0.42											
10	0		0.67	7.00	7.00	2.00	2.00	9.00	9.00	3.50	3.50	4.80	5.25
		0.25											
10	15		0.92	7.00	7.00	2.00	2.00	9.00	9.00	5.50	5.50	8.00	6.00
		0.33											
10	35		1.25	7.00	7.00	2.00	2.00	9.00	9.00	7.50	7.50	6.00	6.00
		0.25											
10	50		1.50	8.00	8.00	1.00	1.00	9.00	9.00	8.50	8.50	4.00	5.67
		0.25											
11	5		1.75	8.00	8.00	1.00	1.00	9.00	9.00	9.50	9.50	4.00	5.43
		0.25											
11	20		2.00	7.50	7.50	0.00	0.00	7.50	7.50	11.00	11.00	6.00	5.50
		0.00											

Infiltration Rate Field Test -- Data Summary

Test # 1	Air Temp: 85	Water Temp: 76.6	Outer ring: 24" Diameter
Date: 7/26/2016	Testers Initials: MB1	Weather: Mostly Clear-Humid	Inner ring: 12" Diameter
Client: Village of Hartland		Test Location: St. Charles Basin 15" PVC Outlet Pipe	

Ruekert·Mielke
engineering solutions for a working world

Time of Day (Military)		Incremental Time (hours)	Cumulative Time (hours)	Water Level Before Filling (inches)		Water Added (inches)		Water Level After Filling (inches)		Cumulative Infiltration (inches)		Inner Ring Infiltration Rate (inches/hour)	
Hrs.	Min.			Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Outer Ring	Inner Ring	Incremental Rate	Cumulative Rate
10	5		0.00	12.00	12.00			12.00	12.00				
		0.58											
10	40		0.58	7.00	7.00	5.00	5.00	12.00	12.00	5.00	5.00	8.57	8.57
		0.25											
10	55		0.83	9.50	9.50	2.50	2.50	12.00	12.00	7.50	7.50	10.00	9.00
		0.33											
11	15		1.17	9.00	9.00	3.00	3.00	12.00	12.00	10.50	10.50	9.00	9.00
		0.25											
11	30		1.42	10.00	10.50	2.00	2.50	12.00	13.00	12.50	12.00	6.00	8.47
		0.25											
11	45		1.67	10.00	10.00	2.00	2.00	12.00	12.00	14.50	15.00	12.00	9.00
		0.42											
12	10		2.08	9.00	9.00	0.00	0.00	9.00	9.00	17.50	18.00	7.20	8.64

Infiltration Rate Testing Location Map Village of Hartland

BEAVER LAKE

OCONOMOWOC RIVER (25)
141.24 Acres

CTH K

MERTON AVE

Infiltration rate testing for possible alternative Memory Ln. and Sunnyslope

Infiltration rate testing for possible alternative Memory Ln. and Sunnyslope

Test Location for Lake Country Lutheran Infiltration Basin E147

St. Charles Church infiltration rate testing for infiltration basin D4

STH 16

581 E. Industrial Drive infiltration rate testing used for basin CV-B010

455 E. Industrial Drive Infiltration rate testing for infiltration basin B005B6

540 Norton Dr. Infiltration rate testing for Bridge B

An average of 581 E. Industrial Drive and 540 Norton Dr. Infiltration rate testing was used for basin CV-B010

STH 83

BARK RIVER

COTTONWOOD AVE

UPPER FOX RIVER - IL
911.5 Acres

Infiltration rate testing for basin A362

BARK RIVER (55)
2427.18 Acres

MAPLE AVE

CTH KE

700 W. North Shore Drive. Test was stopped early and not used. Basin B100H and B100G were evaluated using soils maps.

W N SHORE DR

Infiltration rate testing for basin B001L

PEWAUKEE LAKE

STH 83

N
W E
S

700 350 0 700 1,400
Feet

Ruekert · Mielke

Village of Hartland

Legend

- Res - Low Density
- Res - Med Density
- Res - High Density
- Commercial-Downtown
- Commercial - Office Park
- Commercial-Strip
- Industrial - LI
- Industrial - MI
- Institutional
- Park & Open Space
- Transportation
- Reachshed Boundaries
- Waters of the State
- Infiltration Basin
- Grass Swale Basin
- Wet Pond Basin
- Filter Strip Basin
- Hartland Village Limits

I:\Projects\V_Hartland\GIS\2016\Infiltration\Infiltration_Map.mxd

Date: January, 2017

2016 WinSLAMM Map
Village of Hartland,
Waukesha County, Wisconsin

OCONOMOWOC RIVER (25)
141.24 Acres

BARK RIVER (55)
2,427.16 Acres

Upper Fox River - IL
911.5 Acres

Bark River

Legend

- Major Outfall
- Minor Outfall
- Public BMP
- Private BMP
- Storm Sewer
- Grass Swales
- No Curb
- Streams Rivers
- Reachshed Boundaries
- Grass Swale Basin
- Infiltration Basin
- Wet Pond Basin
- Filter Strip Basin
- Waters of the State
- Infiltration Pond
- Wet Detention Pond
- Open Water
- Parcels
- Hartland Village Limits
- Res - Low Density
- Res - Med Density
- Res - High Density
- Commercial-Downtown
- Commercial - Office Park
- Commercial-Strip
- Industrial - LI
- Industrial - MI
- Institutional
- Park & Open Space
- Transportation

N W E S

0 300 600 1,200 1,800
Feet

Village of Hartland

Ruekert · Mielke

Date: January, 2017

APPENDIX D

ALTERNATIVES ANALYSIS AND RECOMMENED PLAN

ALTERNATIVES PLAN:

The goal of the Clean Water Act, the corresponding Total Maximum Daily Load (TMDL) studies, and NR 151 and 216 of the Wisconsin Administrative Code is to reduce pollutant loads carried by storm water runoff to Waters of the State. Pollutants are typically generated across all types of land use and include decomposing materials such as leaves deposited in the gutters and storm sewers; fertilizers and pesticides; heavy metals from automobiles, rooftops, and buildings; and pet litter and animal waste. These pollutants create water quality problems that not only affect the look, feel and smell of the surface waters, but also the health and safety of plants, animals and people that encounter the polluted waters.

As noted in Table 3, the existing storm water controls in the Upper Bark River Reachshed and Oconomowoc River Reachshed are not sufficient to meet the goals set forth in the Rock River TMDL and the Village's MS4 storm water permit. To help move the Village closer to compliance, alternative nonpoint source pollutant abatement measures were evaluated based on the ability to comply with the Village's TMDL and MS4 permit requirements and the specific needs of the receiving waterways. To the extent feasible, the water quality control measures considered were combined with other Village goals such as pedestrian walkability or public education, to provide multiple benefits to a single water quality facility while also minimizing costs.

As previously described, the Source Loading and Management Model (WinSLAMM Version 10.2) was used to estimate average annual pollutant loadings under existing land use conditions with no control measures and existing control measures. A summary of the probable annual pollutant loadings under existing land use and both no control measures and existing control measures, organized by reachshed, is set forth in Table 4. In addition, the table presents estimated reductions for certain additional alternative control measures considered.

SITE SPECIFIC ALTERNATIVES:

Bark River Reachshed (#55)

This reachshed includes a large portion of the Village extending from the southern boundary to the northernmost village boundary, then east to the boundary of the Upper Fox River Reachshed and west to the boundary of the Oconomowoc River Reachshed. This reachshed accounts for 70 percent of the Village's approximately 3480 total acres.

The recommended water quality alternatives are all focused within reachshed #55 since this reachshed requires a significant amount of Total Suspended Solids (TSS) and Phosphorus reduction to meet the compliance percentages of the TMDL. Based on the existing storm water controls, this reachshed is currently experiencing a 47.97% reduction in total suspended solids (versus a 66% TMDL goal) and a 39.05% reduction in phosphorus (versus a 77% TMDL goal).

There are several storm water quality devices recommended within reachshed #55. Some of the alternatives have variations of the storm water quality device for the same drainage area. This approach allows some flexibility as to which device or combination of devices are chosen as a solution for that drainage area. An example of these additional alternatives for the same drainage

area are: (Alt-2A, Alt-5A, Alt-6A and Alt-6B). These devices were modeled as options to be used in place of the recommended Alt-2, Alt-5, and Alt-6 or in conjunction with these recommended alternatives.

If all of the recommended water quality devices are constructed without their lettered alternatives, and the one existing water quality device is renovated (Alt-10), total suspended solids could be reduced by an additional 19.28 percent when compared to the current storm water controls and phosphorus would be reduced by an additional 17.67 percent when compared to the current storm water controls.

If all the recommended water quality devices and their additional lettered alternatives are implemented, including the implementation of the existing water quality device renovation, total suspended solids could be reduced by an additional 20.01 percent when compared to the current storm water controls and phosphorus would be reduced by an additional 18.21 percent when compared to the current storm water controls.

The overall location of each recommended alternative is represented on Exhibit 4 of this report.

New Storm Water Quality Control Facilities - Bark River Reachshed (55)

Well-maintained storm water quality control facilities, including but not limited to wet ponds, artificial wetlands, infiltration basins, bioretention / biofiltration facilities and rain gardens are an effective way to reduce pollutant loadings in a watershed. Typically, the area contributing to these facilities may benefit by 80 to 100 percent reductions in the annual loadings of sediment and 40 to 100 percent reductions in phosphorus.

Regional storm water facilities are constructed and operated with significant efficiency advantages over individual onsite facilities. Based on these benefits, the Village of Hartland will pursue the implementation of regional facilities wherever practical. Construction costs for regional facilities are generally borne by the Village, although these costs may be charged back to developers and landowners that contribute or benefit from the facility.

- **Alt-01 (Progress Drive Grass Swales)** This first alternative is located along each side of Progress Drive for approximately 1900 feet south of the intersection at Progress and Industrial Drive. The approximately 39-acre drainage area has a mixed land use of industrial and office park. This option would not require land acquisition as the facility would be constructed on land owned by the Village (within the Progress Drive right-of-way). Additionally, the existing connecting storm sewer at the south end of the proposed grass swale is already installed. This existing storm sewer system would be used to conveyed the treated storm water runoff from the proposed grass swale system along Progress Drive south to a point of discharge just north of the Bark River.

  There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  The effectiveness of treatment for this proposed device could be reduced if additional infiltration rate tests are performed and it is found that the rates are significantly reduced in some areas.

  The proposed grass swale system in Progress Drive was modeled to have approximately a 2-foot wide flow line, a 4 to 1 side slope and a dynamic infiltration rate of 1.5 inches per hour. This storm water quality device could provide a total suspended solids reduction of 74.89 percent within the contributing drainage basin, or 4.45 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 72.27 percent within the contributing drainage basin or 2.90 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $192,400 and a total present worth of approximately $230,790.

- **Alt-02 (St Charles Church Infiltration Basin)** This second alternative water quality facility is located at the west end of the St Charles Church/School property on the northwest corner of Renson Road and Circle Drive. This infiltration facility is an existing facility that is approximately 0.39 acres in size and currently serves the storm water runoff from the St Charles Church/School property. With minor modifications to the existing storm sewer in Renson Road, this facility could serve a contributing Institutional and Residential drainage area of approximately 52 acres.

In addition to the benefit of reductions in pollutant loadings from a significantly larger drainage area, the Village could provide an educational component to this alternative by developing a partnership with the St Charles School to allow the students to be involved with the monitoring and care of the vegetation within the facility.

There are no apparent constructability issues or known environmental components apparent in this location that could potentially effect this alternative. Although, the facility would need maintenance along with an evaluation of the existing outlet structure for adequacy. Also, permission to discharge additional storm water into the device would be needed from the St Charles Church Congregation who owns the device.

This facility would provide a total suspended solids reduction of 81.55 percent within the contributing drainage basin, or 3.08 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 77.74 percent within the contributing drainage basin or 3.48 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $63,180 and a total present worth of approximately $96,800.

- **Alt-02A (Hartland North Elementary School Parking Lot Permeable Pavers)** is the second phase of Alt-02 and is located at the Hartland North Elementary school just west of the St Charles Church/School infiltration basin and is owned by the Hartland Joint School District #3.

  There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  This optional phase of Alt-02 would consist of removing a portion of the existing parking lot and replacing it with permeable pavers. The area for the proposed permeable pavers has been calculated so that there will be no more than a 5 to 1 run on from the existing asphalt onto the new permeable paver area. This will ensure a 65.00 percent reduction of total suspended solids within the contributing drainage area.

  This facility would provide a total suspended solids reduction of 65.00 percent within the contributing drainage basin, or .05 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 55.94 percent within the contributing drainage basin or .02 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $153,480 and a total present worth of approximately $235,140.

- **Alt-03 (Village Parking Lot Bioretention Islands, NE Corner of North Avenue and Capitol Drive)** This third alternative labeled Alt-03, is located in the Downtown public parking lot just east and south of 150 North Avenue. This alternative consists of two bioretention facilities approximately 0.09 acres in size that would serve a contributing drainage area of approximately 1.3 acres of Institutional land use.

Table 4 – Summary of Recommended Alternative Structural BMPs for Upper Bark River Reachshed (#55)

	Priority	Control Measure	Total Suspended Solids		Total Phosphorus		Estimated Project Cost	Estimated Project Cost Per Pound of Pollutants Removed		Estimated Annual O&M Costs	Estimated 30 Year Present Worth	Estimated Present Worth Cost Per Pound of Pollutants Removed		Factors that Affect Priority Ranking			
			Pollutants Removed Annually (lbs)	TSS Reduction (Reachshed)	Pollutants Removed Annually (lbs)	Phosphorus Reduction (Reachshed)		Total Suspended Solids	Phosphorus			Total Suspended Solids	Phosphorus	CIP	Regulatory	Land	Grants
PRIMARY	1	St. Charles Church Infiltration Basin (ALT-02)	12,330	3.08%	38.63	3.48%	$63,180	$5.12	$1,635.52	$1,944	$96,796	$7.85	$2,506	YES (2020 - St. Charles Church)	St. Charles Church SW Permit	St. Charles Church	N/A
	2	Progress Drive Grass Swales (ALT-01)	17,808	4.45%	32.21	2.90%	$192,400	$10.80	$5,973.30	$2,220	$230,788	$12.96	$7,165	Current PASER Rating of 7.	NOI	Village-Owned (ROW)	DNR UNPS Construction
	3	Medline Industries Infiltration Basin (ALT-10)	3,707	0.93%	6.31	0.09%	$156,494	$42.22	$24,820.62	$4,815	$239,759	$64.68	$38,027	High potential from infiltration testing.	N/A	MedLine Industries	N/A
	4	900 Walnut Ridge Drive Biofilter (ALT-13)	10,358	2.59%	11.11	1.00%	$172,673	$16.67	$15,542.08	$5,313	$264,545	$25.54	$23,811	N/A	N/A	PDC Partners, LLC	DNR UNPS Construction
	5	Mill Place Subdivision Biofilter (ALT-15)	1,128	0.28%	3.47	0.31%	$79,775	$70.73	$22,983.15	$2,455	$122,220	$108.36	$35,212	WISLR rating map indicates reconstruction in 2021-2025	N/A	Village-Owned	DNR UNPS Construction
	6	Hartridge Subdivision Infiltration Basin (ALT-04)	17,530	4.38%	66.05	5.94%	$142,038	$8.10	$2,150.46	$4,370	$217,611	$12.41	$3,295	N/A	NOI, wetlands	River Reserve HOA	DNR UNPS Construction
	PRIMARY SUBTOTAL		**62,861**	**15.71%**	**157.78**	**13.72%**	**$806,559**	**$12.83**	**$5,112.05**	**$21,117**	**$1,171,718**	**$18.64**	**$5,112**				
SECONDARY	7	Village Parking Lot Bioretention Islands (northeast of North Avenue and East Capitol Drive) (ALT-03)	567	0.14%	1.27	0.12%	$80,990	$142.78	$63,566.44	$2,492	$124,082	$218.74	$97,388	Currently being considered by Village.	DNR Chapter 30 Grading	Village-Owned	DNR UNPS Construction
	8	Park River Estates Biofilter (ALT-12)	1,944	0.49%	6.04	0.54%	$127,920	$65.81	$21,164.79	$3,936	$195,981	$100.83	$32,426	N/A	wetlands	Village-Owned (Park)	DNR UNPS Construction
	9	Hartbrook Park Biofilter (ALT-06)	5,120	1.28%	10.94	0.98%	$106,555	$20.81	$9,739.90	$3,279	$163,248	$31.88	$14,922	YES (2019 - utilities; 2020 - road)	NOI, wetlands	Village-Owned (ROW, Park)	DNR UNPS Construction
	10	Piggly Wiggly Parking Lot Biofilter (ALT-07)	1,038	0.26%	2.10	0.19%	$100,165	$96.46	$47,600.15	$3,082	$153,459	$147.78	$72,926	N/A	N/A	POB Hartland, LLC	DNR UNPS Construction
	11	North Avenue Biofilter (ALT-05)	3,020	0.75%	7.53	0.68%	$205,140	$67.93	$27,243.03	$6,312	$314,287	$104.07	$41,738	N/A	DNR Chapter 30 Grading, wetlands	Village-Owned (Park Board)	DNR UNPS Construction
	12	River Reserve Drive Biofilter (ALT-09)	323	0.08%	6.31	0.10%	$42,445	$131.49	$6,731.96	$1,306	$65,028	$201.46	$10,314	Current PASER rating of 6.	wetlands	Village-Owned (ROW)	DNR UNPS Construction
	13	Sunnyslope Drive Permeable Pavers (ALT-06A)	1,341	0.34%	2.47	0.22%	$313,170	$233.53	$126,789.47	$9,636	$479,796	$357.79	$194,249	YES (2019 - utilities; 2020 - road)	N/A	Village-Owned (ROW)	DNR UNPS Construction
	14	Capitol Drive Permeable Pavers (ALT-11)	612	0.15%	0.95	0.09%	$171,600	$280.53	$180,119.66	$5,280	$262,902	$429.79	$275,955	WISLR rating map indicates reconstruction in 2021-2025	N/A	Village-Owned (ROW)	DNR UNPS Construction
	15	Chestnut Ridge Drive Permeable Pavers (ALT-05A)	1,304	0.32%	3.01	0.26%	$372,515	$285.71	$123,882.61	$11,462	$570,716	$437.73	$189,796	N/A	N/A	Village-Owned (ROW)	DNR UNPS Construction
	16	Granary Circle Permeable Pavers (ALT-08)	795	0.20%	1.83	0.16%	$251,248	$316.23	$137,293.85	$7,731	$384,927	$484.49	$210,343	N/A	N/A	Village-Owned (ROW)	DNR UNPS Construction
	17	Rae Drive Permeable Pavers (ALT-14)	900	0.22%	2.08	0.19%	$394,836	$438.61	$190,282.41	$12,149	$604,913	$671.98	$291,525	N/A	N/A	Village-Owned (ROW, Park)	DNR UNPS Construction
	18	Hartland North Elementary School Parking Lot (ALT-02A)	186	0.05%	0.27	0.02%	$153,481	$823.40	$578,519.60	$4,723	$235,143	$1,261.50	$886,328	N/A	N/A	School District	DNR UNPS Construction
	19	Hartbrook Park Parking Lot Permeable Pavers (ALT-06B)	107	0.03%	0.05	0.02%	$60,255	$561.09	$1,181,470.59	$1,854	$92,314	$859.62	$1,810,087	N/A	N/A	Village-Owned (Park)	DNR UNPS Construction
	SECONDARY SUBTOTAL		**17,257**	**4.31%**	**44.85**	**3.57%**	**$2,380,320**	**$137.93**	**$53,074.79**	**$73,241**	**$3,646,798**	**$211.32**	**$81,314**				
	REACHSHED TOTALS		**80,118**	**20%**	**202.62**	**17%**	**$3,186,879**	**$39.78**	**$15,728.01**	**$94,358**	**$4,818,517**	**$60.14**	**$23,781**				

There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

The facility would provide a total suspended solids reduction of 95.10 percent within the contributing drainage basin, or .14 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 88.89 percent within the contributing drainage basin or .12 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $81,000 and a total present worth of approximately $124,100.

- **Alt-04 (Hartridge Subdivision Infiltration Basin)** This fourth alternative labeled Alt-04, is located just west of the intersection of Hartridge Drive and Maple Avenue (Highway E). Land acquisition maybe necessary since the land where the infiltration basin is proposed to be constructed is currently under ownership by River Reserve Homeowners Association.

  The Residential area of Hartridge Subdivision that would drain to the infiltration basin is approximately 82.1 acres. This area currently discharges into a grass swale along the west side of Maple Avenue just east of where the proposed facility would be located, therefore some additional storm sewer may be needed to convey the storm water the remainder of the way to the proposed basin.

  Potential constructability issues within this area were identified as hydric soils which is also an indicator that wetlands could be present. In addition, hydric soils could also be an indicator that the groundwater level may be elevated within this area. A wetland delineation will be required within this proposed location along with a perk test to verify If high ground water is encountered. If so, this device may need to be designed as a biofilter and lined between the interface of the existing soil and the engineered soil to create a separation between the device's effluent and the ground water. Currently, infiltration rate testing within the area suggests that the underlying soils are infiltrating at a rate of 4-inches per hour.

  Construction of this facility would consist of grading and shaping work, along with storm sewer and an outlet structure. When completed, this infiltration facility would be approximately 0.80 acres in size.

  Infiltration rate tests that were performed in a nearby area to this location resulted in a cumulative infiltration rate of 4.75 inches/hour. At the recommended size and current infiltration rates, total suspended solids could be reduced 89.49 percent within the contributing 82.1-acre drainage basin, or 4.38 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 86.83 percent within the contributing drainage basin or 5.94 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $142,040 and a total present worth of approximately $217,610.

- **Alt-05 (North Avenue Biofilter)** This fifth alternative storm water quality facility, labeled as Alt-05 is located on the east side of North Avenue (Highway E) between a property at 530 and 550 North Avenue. The parcel identified for the alternative is owned by the Hartland Park Board.

This bioretention facility would be approximate 0.14 acres in size and would serve a contributing commercial and residential land use area of 21.3 acres. This facility is unique because the storm water would need to be intercepted from the existing deep elevation storm sewer and pumped up and into the bioretention facility for treatment. This operation would be performed by a large pump within a chamber that could push storm water at a high volume into the proposed biofilter.

There were no environmental issues identified within this proposed location. Constructability and maintenance issues consist of the complications that come with a pumped storm water system. Additionally, the cost per pound of pollutant removed can be higher than a traditional device.

This facility would provide a total suspended solids reduction of 54.00 percent within the contributing drainage basin, or .75 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 38.58 percent within the contributing drainage basin or .68 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $205,140 and a total present worth of approximately $314,300.

- **Alt-05A (Chestnut Ridge Drive Permeable Pavers)** This alternative is another alternative for Alt-05 and is located along both sides of Chestnut Ridge Drive. The construction will consist of removing the asphalt pavement in each lane to allow for the placement of permeable pavers abutting the flange line of the curb and gutter. The pavers will extend from the curb and gutter flange line some distance out into the existing lane of asphalt just far enough so that a 3 to 1 run on from the existing pavement will not be exceeded. This approach will allow pollutant reductions within this drainage area to be maximized. The timing for construction of this alternative was also considered, as this road is currently on the Village's list of near term construction projects.

  There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  This facility would provide a total suspended solids reduction of 65.00 percent within the contributing drainage basin, or .32 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 51.99 percent within the contributing drainage basin or .26 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $372,500 and a total present worth of approximately $570,720.

- **Alt-06 (Hartbrook Park Biofilter)** This sixth alternative labeled Alt-06, is located just west of the Hartbrook Park parking lot at the end of the intersection of Sunnyslope Drive and Rae Drive. This alternative consists of one bioretention facility that is approximately 0.29 acres in size and would serve a contributing drainage area of approximately 20.85 acres of High Density Residential and Commercial land use.

Potential constructability issues within this area were identified as the presence of soils that could suggest that wetlands are present. These soils could also be an indicator that the groundwater level may be elevated within this area. If it is determined that there are wetlands within this area, it may be necessary to use a smaller biofiltration device to avoid any impact. If necessary, the pollutant removal potential could be significantly reduced. In addition, if it is determined that there is high ground water in this area, a liner may need to be installed at the interface of the existing and engineered soils to help protect the ground water.

The facility would provide a total suspended solids reduction of 55.24 percent within the contributing drainage basin, or 1.28 percent throughout the reachshed #55 planning area along with a phosphorus reduction of 43.60 percent within the contributing drainage basin or .98 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $106,550 and a total present worth of approximately $163,250.

- **Alt-06A (Sunnyslope Drive Permeable Pavers)** This alternative is another option for Alt-06 located along both sides of Sunnyslope Drive. The construction will consist of removing the asphalt pavement in each lane to allow for the placement of permeable pavers abutting the flange line of the curb and gutter. The pavers will extend from the curb and gutter flange line some distance out into the existing lane of asphalt just far enough so that a 3 to 1 run on from the existing pavement will not be exceeded. This approach will allow pollutant reductions within this drainage area to be maximized. The timing for construction of this alternative was also considered, as this road is currently on the Village's list of near term construction projects.

  There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  This facility would provide a total suspended solids reduction of 65.00 percent within the contributing drainage basin, or .34 percent throughout the reachshed #55 planning area along with a phosphorus reduction of 57.18 percent within the contributing drainage basin or .22 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $313,170 and a total present worth of approximately $479,800.

- **Alt-06B (Hartbrook Park Parking Lot Permeable Pavers)** This alternative is another option for Alt-06 located at the Hartbrook Park Parking lot just west of the intersection of Sunnyslope Drive and Rae Drive.

  There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  This optional phase of Alt-06 would consist of removing a portion of the existing parking lot and replacing it with permeable pavers. The area for the proposed permeable pavers has been calculated so that there will be no more than a 5 to 1 run on from the existing asphalt onto the new permeable paver area. This will ensure a 65.00 percent reduction of total suspended solids within the contributing drainage area.

This facility would provide a total suspended solids reduction of 65.00 percent within the contributing drainage basin, or .03 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 53.50 percent within the contributing drainage basin or .02 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $60,260 and a total present worth of approximately $92,300.

- **Alt-07 (Piggly Wiggly Parking Lot Biofilter)** This seventh alternative labeled Alt-07, is located within the Piggly Wiggly parking lot just northwest of the intersection of Cottonwood Avenue and Cardinal Lane. This alternative consists of one bioretention facility that is approximately 0.17 acres in size and would serve a contributing drainage area of approximately 2 49 acres of Commercial land use.

  There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  The facility would provide a total suspended solids reduction of 89.44 percent within the contributing drainage basin, or .26 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 79.92 percent within the contributing drainage basin or .19 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $100,170 and a total present worth of approximately $153,460.

- **Alt-08 (Granary Circle Permeable Pavers)** This alternative is located along both sides of Granary Circle and Harvest Way. The extents of the pavers will include all of Harvest Way and the portion of Granary Circle that extends to the north from the intersection of Harvest way on the east and west. The timing for construction of this alternative was also considered, as this road is currently on the Village's list of near term construction projects.

  Constructing this alternative will consist of removing the asphalt pavement in each lane to allow for the placement of permeable pavers abutting the flange line of the curb and gutter. The pavers will extend from the curb and gutter flange line some distance out into the existing lane of asphalt just far enough so that a 3 to 1 run on from the existing pavement will not be exceeded. This approach will allow pollutant reductions within this drainage area to be maximized.

  There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  This facility would provide a total suspended solids reduction of 65.00 percent within the contributing drainage basin, or .20 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 52.44 percent within the contributing drainage basin or .16 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $251,250 and a total present worth of approximately $384,930.

- **Alt-09 (River Reserve Drive Biofilter)** This ninth alternative labeled Alt-09 is located within the River Reserve subdivision, more specifically the center of the cul-de-sac at the north end of River Reserve Drive. This alternative consists of one bioretention facility that is approximately 0.05 acres in size and would serve a contributing drainage area of approximately 2.08 acres of Residential land use. The timing for construction of this alternative was also considered, as this road is currently on the Village's list of near term construction projects.

  There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  The facility would provide a total suspended solids reduction of 89.49 percent within the contributing drainage basin, or .08 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 73.42 percent within the contributing drainage basin or .10 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $42,450 and a total present worth of approximately $65,030.

- **Alt-10 (Medline Industries Infiltration Basin)** This alternative consists of the evaluation and potential modification of an existing device. Currently, there is water discharging from an existing storm sewer into this facility during dry weather conditions. Due to the continuous inundation of water, this infiltration facility now has standing water in it. Because of the standing water, this water quality device was modeled as having zero potential for infiltration. Once the flow of water is identified and stopped, an infiltration rate test can be performed to evaluate how the device soils perform under normal conditions. At that point, a determination can be made about the adequacy of the soils at the bottom of the device and whether they need to be amended.

  Since this device is existing, no constructability challenges were identified. Although high ground water could be an issue if it is determined that the device needs to be retrofitted with amended soil. At that point a determination would need to be made as to whether a liner at the amended and existing soil interface is required.

  Once it is determined that the existing soil has a sufficient infiltration rate for water quality or the facility is amended with new soil, a total suspended solids reduction of 72.05 percent within the contributing 8.02-acre drainage basin could be achieved, or .93 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 68.81 percent within the contributing drainage basin or .57 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $156,500 and a total present worth of approximately $239,760.

- **Alt-11 (Capital Drive Permeable Pavers)** This alternative is located along both sides of Capital Drive. The construction will consist of removing the asphalt pavement in each lane to allow for the placement of permeable pavers abutting the flange line of the curb and gutter. The pavers will extend from the curb and gutter flange line some distance out into the existing lane of asphalt just far enough so that a 3 to 1 run on from the existing pavement will

not be exceeded. This approach will allow pollutant reductions within this drainage area to be maximized. The timing for construction of this alternative was also considered, as this road is currently on the Village's list of near term construction projects.

There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

This facility would provide a total suspended solids reduction of 65.00 percent within the contributing drainage basin, or .15 percent throughout the reachshed #55 planning area along with a Phosphorus reduction of 60.76 percent within the contributing drainage basin or .09 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $171,600 and a total present worth of approximately $262,900.

- **Alt-12 (Park River Estates Biofilter)** This alternative labeled Alt-12 is located at the south end of Centennial Park just north of Park River Estates subdivision. This alternative consists of one bioretention facility that is approximately 0.33 acres in size and would serve a contributing drainage area of approximately 9.53 acres of Residential land use. The proposed location for the alternative is within property currently owned by the Village of Hartland.

  Construction of this facility would consist of excavation and grading work, along with rerouting of existing storm sewer, and the addition of new storm sewer.

  There are hydric soils just west of the proposed location but not within the foot print of the proposed device. Other constructability issues may consist of challenges with elevation and the ability to gravity feed storm water to and from this device. There are no other apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  The facility would provide a total suspended solids reduction of 86.81 percent within the contributing drainage basin, or .49 percent throughout the reachshed #55 planning area along with a phosphorus reduction of 69.11 percent within the contributing drainage basin or .54 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $127,920 and a total present worth of approximately $195,980.

- **Alt-13 (900 Walnut Ridge Drive Biofilter)** This alternative labeled Alt-13 is located at the bend of Walnut Ridge Drive just west of the property at 950 Walnut ridge Drive. This alternative consists of one bioretention facility that is approximately 0.52 acres in size and would serve a contributing drainage area of approximately 23.18 acres of Commercial land use. The proposed location for the alternative is on property currently owned by PDC Partners LLC. The property for this alternative would need to be researched to see if it was available for and able to be purchased.

  Construction of this facility would consist of excavation and grading work, along with the removal of a small amount of the existing storm sewer prior to entering the device.

There are hydric soils to the north of the proposed location but not within the foot print of the proposed device. There are no other apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

The facility would provide a total suspended solids reduction of 80.15 percent within the contributing drainage basin, or 2.59 percent throughout the reachshed #55 planning area along with a phosphorus reduction of 63.01 percent within the contributing drainage basin or 1.42 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $172,670 and a total present worth of approximately $264,550.

- **Alt-14 (Rae Drive Permeable Pavers)** This alternative is located along both sides of Rae Drive from just north of the intersection of River Meadow Drive on the north to Hartbrook Drive on the south. The timing for construction of this alternative was also considered, as this road is currently on the Village's list of near term construction projects.

  Constructing this alternative will consist of removing the asphalt pavement in each lane to allow for the placement of permeable pavers abutting the flange line of the curb and gutter. The pavers will extend from the curb and gutter flange line some distance out into the existing lane of asphalt just far enough so that a 3 to 1 run on from the existing pavement will not be exceeded. This approach will allow pollutant reductions within this drainage area to be maximized.

  There are no apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

  This facility would provide a total suspended solids reduction of 65.00 percent within the contributing drainage basin, or .22 percent throughout the reachshed #55 planning area along with a phosphorus reduction of 50.12 percent within the contributing drainage basin or .19 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $394,840 and a total present worth of approximately $604,900.

- **Alt-15 (Mill Place Subdivision Biofilter)** This alternative labeled Alt-15 is located at the south west corner of Mill Place Subdivision just north of Cardinal Lane and west of Granary Circle. This alternative consists of one bioretention facility that is approximately 0.19 acres in size and would serve a contributing drainage area of approximately 6.19 acres of Residential land use. The proposed location for the alternative is within property currently owned by the Village of Hartland.

  Construction of this facility would consist of excavation and grading work, along with the potential of some minor storm sewer work outside of the paved area.

  Some challenges for the proposed biofilter are the hydric soils showing up within the proposed location of the water quality device. This could also mean the presence of wetland within the area. A wetland delineation will be required within this proposed location. The potential presence of wetlands and hydric soils may also suggest the presence of a shallow

water table. These components could potentially limit the constructability of the device if it is determined that there is the presence of high ground water or wetlands within the proposed location. A perk test should also be performed in this location to verify feasibility. If high ground water is encountered, this device may need to be lined between the interface of the existing soil and the engineered soil to create a separation between the device's effluent and the ground water. There are no other apparent constructability issues or known environmental components in this location that would affect the construction of this alternative.

The facility would provide a total suspended solids reduction of 83.55 percent within the contributing drainage basin, or .28 percent throughout the reachshed #55 planning area along with a phosphorus reduction of 64.95 percent within the contributing drainage basin or .31 percent throughout the reachshed #55 planning area when compared to no storm water controls. This facility has an estimated project cost of $79,770 and a total present worth of approximately $122,220.

Oconomowoc River Reachshed (#25)

This reachshed includes a small portion of the Village which extends from STH 16 on the south to the northernmost village boundary, then east to the boundary of the Upper Bark River reachshed and west to the Village boundary. This reachshed accounts for 4 percent of the Village's approximately 3480 total acres. Based on the existing storm water controls, this reachshed is currently experiencing a 94.22% reduction in total suspended solids (versus a 59% TMDL goal) and a 70.27% reduction in Phosphorus (versus a 74% TMDL goal). Since this reachshed is already in compliance with the TMDL's Total Suspended Solids requirements and is nearly in compliance with the TMDL's phosphorus requirements, we recommend the implementation of soft practices within this reachshed area moving forward.

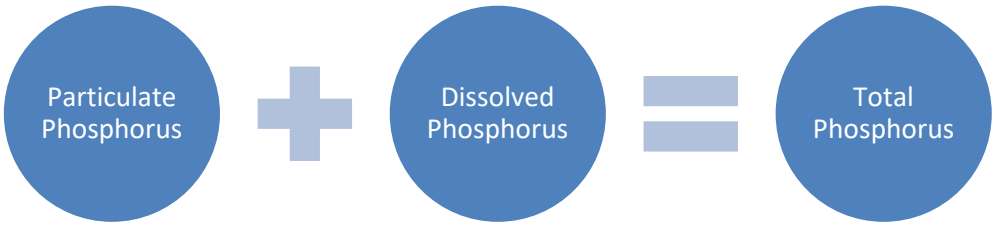
An example of effective soft practices for this reachshed may be continuing the leaf collection and management program, and leaving grasses longer around particular areas of Lake Country Lutheran High School. This will help to deter geese from congregating around storm water devices and waterways, in turn reducing the phosphorus loading. As these soft practices are implemented more throughout the years and water quality models become more capable of identifying reductions achieved by soft practices, we anticipate that the Oconomowoc River Reachshed #25 will comply with TMDL phosphorus requirements for this area.

NON-TRADITIONAL WATER QUALITY ALTERNATIVES:

The Village of Hartland is required to meet the Rock River Basin TMDL limits through the Municipal Separate Storm Sewer (MS4) Permit no. WI-S050075-2. The TMDL requirements include reductions in the amount of sediment, or total suspended solids (TSS) and phosphorus (P) that are discharged from the Village's storm sewer system into the Bark River and tributary waterways.

An analysis of the Village's storm water system has determined that the TSS reductions can be achieved with the addition of a storm water treatment facilities at strategic locations within the Village, as described earlier in this section.

The required phosphorus reductions are more difficult to reach. Phosphorus found in storm water runoff is a combination of particulate phosphorus (which is typically attached to other particles such as sediment and dissolved phosphorus). Sediment, or TSS, has been the standard pollutant that has been targeted in storm water treatment facilities, since other pollutants such as phosphorus (in particulate form), heavy metals, nutrients and more have been found to be attached to the sediment particles. However, these water quality treatment facilities only have a limited impact on removing phosphorus that is in dissolved form. Researchers have recently started putting an emphasis on finding cost effective ways to remove phosphorus from storm water runoff, and it is expected that this technology will evolve rapidly in the coming years.



While the TMDL requirements in the Village's permit are associated with pollutant reductions, specifically reductions in TSS and phosphorus, the overall goal of the TMDL is to remove, or "de-list", waterways from the State's Impaired Waters List. The impairment for the Bark River downstream of the Hartland area is Low Dissolved Oxygen (DO), with phosphorus listed as the primary pollutant of concern and the sources of the phosphorus listed as nonpoint (agriculture) and urban runoff. Methods and practices to improve the dissolved oxygen levels along the Bark River, thus improving the quality of the river, are included in the list of alternatives that the Village can evaluate and implement to meet the TMDL requirements under the MS4 permit.

Temperature, mineral content, and flow are some of the factors that determine the levels of Dissolved Oxygen (DO) in a waterway. A lack of flow, or still areas of the river, can reduce the dissolved oxygen levels in a river. In contrast, a swiftly flowing river, with rapids or turbulent areas, can re-oxygenate the water. Minerals such as salt can reduce the dissolved oxygen levels as well. Temperature plays a role, in that higher rates of photosynthesis or plant and algae die-off can occur when the water is warmer. Photosynthesis and algae and plant die-off can reduce the oxygen available in the waterway for fish and other aquatic organisms. An abundance of phosphorus leads to excessive plant and algae growth; reduced phosphorus levels lead to a reduction in the amount of aquatic plants and algae in the water.

Projects to improve the biological, physical and chemical aspects of the Bark River and its tributaries can be implemented under the MS4 permit to meet the goals of the TMDL. These alternatives may cost less than traditional storm water practices, and may be completed in conjunction with other activities that would directly reduce the amount of TSS and/or phosphorus that is flowing off the landscape and entering the river system. Consideration should be given to mixing these alternative practices with other traditional storm water reduction measures as an overall strategy to meet the MS4 permit requirements and to meet the goals of the TMDL.

Table 5: Summary of Non-Traditional Water Quality Recommendations and Next Steps

Water Quality Recommendation	Recommended Next Steps
Investigate Potential Pollutant Trading Opportunities	Perform analysis to identify effectiveness of trading for MS4 / TMDL compliance, including potential trading partners and opportunities.
Investigate Potential Pollutant Trading with nearby Wastewater Treatment Plant	Develop trading plan to assess the viability of a long-term trading arrangement between these MS4 and WWTP.
Require Phosphorus Reduction for New and Redevelopment Sites	Revise storm water ordinance to include a 30% phosphorus reduction for new and redevelopment sites.
Review Adequacy of Village Culverts and Bridges	Perform survey of Village bridges, culverts and stream crossings. Identify erosion concerns, structural problems or oversized/undersized structures.
Review of Waterway Impediments / Bank Erosion	Perform survey of Bark River identifying streambank erosion, navigation hazards, oxygenation opportunities, etc.
Promote Permeable Pavement and other Non-Traditional Water Quality Treatment Practices	Develop summary of preferred water quality treatment practices in the Village, including permeable pavement guidelines.
Chloride Reduction Efforts (Deicing, Water Softeners, etc.)	Review salt application rates and techniques used by Village during snow / ice removal operations. Provide information to Village residents (water softeners) and private plowing companies (salt usage & techniques).
Install Pet Waste Stations	Install pet waste stations strategically around the Village. Focus on parks and subdivisions that drain directly to the Bark River (or its tributaries).
Implement River Monitoring Program	Develop a monitoring protocol to collect information such as TSS and phosphorus throughout the year. Identify volunteer network to perform monitoring.
Nixon Park Pond Dredging	Evaluate need for dredging of sediment that flows from Bark River into Nixon Park Pond; determine if routine dredging schedule is beneficial water quality and Village goals.
Continue Municipal Leaf Collection and Management Program	Continue Leaf Collection and Management Program; evaluate quantities of leaves collected annually once studies and computer model updates have been completed.
Review New Water Quality Technologies	This recommendation is ongoing. Village can utilize R/M's Water Council connection and other contacts to look for new cost effective water quality technologies.

Non-Traditional Water Quality Improvement Practices for Bark River Reachshed (55)

- **Investigate Potential Pollutant Trading Opportunities with Property Owners, Neighboring Municipalities:** A cost-effective way to reduce the amount of phosphorus entering the Bark River and tributary waterways is to approach local property owners outside of the Village, who may have opportunities for buffers, filter strips, cover crops and other agricultural practices designed to capture sediment and nutrients on land. These practices prevent sediment and nutrients from these fields from reaching the waterways. The Department of Natural Resources has released "A Water Quality Trading How To Manual" to help wastewater and MS4 permit holders determine if entering into a phosphorus trading agreement with agricultural property owners is a good option for the community (see link below):
  http://dnr.wi.gov/topic/surfacewater/documents/WQT_howto_9_9_2013signed.pdf

  Due to the proximity of agricultural fields and other undeveloped lands to the Bark River and tributaries near Hartland, there may be opportunities that could improve the local waterways and cost less than traditional storm water practices would cost to achieve the same results. However future development of specific lands currently in agricultural should be taken into consideration, as long-term runoff controls from agricultural activities would not be necessary in these areas. Coordination with planning staff from neighboring communities would help identify lands that have the greatest potential for development in the short term, which would minimize the benefit of installing runoff controls on these properties, and help direct the Village to properties where long-term improvements can be achieved. Discussions with planning and zoning staff from neighboring communities and possibly Waukesha County, along with an investigation into potential trading opportunities and partners, could be the next steps for the Village of Hartland's efforts to meet permit requirements and to reach the goals of the TMDL.

Water Quality Trading	Adaptive Management
• Permittee purchases "credits" in the watershed to acheive compliance. • Permit compliance is demonstrated by comparing permittee dischage data, available credits and permit limits. • Can be used to comply with a number of pollutants, not just phosphorus.	• Permittee improves water quality in the watershed by reducing in-stream phosphorus concentrations. • Permit compliance is demonstrated by reducing in-stream phosphorus concentrations to acheive water quality criteria. • Typically for phosphorus compliance only.

- **Investigate Potential Pollutant Trading with nearby Wastewater Treatment Plant:** The Village of Hartland may be able to trade or enter into an adaptive management program with the Dela-Hart Wastewater Treatment Plant. An inquiry into the status of the Dela-Hart Wastewater Treatment Plant and compliance with the Rock River Basin TMDL would be appropriate. The Dela-Hart Plant is required to meet the TSS & phosphorus reductions found in the TMDL report, just as the Village of Hartland is required to do so under the MS4 storm water permit.

  The TMDL wasteload allocation limits for the wastewater treatment plants are viewed differently than the limits for the MS4 permittees. Whereas the TMDL limits for the MS4 permittees are based on annual pollutant reduction goals, the wastewater treatment plant TMDL limits are variable for each month to take into account the natural seasonal fluctuation of total phosphorus and total suspended solids in the Bark River. In general, the limits are more stringent in the warmer months and less stringent in the winter months. The new limits may require a treatment facility upgrade for the warmer months. In the colder months when the limits are not as stringent, a treatment facility upgrade may not be required.

  A trade can be made with the excess phosphorus control at the treatment plant if the plant is already meeting the wasteload allocations, and if the plant will have enough reserve capacity to account for future development and inclusion of lands within the Village's sanitary sewer service area. A trading plan could be developed to assess the viability of a long-term trading arrangement between the Dela-Hart Wastewater Treatment Plant and the Village of Hartland (MS4 permit requirements). The Department of Natural Resources has developed a handbook and structure for reviewing and approving proposed pollutant trades: http://dnr.wi.gov/topic/surfacewater/waterqualitytrading.html

Wastewater treatment plants have other compliance alternatives available for meeting the TMDL wasteload allocations. If the Dela-Hart plant is interested in starting an adaptive management program, there may be a benefit for the Village to participate in that type of program. An adaptive management program can identify sites outside of community borders, *within the watershed*, to implement runoff reduction practices such as buffers, cover crops and other agricultural practices. The benefits of the cumulative impact of these practices is typically verified through an in-stream monitoring program, as opposed to a computer-based modelling program (which the pollutant trading approach is based on).

- **Require 30% Phosphorus Reduction for New and Redevelopment Sites:** The Village of Hartland's current erosion control and post-construction storm water ordinance was revised in the first half of 2016, as required by the MS4 permit. That revision included an increase in the TSS control on redevelopment sites from 40% to 66%. (The TSS control required for new development sites remained the same at 80%.) Phosphorus is not required to be controlled to any certain levels through the current ordinance, however could be included to help the Village come closer to the required phosphorus reductions listed in the TMDL report and required by the MS4 permit. A 30% phosphorus control would direct property owners with new and redevelopment projects to consider infiltration, permeable pavement systems, and other green infrastructure practices that focus on treating storm water that results from the average storm events. Research has shown the smaller, average rain events that happen every year cause the most damage to stream channels and water quality over time, as opposed to the large, flooding events that occur only infrequently. As phosphorus treatment technologies evolve and become more cost effective, the Village may consider additional increases beyond 30% phosphorus control.

- **Complete Inventory of Road Crossings for Improper Culverts and Bridge Crossings:** Evaluate bridges and culverts for failing or improperly sized road crossings. An inventory of road crossings should be completed to determine if any culverts are undersized, restricting flow, or if any are too large, creating shallow stream reaches where the water can easily warm up during the day, contributing to the low DO levels in the river. Fish passage problems and eroded or failing culverts or bridges can also be detected and resolved during future road projects.

- **Complete Inventory of Eroding and/or Failing Streambanks and Impediments to Flow Along Bark River Throughout Village:** An inventory of fallen trees and other obstacles that are impeding flow in the river can be developed to help determine which areas should be cleared and which areas should be left undisturbed to promote valuable habitat for fish and other wildlife. Improving the flow throughout the river will provide additional opportunities for turbulent water to re-oxygenate, improving the dissolved oxygen levels in the river. An inventory of eroding stream banks and failing retaining walls that may be contributing to the sediment and nutrient loads in the river and tributary waterways should be completed. This inventory would help identify and prioritize the most problematic areas that are contributing to the sediment and phosphorus loads in the river. Potential streambank stabilization projects can be evaluated for grant funding from various grant sources.

- **Create Permeable Pavement Guidelines and Storm Water Quality Treatment Options Brochure for New and Redevelopment Projects in the Village:** New and redevelopment project owners within the Village may consider using permeable pavement systems to meet state and local storm water requirements. A specification for permeable pavement systems, including typical maintenance considerations, could be developed for developers and property owners to use when designing these projects. Information could be compiled into a handout or web-site format regarding typical storm water practices that are used in the Village of Hartland, with the specific goal of reducing the amount of TSS and phosphorus that is reaching the Bark River and its tributaries.

- **Reducing Chlorides in the River:** One of the contributing factors to low dissolved oxygen (DO) levels in waterways is excess chloride levels. Excessive chlorides can result from many sources, including older or non-efficient water softeners and road de-icing activities (road salt). The Bark River downstream of the Village of Hartland is currently on the State of Wisconsin's impaired waters list for low DO levels, primarily due to excess phosphorus. Excessive chloride levels have not been observed in the Bark River; however, contributions of chlorides in addition to the excessive phosphorus levels will compound the low DO problems in the river.

  The Village of Hartland can help to reduce excessive chlorides in the Bark River by providing information to residents on the benefits of newer models of water softeners that run on timers and replenish the salt in the water on an as-needed basis, or of alternative technologies to soften the water. Information can be available on the Village web-site, in newsletters or in articles in the local newspaper.

  Excess chlorides from winter de-icing activities can be related to both municipal road salt programs and private applications of road salt in parking lots, driveways and sidewalks. The Village of Hartland uses both salt and a salt brine mixture to manage roads during winter weather events. Many communities in Wisconsin and the Midwest have switched to a brine solution as a substitute for straight dry salt applications, to reduce both the amount of chlorides ultimately reaching the local waterways and to reduce the amount of money spent on road salt each year. Calibrating the road salting equipment each year will confirm the appropriate amount of salt is being applied to the roads. Calibration usually occurs in the summer or fall. Various winter road management training opportunities are available during the fall of each year and on-line, through a variety of sources including Waukesha County, the University of Wisconsin, and other local water resource or industry-related groups.

  Private snow plowing and salting operators managing privately-owned parking lots, driveway and sidewalks are also encouraged to use the appropriate amount of road salt and to consider alternative products. Different strategies of alternative products can be used, depending on the weather event and temperatures, calibration of equipment, and training for crews on different application methods. Roads and parking lots can be effectively treated by applying the salt in ways that will create the biggest impact, as opposed to applying too much that will bounce and scatter off the road into ditches, wetlands and grassed areas. Training opportunities are typically available in the fall and on-line through the same water resource or industry-related groups that offer workshops for municipal road salt applicators.

- **Install Pet Waste Stations in Parks and Popular Dog-Walking Pathways:** Storm water runoff from urban areas includes excess nutrients and bacteria from pet waste. Rain and snow melt from areas where owners repeatedly walk their dogs, but don't pick up after them, can run off during rain events into the storm sewers and ditches, ultimately reaching nearby lakes, rivers and wetlands. These contaminants contribute to the excessive phosphorus levels in the river, excessive aquatic plant growth and algae blooms, and low DO levels. Pet waste stations are becoming more common in parks and along popular dog-walking routes around the state, especially in areas where the local waterways are impaired due to excessive nutrients. Pet waste stations typically include a garbage can and a source of bags for owners to pick up after their pets. The Village of Hartland currently has an ordinance in place requiring pet owners to pick up and properly dispose of pet waste; the installation of dedicated pet waste stations would encourage pet owners to follow these rules. In addition, pet waste stations also provide information to the general public on the impacts of excessive nutrients to water quality, especially when installed in parks and subdivisions that drain directly to the Bark River and its tributaries.

Figure: Illustration of a Typical Pet Waste Station

- **Implement / Participate in a River Monitoring Program:** The success of the efforts to improve the Bark River and remove the river from the State's Impaired Waters List will be proven through actual in-stream monitoring. The Village of Hartland could develop a monitoring protocol to collect information such as TSS and phosphorus levels throughout the year, to evaluate the impact of the various pollutant reduction measures as they are implemented over time. Setting up monitoring stations upstream and downstream of the Bark River wetland complex west of Cottonwood Avenue and east of STH 83 would provide site-specific information about the impacts of the wetlands on the phosphorus levels in the river throughout the year. New monitoring activities should be coordinated with data collection efforts by WDNR, Waukesha County and the citizen-based Water Action Volunteers network, the Southeast Wisconsin Regional Planning Commission (SEWRPC), and other wastewater and MS4 permittees upstream and downstream of the Village. The data collected over a multi-year period would provide better information for decision makers and biologists regarding which pollutant reduction efforts have more of an immediate impact on the Bark River and its tributaries versus projects that would be better to implement at a

later date. This data would also be valuable to share with the public, to show the benefits of a strategic plan to improve the waterways over time.

- **Routine Sediment Removal from Nixon Park Pond:** Nixon Park Pond is an approximately ½ acre "on-line" pond, which means it is connected upstream and downstream to the Bark River in Nixon Park. Some water from the river flows into the pond and water from the pond flows out to the river on a constant basis. A walking trail connects the pond to trails along the Bark River and further throughout the Village. The pond has traditionally been managed to provide recreational opportunities such as fishing and aesthetic enjoyment of the pond for residents and others visiting Nixon Park. As sediment and nutrients from the Bark River flow into the pond and settles there, the Village has determined that dredging is needed approximately every 10 years to allow for continued enjoyment of the pond. Nixon Park Pond is functioning as a storm water quality treatment pond, capturing sediment and nutrients that would otherwise continue down the Bark River to be deposited in Nagawicka Lake and impact the Bark River further on.

Nixon Park Pond on Bark River

Nixon Park, Village of Hartland

The Village dredges the pond approximately once every 10 years. The amount of sediment removed from the pond, and thus from the Bark River system is approximately 3,000 yards. The material that accumulates in Nixon Park Pond comes primarily from the Bark River. Sediment from upstream rural and urban land uses, including riparian lands that directly drain to the Bark River and its tributaries along with storm sewer system outfalls and other discharge points, are diverted from the river into Nixon Park Pond. Sediment settles in the pond, building up over time, making the pond shallower, warmer, and clogged with sediment and abundant aquatic vegetation growth. The Village of Hartland has previously dredged Nixon Park Pond to promote

better water flow, deeper water, more balanced levels of aquatic vegetation, improved habitat and better aesthetic opportunities for residents and visitors to the park.

Without the benefit of this on-line pond, 3,000 cubic yards of sediment would transport downstream to Nagawicka Lake and beyond, contributing to the sediment and phosphorus loads in Nagawicka Lake and further down the Bark River system. The annual baseline load for TSS in Reach 55 is 121.73 tons, and the annual baseline load for phosphorus in Reach 55 is 1233.78 pounds. The Village's wasteload allocation (the amount that is allowed to be discharged from land through the storm sewer system) for this reach is 48.59 tons of TSS and 198.21 pounds of phosphorus. The Village's maintenance of Nixon Park Pond prevents a significant amount of TSS and phosphorus from impacting the Bark River and downstream lakes. The Department of Natural Resources and the U.S. Army Corps of Engineers regulate the dredging of on-line ponds (ponds that are directly attached to a river or stream). The WDNR currently has regulations in place to allow easier permitting for the removal of 3,000 cubic yards or less in previously dredged waterbodies. The Village of Hartland may want to assess the current need for dredging of Nixon Park Pond, and consider scheduling future dredging to remove an amount less than 3,000 cubic yards. Depending on the amount of sediment that accumulates in the pond, this could result in routine dredging more often than every 10 years. Any pollutant reduction to the Bark River due to the physical removal of sediment that is transported downstream and settles in Nixon Park Pond should be considered in addition to the traditional storm water practices represented in the WinSLAMM model results.

- **Continue the Municipal Leaf Collection and Management Program** The Village of Hartland has had a leaf collection and management program for many years, with Village crews picking up approximately 1,000 pounds of leaves from the curbside annually, and storing the leaves at the Public Works yard. The leaves are disposed of annually at a local agricultural field, to be incorporated into the soil and used as fertilizer.

Leaf Collection and Management Program
East Capitol Drive, Village of Hartland
November 2016

Studies are currently underway to better understand the relationship between decomposing leaves that fall from the trees in autumn and the amount of phosphorus from the leaves that reaches local waterways via the storm sewer system. USGS is expected to complete a significant study to determine the impacts of a community-wide leaf collection program on local waterways. Once this study has been completed, computer models (such as WinSLAMM) are expected to be updated to include the pollutant reductions offered by the annual leaf collection programs, and the Department of Natural Resources is expected to acknowledge and give "credit" to communities who operate leaf collection programs with regard to meeting TMDL wasteload allocations for phosphorus. Additional information on the current USGS study to evaluate the effectiveness of municipal leaf collection programs to control phosphorus in storm water runoff can be found at: https://www.usgs.gov/news/removal-fallen-leaves-can-improve-urban-water-quality

- **Technologies Currently Under Development:** Capturing particulate phosphorus that has been attached to sediment particles has been a secondary benefit of using TSS as a surrogate pollutant when designing and constructing storm water treatment facilities. Due to the increased concern about excessive phosphorus loadings in our local waterways, new technologies and practices are currently under development to specifically address phosphorus. As improved phosphorus reduction methods become available, these options should be evaluated for implementation within the Village to control the amount of phosphorus reaching the waterways via the municipal storm sewer system.

  Current technologies and practices to reduce the amount of phosphorus in storm water runoff that are under development include:

  - Using alternative media in the construction of biofilter facilities, rather than a soil / compost mix;
  - Placing artificial biofilter-islands in large storm water ponds, to take up the dissolved nutrients (phosphorus) into the roots and the media that comprises the "island". Plants that grow on the island would be managed through cutting and removing the excess plant material at the end of the season. This process disrupts the natural cycle of nutrients in the pond entering the plants, then returning to the pond when the plants die off in the fall.
  - Installing rock berms constructed with lime filters in storm water ponds to prevent phosphorus from flowing from one end of the storm water pond through to the other end and discharging through the outlet of the pond.

OCONOMOWOC RIVER (25)
141.24 Acres

BARK RIVER (55)
2,427.16 Acres

Upper Fox River - IL
911.5 Acres

ALT01
ALT02
ALT02A
ALT03
ALT04
ALT05
ALT05A
ALT06
ALT06A
ALT06B
ALT07
ALT08
ALT09
ALT10
ALT11
ALT12
ALT13
ALT14
ALT15

WB STH 16
EB STH 16
LISBON RD
K
HILL ST
HILL CT
LAWN ST
E CAPITOL DR
W CAPITOL DR
WARREN AVE
E PARK AVE
LISBON AVE
TENNY AVE
PAWLING AVE
INDUSTRIAL DR
CARDINAL LN
NORTON DR
COTTONWOOD AVE
APPLE AVE
SUNSET TRL
OXFORD DR
COVENTRY LN
HARTRIDGE DR
E IMPERIAL DR
RUSTIC LN
NORTH AVE
HAZEL LN
MEADOW LN
MERTON AVE
ANTON RD
DONA RD
JUNCTION RD
WINKLEMAN RD
MARY ALL CIR
SUNSHINE DR
WILSON DR
CAMPBELL DR
ROSE DR
FOXWOOD LN
RAM DR
ROUND DR
83

Legend

- Storm Sewer
- Reachshed Boundaries
- 2016 Alternative Basins
- Grass Swale Basin
- Infiltration Basin
- Wet Pond Basin
- Filter Strip Basin
- Hartland Village Limits

Alternative Storm Water Quality Facilities
Village of Hartland
Exhibit 4

0 950 1,900 3,800 5,700
Feet

N W E S

Village of Hartland

Ruekert · Mielke

ALTERNATIVE 1: PROGRESS DRIVE GRASS SWALES

OVERVIEW

Installation of a series of grass swales on both sides of Progress Drive, running for approximately 1900 feet south of the intersection at Progress and Industrial Drive, would capture and treat runoff from the approximately 39-acre drainage area. This area has a mixed land use of industrial and office park. The swales would be constructed within the street right-of-way and culverts would be installed underneath driveways to convey the treated storm water to the existing discharge point to the south of Cardinal Lane.

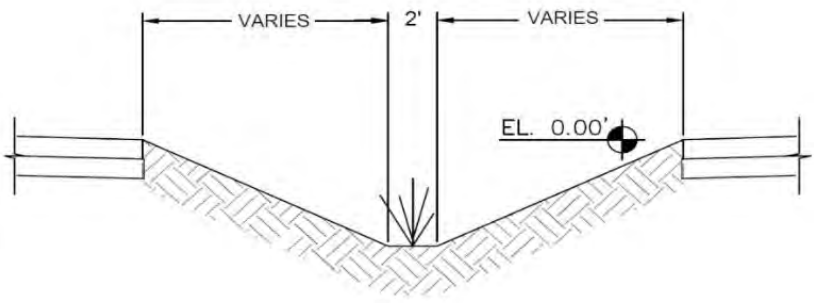
ESTIMATED CONSTRUCTION COST: $192,400

ESTIMATED PROJECT WORTH: $230,800

ESTIMATED CONSTRUCTION COST PER POUND OF POLLUTANTS REMOVED:

Total Suspended Solids (TSS) = $11

Phosphorus (P) = $5,975



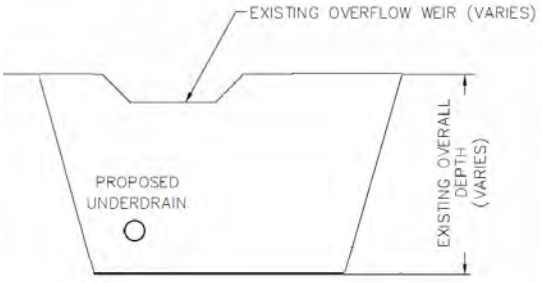
POLLUTANT REDUCTIONS				
	No controls (lbs)	With controls (lbs)	Percent reduction within 39.53-acre drainage area	Percent reduction within entire reachshed
TSS	23779	5971	75%	4.5%
P	44.6	12.4	72%	2.9%

ALTERNATIVE 2: ST. CHARLES CHURCH INFILTRATION BASIN & ALTERNATIVE 2A: HARTLAND NORTH ELEMENTARY SCHOOL PARKING LOT

OVERVIEW

ALT 2: Divert runoff from the existing storm sewer system into a 17,300 SF retrofitted infiltration basin on the St. Charles Church property. The basin will treat approximately 52 acres of runoff from the subdivision to the south as well as St. Charles property to the east.

ALT 2A: Installation of permeable pavers and a swale on the north end of the Hartland North Elementary school parking lot would reduce TSS and phosphorus reaching to the Bark River. Additional signage and features could enhance this area for use as an outdoor classroom for students.



ESTIMATED CONSTRUCTION COST:

ALT 2: $63,200

ALT 2A: $153,500

ESTIMATED PRESENT WORTH:

ALT 2: $96,800

ALT 2A: $235,140

ESTIMATED CONSTRUCTION COST PER POUND OF POLLUTANTS REMOVED:

ALT 2: Total Suspended Solids (TSS) = $5

Phosphorus (P) = $1,635

ALT 2A: Total Suspended Solids (TSS) = $823

Phosphorus (P) = $578,520

POLLUTANT REDUCTIONS

		No controls (lbs)	With controls (lbs)	Percent reduction within 51.82-acre drainage area	Percent reduction within entire reachshed
ALT 2	TSS	15119	2789	82%	3.1%
	P	49.7	11.1	78%	3.5%
ALT 2A		No controls (lbs)	With controls (lbs)	Percent reduction within 0.46-acre drainage area	Percent reduction within entire reachshed
	TSS	287	100	65%	0.05%
	P	0.47	0.21	56%	0.02%

ALTERNATIVE 3: VILLAGE PARKING LOT BIORETENTION ISLANDS

OVERVIEW

This one-acre parking lot located northeast of North Avenue and East Capitol Drive is directly adjacent to the west bank of the Bark River. Currently there is no storm water infrastructure on site to convey or treat runoff prior or discharge in the river. It is proposed that biofiltration islands are installed throughout the parking lot to capture and treat storm runoff. An underdrain would convey treated storm water from the biofiltration islands to a discharge point west of the river.

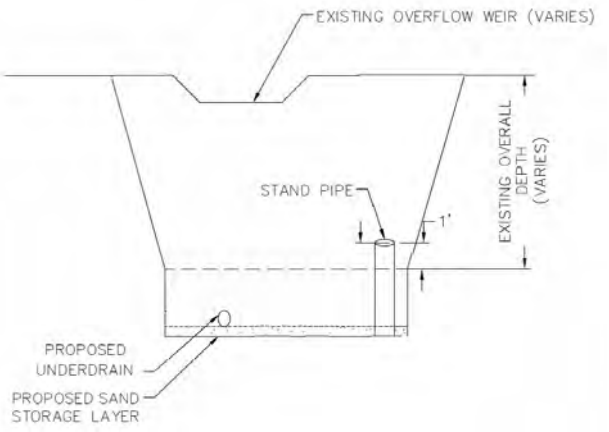
ESTIMATED CONSTRUCTION COST: $81,000

ESTIMATED PROJECT WORTH: $124,000

ESTIMATED CONSTRUCTION COST PER POUND OF POLLUTANTS REMOVED:

Total Suspended Solids (TSS) = $143

Phosphorus (P) = $63,600

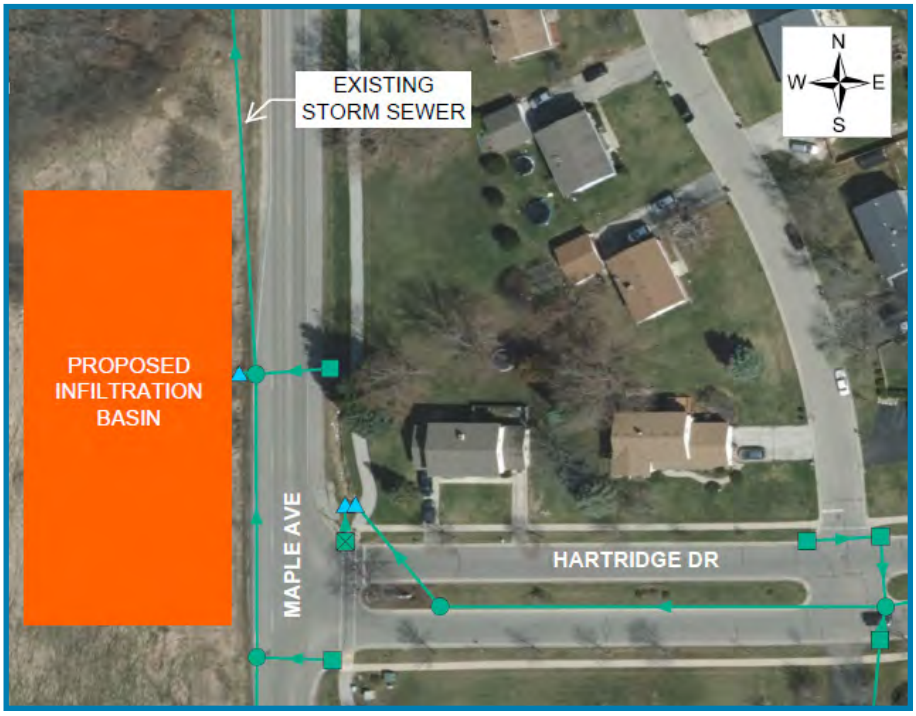


POLLUTANT REDUCTIONS				
	No controls (lbs)	With controls (lbs)	Percent reduction within 1.3-acre drainage area	Percent reduction within entire reachshed
TSS	597	29	95%	0.14%
P	1.44	0.16	89%	0.12%

ALTERNATIVE 4: HARTRIDGE SUBDIVISION INFILTRATION BASIN

OVERVIEW

An approximately 35,000 SF infiltration basin to treat and infiltrate approximately 82 acres of runoff from the Hartridge subdivision could be constructed near the existing storm sewer outfall west of Maple Ave. An overflow weir approximately 150 feet wide will discharge treated runoff to wetlands to the west. The location of this basin is approximate and it could vary based on field conditions as determined during the design phase.



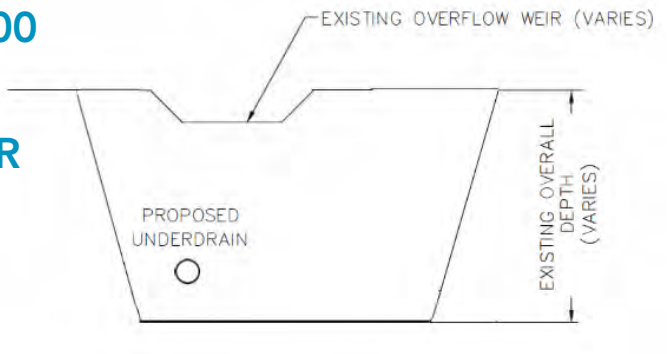
ESTIMATED CONSTRUCTION COST: $142,000

ESTIMATED PROJECT WORTH: $217,600

ESTIMATED CONSTRUCTION COST PER POUND OF POLLUTANTS REMOVED:

Total Suspended Solids (TSS) = $8

Phosphorus (P) = $2150

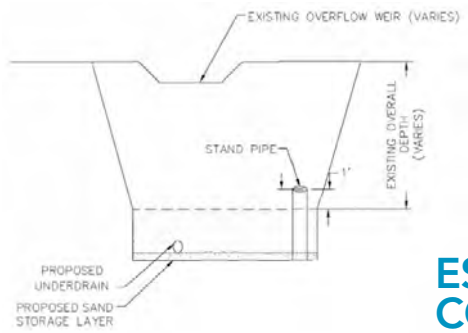


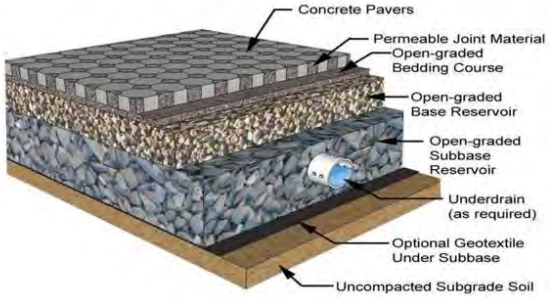
POLLUTANT REDUCTIONS				
	No controls (lbs)	With controls (lbs)	Percent reduction within 82.11-acre drainage area	Percent reduction within entire reachshed
TSS	19589	2059	89%	4.4%
P	76.1	10	87%	5.9%

ALTERNATIVE 5: NORTH AVENUE BIOFILTER & ALTERNATIVE 5A: CHESTNUT DRIVE PERMEABLE PAVERS

OVERVIEW

Installation of a biofiltration device located on the park property along North Avenue. The biofilter would capture runoff from the Chestnut Ridge Subdivision as well as North Avenue and discharge at the outfill to the Bark River. To provide further treatment to storm water runoff in this area, permeable pavers could be installed adjacent to the curb and gutter along Chestnut Ridge Drive and North Avenue. The pavers would include an underdrain to convey water to the existing storm sewer system.





ESTIMATED CONSTRUCTION COST:

ALT 5: $205,000

ALT 5A: $370,000

ESTIMATED PRESENT WORTH:

ALT 5: $314,300

ALT 5A: $570,700

ESTIMATED CONSTRUCTION COST PER POUND OF POLLUTANTS REMOVED:

ALT 5: Total Suspended Solids (TSS) = $68

Phosphorus (P) = $27,240

ALT 5A: Total Suspended Solids (TSS) = $285

Phosphorus (P) = $123,880

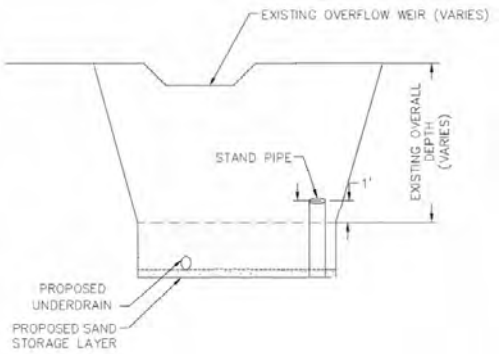
POLLUTANT REDUCTIONS

		No controls (lbs)	With controls (lbs)	Percent reduction within 21.28-acre drainage area	Percent reduction within entire reachshed
ALT 5	TSS	5592	2572	54%	0.75%
	P	19.5	12	39%	0.68%
ALT 5A		No controls (lbs)	With controls (lbs)	Percent reduction within 1.77-acre drainage area	Percent reduction within entire reachshed
	TSS	2006	702	65%	0.32%
	P	5.8	2.8	52%	0.26%

ALTERNATIVE 6: HARTBROOK PARK BIOFILTER & ALTERNATIVE 6A: SUNNYSLOPE DRIVE PERMEABLE PAVERS & ALTERNATIVE 6B: HARTBROOK PARK PARKING LOT PERMEABLE PAVERS

OVERVIEW

Alternative 6 is an approximately 12,700 SF biofilter located in Hartbrook Park which would treat runoff from the surrounding area at the existing storm sewer discharge area to the west of the parking lot. Alternative 6A proposes installation of permeable pavers and an underdrain adjacent to the curb and gutter in the parking lanes on the western portion of Sunnyslope Drive. Alternative 6B involves replacing approximately 20% of the pavement in the Hartbrook Park parking lot with permeable pavers and an underdrain system.



ESTIMATED CONSTRUCTION COST:

ALT 6: $107,000
ALT 6A: $313,170, **ALT 6B:** $60,255

ESTIMATED PRESENT WORTH:

ALT 6: $163,250
ALT 6A: $480,000, **ALT 6B:** $92,300

ESTIMATED CONSTRUCTION COST PER POUND OF POLLUTANTS REMOVED:

ALT 6: Total Suspended Solids (TSS) = $21
Phosphorus (P) = $9,740

ALT 6A: Total Suspended Solids (TSS) = $234
Phosphorus (P) = $126,790

ALT 6B: Total Suspended Solids (TSS) = $560
Phosphorus (P) = $1,181,470

POLLUTANT REDUCTIONS

		No controls (lbs)	With controls (lbs)	Percent reduction within 20.85-acre drainage area	Percent reduction within entire reachshed
ALT 6	TSS	9269	4149	55%	1.28%
	P	25.1	14.2	44%	0.98%
ALT 6A		No controls (lbs)	With controls (lbs)	Percent reduction within 1.31-acre drainage area	Percent reduction within entire reachshed
	TSS	2063	722	65%	0.34%
	P	4.3	1.9	57%	0.22%
ALT 6B		No controls (lbs)	With controls (lbs)	Percent reduction within 0.36-acre drainage area	Percent reduction within entire reachshed
	TSS	165.2	57.81	65%	0.03%
	P	0.09	0.04	57%	0.02%

Village of Hartland
Economic Analysis of Alternative 1
Construct New Grass Swale
Description: ALT 01 - Grass Swale

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and grading	CY	1900	$15.00	$28,500.00		30
Restoration (topsoil, seed & erosion mat)	SY	4850	$7.00	$33,950.00		30
Culverts	LF	600	$50.00	$30,000.00		30
Driveway Replacement	SY	790	$60.00	$47,400.00		30
Catch Basin Adjustments	EA	5	$200.00	$1,000.00		30
Add Inlet Manhole Structure	EA	1	$3,000.00	$3,000.00		30
Manufactured ditch checks	EA	10	$85.00	$850.00		30
Silt fence	LF	650	$3.00	$1,950.00		30
Inlet protection	EA	15	$90.00	$1,350.00		30
		Totals		$148,000.00	$2,220.00	
		Present Worth Factor			17.2920	
		Present Worth			$38,388.31	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$148,000.00
Legal, Engineering, & Contingencies (30%)	$44,400.00
Subtotal - Estimated Project Cost	$192,400.00
Present Worth of O&M (30 Year)	$38,388.31
Total Present Worth	**$230,788.31**

Village of Hartland
Economic Analysis of Alternative 2
Retrofit Existing Infiltration Basin
Description: ALT 02 - Infiltration Basin

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and grading	CY	900	$15.00	$13,500.00		30
Restoration (topsoil and erosion mat)	SY	2300	$7.00	$16,100.00		30
Agrecol wetland renewal seed mix	SY	700	$4.00	$2,800.00		30
Outlet structure adjustment	EA	1	$2,000.00	$2,000.00		30
Core connection to existing manhole	LS	1	$3,000.00	$3,000.00		30
Storm Sewer	LF	70	$65.00	$4,550.00		30
Storm End Section	EA	1	$1,500.00	$1,500.00		30
Rip rap	CY	25	$75.00	$1,875.00		30
Manufactured ditch checks	EA	5	$85.00	$425.00		30
Inlet Protection	EA	5	$90.00	$450.00		30
Tracking pad	TON	75	$20.00	$1,500.00		30
Silt fence	LF	300	$3.00	$900.00		30
			Totals	$48,600.00	$1,944.00	
			Present Worth Factor		17.2920	
			Present Worth		$33,615.71	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$48,600.00
Legal, Engineering, & Contingencies (30%)	$14,580.00
Subtotal - Estimated Project Cost	$63,180.00
Present Worth of O&M (30 Year)	$33,615.71
Total Present Worth	**$96,795.71**

Village of Hartland
Economic Analysis of Alternative 2A
Construct New Permeable Pavement Parking Lot
Description: ALT 02A - Permeable Pavement

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Pavement removal, shaping and compacting	CY	425	$12.50	$5,312.50		30
Permeable pavement (includes engineered media, drain tile, storm sewer adjustments, etc.)	SY	850	$130.00	$110,500.00		30
Restoration (topsoil, seed & erosion mat)	SY	150	$7.00	$1,050.00		30
Silt fence	LF	400	$3.00	$1,200.00		30
			Totals	$118,062.50	$4,722.50	
			Present Worth Factor		17.2920	
			Present Worth		$81,661.63	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$118,062.50
Legal, Engineering, & Contingencies (30%)	$35,418.75
Subtotal - Estimated Project Cost	$153,481.25
Present Worth of O&M (30 Year)	$81,661.63
Total Present Worth	**$235,142.88**

Village of Hartland
Economic Analysis of Alternative 3
Construct New Biofiltration Device
Description: ALT 03 - Biofiltration Islands

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and Grading	CY	475	$15.00	$7,125.00		30
Restoration (topsoil, seed & erosion mat)	SY	450	$7.00	$3,150.00		30
Engineered Media	CY	175	$60.00	$10,500.00		30
Rock Fill	CY	60	$30.00	$1,800.00		30
Curb & Gutter	LF	400	$20.00	$8,000.00		30
Plantings	SY	320	$40.00	$12,800.00		30
Standpipe Outlet Structure	EA	2	$1,500.00	$3,000.00		30
Drain Tile	LF	400	$10.00	$4,000.00		30
End Section	EA	2	$1,500.00	$3,000.00		30
Rip Rap	CY	2	$75.00	$150.00		30
Asphalt Replacement	TON	80	$70.00	$5,600.00		30
Manufactured Ditch Checks	EA	15	$85.00	$1,275.00		30
Silt Fence	LF	300	$3.00	$900.00		30
Pavement Markings	LS	1	$1,000.00	$1,000.00		30
			Totals	$62,300.00	$2,492.00	
			Present Worth Factor		17.2920	
			Present Worth		$43,091.75	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$62,300.00
Legal, Engineering, & Contingencies (30%)	$18,690.00
Subtotal - Estimated Project Cost	$80,990.00
Present Worth of O&M (30 Year)	$43,091.75
Total Present Worth	**$124,081.75**

Village of Hartland
Economic Analysis of Alternative 4
Construct New Infiltration Device
Description: ALT 04 - Infiltration Device

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and grading	CY	4200	$15.00	$63,000.00		30
Restoration (topsoil and erosion mat)	SY	4300	$7.00	$30,100.00		30
Agrecol wetland renewal seed mix	SY	2400	$4.00	$9,600.00		30
Rip rap	CY	30	$75.00	$2,250.00		30
Manufactured ditch checks	EA	20	$85.00	$1,700.00		30
Inlet Protection	EA	4	$90.00	$360.00		30
Tracking pad	TON	75	$20.00	$1,500.00		30
Silt fence	LF	250	$3.00	$750.00		30
			Totals	$109,260.00	$4,370.40	
			Present Worth Factor		17.2920	
			Present Worth		$75,573.10	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$109,260.00
Legal, Engineering, & Contingencies (30%)	$32,778.00
Subtotal - Estimated Project Cost	$142,038.00
Present Worth of O&M (30 Year)	$75,573.10
Total Present Worth	**$217,611.10**

Village of Hartland
Economic Analysis of Alternative 5
Construct New Biofiltration Device
Description: ALT 05 - 1000 GPM Biofiltration Device

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
One submersible pump rated at 1,000 gpm at 8 feet TDH	EA	1	$9,000.00	$9,000.00		30
Wet well structure (6 ft x 6 ft.)	EA	1	$9,000.00	$9,000.00		30
Check Valve	EA	1	$4,000.00	$4,000.00		30
Access door	EA	1	$3,000.00	$3,000.00		30
Piping and fittings	LF	230	$80.00	$18,400.00		30
Pump Controls and Electrical	LS	1	$10,000.00	$10,000.00		30
Excavation, backfill, dewatering	LS	1	$30,000.00	$30,000.00		30
Painting	LS	1	$2,500.00	$2,500.00		30
Excavation and Grading (Retention and Media Area)	CY	750	$15.00	$11,250.00		30
Engineered Media	CY	255	$60.00	$15,300.00		30
Plantings	SY	510	$40.00	$20,400.00		30
4-inch Thick Layer Washed Pea Gravel	CY	55	$26.00	$1,430.00		30
6-inch Thick Layer #2 Washed Stone	CY	115	$18.00	$2,070.00		30
6-inch Underdrain W/Cleanouts	LF	190	$25.00	$4,750.00		30
15-inch PVC storm sewer w/spoil backfill	LF	30	$60.00	$1,800.00		30
Rip-Rap	TON	12	$75.00	$900.00		30
Core Hole in Pipe and build Concrete Dam	EA	1	$2,000.00	$2,000.00		30
Clearing and Grubbing	LS	1	$5,000.00	$5,000.00		30
Topsoil, seed and fertilizer	SY	850	$3.25	$2,762.50		30
Erosion Matting	SY	1350	$2.25	$3,037.50		30
Silt fence	LF	400	$3.00	$1,200.00		30
			Totals	$157,800.00	$6,312.00	
			Present Worth Factor		17.2920	
			Present Worth		$109,147.31	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$157,800.00
Legal, Engineering, & Contingencies (30%)	$47,340.00
Subtotal - Estimated Project Cost	$205,140.00
Present Worth of O&M (30 Year)	$109,147.31
Total Present Worth	**$314,287.31**

Village of Hartland
Economic Analysis of Alternative 5A
Construct New Permeable Pavement Roadway
Description: ALT 05A - Permeable Pavement

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Pavement removal, shaping and compacting	CY	1010	$12.50	$12,625.00		30
Permeable pavement (includes engineered media, drain tile, storm sewer adjustments, etc.)	SY	2025	$140.00	$283,500.00		30
Inlet Protection	EA	15	$90.00	$1,350.00		30
Manufactured Ditch Checks (erosion rolls)	EA	20	$85.00	$1,700.00		30
			Totals	$286,550.00	$11,462.00	
			Present Worth Factor		17.2920	
			Present Worth		$198,201.29	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$286,550.00
Legal, Engineering, & Contingencies (30%)	$85,965.00
Subtotal - Estimated Project Cost	$372,515.00
Present Worth of O&M (30 Year)	$198,201.29
Total Present Worth	**$570,716.29**

Village of Hartland
Economic Analysis of Alternative 6
Construct New Biofiltration Device
Description: ALT 06 - Biofiltration Device

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and Grading	CY	1500	$15.00	$22,500.00		30
Restoration (topsoil, seed & erosion mat)	SY	1820	$7.00	$12,740.00		30
Engineered Media	CY	230	$60.00	$13,800.00		30
Rock Fill	CY	80	$30.00	$2,400.00		30
Plantings	SY	430	$40.00	$17,200.00		30
Drain Tile	LF	300	$10.00	$3,000.00		30
Adjustment of Existing Storm Sewer	LS	1	$5,000.00	$5,000.00		30
End Section	EA	2	$1,500.00	$3,000.00		30
Rip Rap	CY	15	$75.00	$1,125.00		30
Silt Fence	LF	400	$3.00	$1,200.00		30
			Totals	$81,965.00	$3,278.60	
			Present Worth Factor		17.2920	
			Present Worth		$56,693.66	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$81,965.00
Legal, Engineering, & Contingencies (30%)	$24,589.50
Subtotal - Estimated Project Cost	$106,554.50
Present Worth of O&M (30 Year)	$56,693.66
Total Present Worth	**$163,248.16**

Village of Hartland
Economic Analysis of Alternative 6A
Install Permeable Pavers on Roadway
Description: ALT 06A - Permeable Pavement

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Pavement removal, shaping and compacting	CY	800	$12.50	$10,000.00		30
Permeable pavement (includes engineered media, drain tile, storm sewer adjustments, etc.)	SY	1600	$150.00	$240,000.00		30
Inlet Protection	EA	10	$90.00	$900.00		30
		Totals		$240,900.00	$9,636.00	
		Present Worth Factor			17.2920	
		Present Worth			$166,626.03	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$240,900.00
Legal, Engineering, & Contingencies (30%)	$72,270.00
Subtotal - Estimated Project Cost	$313,170.00
Present Worth of O&M (30 Year)	$166,626.03
Total Present Worth	**$479,796.03**

Village of Hartland
Economic Analysis of Alternative 6B
Install Permeable Pavers in Parking Lot
Description: ALT 06B - Permeable Pavement

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Pavement removal, shaping and compacting	CY	160	$12.50	$2,000.00		30
Permeable pavement (includes engineered media, drain tile, storm sewer adjustments, etc.)	SY	320	$130.00	$41,600.00		30
Restoration (topsoil, seed & erosion mat)	SY	150	$7.00	$1,050.00		30
Manufactured Ditch Checks (erosion roll)	EA	20	$85.00	$1,700.00		30
			Totals	$46,350.00	$1,854.00	
			Present Worth Factor		17.2920	
			Present Worth		$32,059.43	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$46,350.00
Legal, Engineering, & Contingencies (30%)	$13,905.00
Subtotal - Estimated Project Cost	$60,255.00
Present Worth of O&M (30 Year)	$32,059.43
Total Present Worth	**$92,314.43**

Village of Hartland
Economic Analysis of Alternative 7
Construct New Biofiltration Device
Description: ALT 07 - Biofiltration Device

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and Grading	CY	950	$15.00	$14,250.00		30
Restoration (topsoil, seed & erosion mat)	SY	1050	$7.00	$7,350.00		30
Engineered Media	CY	325	$60.00	$19,500.00		30
Rock Fill	CY	110	$30.00	$3,300.00		30
Plantings	SY	625	$40.00	$25,000.00		30
Drain Tile	LF	400	$10.00	$4,000.00		30
Connection to Existing Manhole	EA	1	$2,000.00	$2,000.00		30
Silt Fence	LF	400	$3.00	$1,200.00		30
Inlet Protection	EA	5	$90.00	$450.00		30
			Totals	$77,050.00	$3,082.00	
			Present Worth Factor		17.2920	
			Present Worth		$53,294.05	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$77,050.00
Legal, Engineering, & Contingencies (30%)	$23,115.00
Subtotal - Estimated Project Cost	$100,165.00
Present Worth of O&M (30 Year)	$53,294.05
Total Present Worth	**$153,459.05**

Village of Hartland
Economic Analysis of Alternative 8
Install Permeable Pavers on Roadway
Description: ALT 08 - Permeable Pavement

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Pavement removal, shaping and compacting	CY	615	$12.50	$7,687.50		30
Permeable pavement (includes engineered media, drain tile, storm sewer adjustments, etc.)	SY	1230	$150.00	$184,500.00		30
Inlet Protection	EA	12	$90.00	$1,080.00		30
			Totals	$193,267.50	$7,730.70	
			Present Worth Factor		17.2920	
			Present Worth		$133,679.52	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$193,267.50
Legal, Engineering, & Contingencies (30%)	$57,980.25
Subtotal - Estimated Project Cost	$251,247.75
Present Worth of O&M (30 Year)	$133,679.52
Total Present Worth	**$384,927.27**

Village of Hartland
Economic Analysis of Alternative 9
Construct New Biofiltration Device
Description: ALT 09 - Biofiltration Device

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and Grading	CY	200	$15.00	$3,000.00		30
Restoration (topsoil, seed & erosion mat)	SY	240	$7.00	$1,680.00		30
Engineered Media	CY	60	$60.00	$3,600.00		30
Rock Fill	CY	20	$30.00	$600.00		30
Curb & Gutter	LF	170	$20.00	$3,400.00		30
Plantings	SY	240	$40.00	$9,600.00		30
Drain Tile	LF	150	$10.00	$1,500.00		30
Catch Basin Adjustment	LS	1	$1,500.00	$1,500.00		30
Road Replacement	SY	100	$75.00	$7,500.00		30
Inlet Protection	EA	3	$90.00	$270.00		30
			Totals	$32,650.00	$1,306.00	
			Present Worth Factor		17.2920	
			Present Worth		$22,583.40	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$32,650.00
Legal, Engineering, & Contingencies (30%)	$9,795.00
Subtotal - Estimated Project Cost	$42,445.00
Present Worth of O&M (30 Year)	$22,583.40
Total Present Worth	**$65,028.40**

Village of Hartland
Economic Analysis of Alternative 10
Construct New Infiltration Device
Description: ALT 10 - Infiltration Device

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and Grading	CY	3000	$15.00	$45,000.00		30
Restoration (Topsoil and Erosion Mat)	SY	4600	$7.00	$32,200.00		30
Agrecol wetland renewal seed mix	SY	1560	$4.00	$6,240.00		30
Inlet Protection	EA	6	$90.00	$540.00		30
Tracking pad	TON	75	$20.00	$1,500.00		30
Silt fence	LF	800	$3.00	$2,400.00		30
Engineered Media	CY	500	$65.00	$32,500.00		30
			Totals	$120,380.00	$4,815.20	
			Present Worth Factor		17.2920	
			Present Worth		$83,264.60	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$120,380.00
Legal, Engineering, & Contingencies (30%)	$36,114.00
Subtotal - Estimated Project Cost	$156,494.00
Present Worth of O&M (30 Year)	$83,264.60
Total Present Worth	**$239,758.60**

Village of Hartland
Economic Analysis of Alternative 11
Install Permeable Pavers on Roadway
Description: ALT 11 - Permeable Pavement

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Pavement removal, shaping and compacting	CY	420	$12.50	$5,250.00		30
Permeable pavement (includes engineered media, drain tile, storm sewer adjustments, etc.)	SY	825	$150.00	$123,750.00		30
Restoration (topsoil, seed & erosion mat)	SY	300	$7.00	$2,100.00		30
Inlet Protection	EA	10	$90.00	$900.00		30
			Totals	$132,000.00	$5,280.00	
			Present Worth Factor		17.2920	
			Present Worth		$91,301.94	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$132,000.00
Legal, Engineering, & Contingencies (30%)	$39,600.00
Subtotal - Estimated Project Cost	$171,600.00
Present Worth of O&M (30 Year)	$91,301.94
Total Present Worth	**$262,901.94**

Village of Hartland
Economic Analysis of Alternative 12
Construct New Biofiltration Device
Description: ALT 12 - Biofiltration Device

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and Grading	CY	2000	$15.00	$30,000.00		30
Restoration (topsoil, seed & erosion mat)	SY	2050	$7.00	$14,350.00		30
Engineered Media	CY	330	$60.00	$19,800.00		30
Rock Fill	CY	115	$30.00	$3,450.00		30
Plantings	SY	650	$40.00	$26,000.00		30
Drain Tile	LF	100	$10.00	$1,000.00		30
Storm Sewer Adjustment	LS	1	$2,000.00	$2,000.00		30
Rip Rap	CY	10	$75.00	$750.00		30
Silt Fence	LF	350	$3.00	$1,050.00		30
			Totals	$98,400.00	$3,936.00	
			Present Worth Factor		17.2920	
			Present Worth		$68,061.44	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$98,400.00
Legal, Engineering, & Contingencies (30%)	$29,520.00
Subtotal - Estimated Project Cost	$127,920.00
Present Worth of O&M (30 Year)	$68,061.44
Total Present Worth	**$195,981.44**

Village of Hartland
Economic Analysis of Alternative 13
Construct New Biofiltration Device
Description: ALT 13 - Biofiltration Device

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and Grading	CY	2700	$15.00	$40,500.00		30
Restoration (topsoil, seed & erosion mat)	SY	3050	$7.00	$21,350.00		30
Engineered Media	CY	425	$60.00	$25,500.00		30
Rock Fill	CY	145	$30.00	$4,350.00		30
Plantings	SY	850	$40.00	$34,000.00		30
Drain Tile	LF	200	$10.00	$2,000.00		30
Storm Sewer Adjustment	LS	1	$3,000.00	$3,000.00		30
Rip Rap	CY	5	$75.00	$375.00		30
Silt Fence	LF	300	$3.00	$900.00		30
Manufactured Ditch Check (erosion roll)	EA	10	$85.00	$850.00		30
			Totals	$132,825.00	$5,313.00	
			Present Worth Factor		17.2920	
			Present Worth		$91,872.57	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$132,825.00
Legal, Engineering, & Contingencies (30%)	$39,847.50
Subtotal - Estimated Project Cost	$172,672.50
Present Worth of O&M (30 Year)	$91,872.57
Total Present Worth	**$264,545.07**

Village of Hartland
Economic Analysis of Alternative 14
Install Permeable Pavers on Roadway
Description: ALT 14 - Permeable Pavement

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Pavement removal, shaping and compacting	CY	960	$12.50	$12,000.00		30
Permeable pavement (includes engineered media, drain tile, storm sewer adjustments, etc.)	SY	1920	$150.00	$288,000.00		30
Restoration (topsoil, seed & erosion mat)	SY	300	$7.00	$2,100.00		30
Inlet Protection	EA	18	$90.00	$1,620.00		30
			Totals	$303,720.00	$12,148.80	
			Present Worth Factor		17.2920	
			Present Worth		$210,077.45	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$303,720.00
Legal, Engineering, & Contingencies (30%)	$91,116.00
Subtotal - Estimated Project Cost	$394,836.00
Present Worth of O&M (30 Year)	$210,077.45
Total Present Worth	**$604,913.45**

Village of Hartland
Economic Analysis of Alternative 15
Construct New Biofiltration Device
Description: ALT 15 - Biofiltration Device

i= 4.000% Item Description	Unit	Initial Quantity	Unit Price	Initial Cost	Annual Incremental O&M	Serv. Life
Excavation and Grading	CY	1100	$15.00	$16,500.00		30
Restoration (topsoil, seed & erosion mat)	SY	1200	$7.00	$8,400.00		30
Engineered Media	CY	200	$60.00	$12,000.00		30
Rock Fill	CY	65	$30.00	$1,950.00		30
Plantings	SY	400	$40.00	$16,000.00		30
Drain Tile	LF	200	$10.00	$2,000.00		30
Standpipe Outlet Structure	EA	1	$1,500.00	$1,500.00		30
Storm Sewer Adjustment	LS	1	$1,500.00	$1,500.00		30
Rip Rap	CY	5	$75.00	$375.00		30
Silt Fence	LF	350	$3.00	$1,050.00		30
Inlet Protection	EA	1	$90.00	$90.00		30
			Totals	$61,365.00	$2,454.60	
			Present Worth Factor		17.2920	
			Present Worth		$42,445.02	

Summary of Estimated Present Worth Costs

Total Estimated Construction Cost	$61,365.00
Legal, Engineering, & Contingencies (30%)	$18,409.50
Subtotal - Estimated Project Cost	$79,774.50
Present Worth of O&M (30 Year)	$42,445.02
Total Present Worth	**$122,219.52**

Summary of MS4 Modeling Results

Reachshed #55 Proposed Stand Alone Alternatives	Area (acres)	Total Suspended Solids			Total Phosphorus			Stormwater Practices Employed
		Discharge no controls (pounds)	Discharge with controls (pounds)	TSS Control (%)	Discharge no controls (pounds)**	Discharge with controls (pounds)**	P Control (%)**	Primary (WP, SW, etc.)
ALT-01: Progress Drive - Grass Swale	39.53	23779.00	5971.00	74.89%	44.57	12.36	72.27%	GS
ALT-02: St. Charles Church - Infiltration Basin Retrofit	51.82	15119.00	2789.00	81.55%	49.69	11.06	77.74%	I
ALT-02A: Hartland North Elementary Parking Lot - Permeable Pavers	0.46	286.80	100.40	64.99%	0.47	0.21	55.94%	PP
ALT-03: Village of Hartland Parking Lot - Biofilter	1.30	596.50	29.25	95.10%	1.44	0.16	88.60%	B
ALT-04: West of Maple Avenue and Hartridge Drive - Infiltration	82.11	19589.00	2059.00	89.49%	76.07	10.02	86.83%	I
ALT-05: Hartland Park Board Property - Biofilter with Pump	21.28	5592.00	3019.68	46.00%	19.52	7.80	60.04%	1000GPM B
ALT-05A: Chestnut Ridge Drive - Permeable Pavers	1.77	2006.00	702.20	65.00%	5.79	2.78	51.93%	PP
ALT-06: Sunnyslope Drive and Hartbrook Park - Biofilter	20.85	9269.00	4149.00	55.24%	25.09	14.15	43.60%	B
ALT-06A: Sunnyslope Drive - Permeable Pavers	1.31	2063.00	722.00	65.00%	4.32	1.85	57.29%	PP
ALT-06B: Hartbrook Park Parking Lot - Permeable Pavers	0.06	37.41	13.09	65.01%	0.09	0.04	57.30%	PP
ALT-07: Piggly Wiggly Parking Lot - Biofilter	2.49	1161.00	122.60	89.44%	2.64	0.53	79.86%	B
ALT-08: Granary Circle - Permeable Pavers	1.02	1222.00	427.50	65.02%	3.49	1.66	52.48%	PP
ALT-09: Cul De Sac at North end of River Reserve Drive - Biofilter	2.08	360.70	37.91	89.49%	1.58	0.42	73.24%	B
ALT-10: Northwest corner of Richards Road and CTH KE - Infiltration Testing/Retrofit	8.02	5145.00	1438.00	72.05%	9.17	2.86	68.77%	I
ALT-11: Capital Drive (Goodwin Ave to Maple Ave) - Permeable Pavers	0.67	941.00	329.30	65.01%	1.58	0.62	60.45%	PP
ALT-12: Park River Estates - Biofilter	9.53	2239.00	295.30	86.81%	8.74	2.70	69.14%	B
ALT-13: 900 Walnut Ridge Dr. - Biofilter	23.14	12923.00	2565.00	80.15%	20.45	9.34	54.34%	B
ALT-14: Rae Drive - Permeable Pavers	1.44	1385.00	484.80	65.00%	4.14	2.07	50.12%	PP
ALT-15: Mill Place Subdivision - Biofilter	6.19	1350.00	222.10	83.55%	5.34	1.87	64.95%	B
ALT-01	39.53	23779.00	4712.00	80.18%	44.57	9.81	77.99%	GS
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	
Reduction from No Controls				4.71%			3.05%	
Reachshed #55 Reduction		**405243.96**	**196182.57**	**51.59%**	**1140.75**	**672.37**	**41.06%**	
ALT-02	51.82	15119.00	2789.00	81.55%	49.69	11.06	77.74%	I
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	
Reduction from No Controls				3.04%			3.39%	
Reachshed #55 Reduction		**405243.96**	**202919.57**	**49.93%**	**1140.75**	**668.50**	**41.40%**	
ALT-02A	0.46	286.80	100.40	64.99%	0.47	0.21	55.94%	PP
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	
Reduction from No Controls				0.05%			0.02%	
Reachshed #55 Reduction		**405243.96**	**215063.17**	**46.93%**	**1140.75**	**706.86**	**38.04%**	

Summary of MS4 Modeling Results

Reachshed #55 Proposed Stand Alone Alternatives	Area (acres)	Total Suspended Solids			Total Phosphorus			Stormwater Practices Employed
		Discharge no controls (pounds)	Discharge with controls (pounds)	TSS Control (%)	Discharge no controls (pounds)**	Discharge with controls (pounds)**	P Control (%)**	Primary (WP, SW, etc.)
ALT-03	1.30	596.50	29.25	95.10%	1.44	0.16	88.89%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	B
Reduction from No Controls				0.14%			0.11%	
Reachshed #55 Reduction		**405243.96**	**214682.32**	**47.02%**	**1140.75**	**705.85**	**38.12%**	
ALT-04	82.11	19589.00	2059.00	89.49%	76.07	10.02	86.83%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	I
Reduction from No Controls				4.33%			5.79%	
Reachshed #55 Reduction		**405243.96**	**197719.57**	**51.21%**	**1140.75**	**641.08**	**43.80%**	
ALT-05	21.28	5592.00	3019.68	46.00%	19.52	7.80	60.04%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	1000GPM B
Reduction from No Controls				0.63%			1.03%	
Reachshed #55 Reduction		**405243.96**	**212677.25**	**47.52%**	**1140.75**	**695.41**	**39.04%**	
ALT-05A	1.77	2006.00	702.20	65.00%	5.79	2.78	51.99%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	PP
Reduction from No Controls				0.32%			0.26%	
Reachshed #55 Reduction		**405243.96**	**213945.77**	**47.21%**	**1140.75**	**704.12**	**38.28%**	
ALT-06	20.85	9269.00	4149.00	55.24%	25.09	14.15	43.60%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	B
Reduction from No Controls				1.26%			0.96%	
Reachshed #55 Reduction		**405243.96**	**210129.57**	**48.15%**	**1140.75**	**696.19**	**38.97%**	
ALT-06A	1.31	2063.00	722.00	65.00%	4.32	1.85	57.18%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	PP
Reduction from No Controls				0.33%			0.22%	
Reachshed #55 Reduction		**405243.96**	**213908.57**	**47.21%**	**1140.75**	**704.66**	**38.23%**	
ALT-06B	0.06	37.41	13.09	65.01%	0.09	0.04	55.56%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	PP
Reduction from No Controls				0.01%			0.004%	
Reachshed #55 Reduction		**405243.96**	**215225.25**	**46.89%**	**1140.75**	**707.08**	**38.02%**	
ALT-07	2.49	1161.00	122.60	89.44%	2.64	0.53	79.92%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	B
Reduction from No Controls				0.26%			0.18%	
Reachshed #55 Reduction		**405243.96**	**214211.17**	**47.14%**	**1140.75**	**705.02**	**38.20%**	
ALT-08	1.02	1222.00	427.50	65.02%	3.49	1.66	52.44%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	PP
Reduction from No Controls				0.20%			0.16%	
Reachshed #55 Reduction		**405243.96**	**214455.07**	**47.08%**	**1140.75**	**705.30**	**38.17%**	
ALT-09	2.08	360.70	37.91	89.49%	1.58	0.42	73.42%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	B
Reduction from No Controls				0.08%			0.10%	
Reachshed #55 Reduction		**405243.96**	**214926.78**	**46.96%**	**1140.75**	**705.97**	**38.11%**	
ALT-10	8.02	5145.00	1438.00	72.05%	9.17	2.86	68.81%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	I
Reduction from No Controls				0.91%			0.55%	
Reachshed #55 Reduction		**405243.96**	**211542.57**	**47.80%**	**1140.75**	**700.82**	**38.56%**	
ALT-11	0.67	941.00	329.30	65.01%	1.58	0.62	60.76%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	PP
Reduction from No Controls				0.15%			0.08%	
Reachshed #55 Reduction		**405243.96**	**214637.87**	**47.03%**	**1140.75**	**706.17**	**38.10%**	
ALT-12	9.53	2239.00	295.30	86.81%	8.74	2.70	69.11%	

Summary of MS4 Modeling Results

Reachshed #55 Proposed Stand Alone Alternatives	Area (acres)	Total Suspended Solids: Discharge no controls (pounds)	Total Suspended Solids: Discharge with controls (pounds)	Total Suspended Solids: TSS Control (%)	Total Phosphorus: Discharge no controls (pounds)**	Total Phosphorus: Discharge with controls (pounds)**	Total Phosphorus: P Control (%)**	Stormwater Practices Employed: Primary (WP, SW, etc.)
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	B
Reduction from No Controls				0.48%			0.53%	
Reachshed #55 Reduction		**405243.96**	**213305.87**	**47.36%**	**1140.75**	**701.09**	**38.54%**	
ALT-13	23.18	12923.00	2565.00	80.15%	25.11	9.29	63.01%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	B
Reduction from No Controls				2.56%			1.39%	
Reachshed #55 Reduction		**405243.96**	**204891.57**	**49.44%**	**1140.75**	**691.31**	**39.40%**	
ALT-14	2.46	1385.00	484.80	65.00%	4.14	2.07	50.12%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	PP
Reduction from No Controls				0.22%			0.18%	
Reachshed #55 Reduction		**405243.96**	**214349.37**	**47.11%**	**1140.75**	**705.06**	**38.19%**	
ALT-15	6.19	1350.00	222.10	83.55%	5.34	1.87	64.95%	
EXISTING	1663.73	405243.96	215249.57	46.88%	1140.75	707.13	38.01%	B
Reduction from No Controls				0.28%			0.30%	
Reachshed #55 Reduction		**405243.96**	**214121.67**	**47.16%**	**1140.75**	**703.66**	**38.32%**	
Overall W/# Alternatives Only		**405243.96**	**137258.81**	**66.13%**	**1140.75**	**503.97**	**55.82%**	
Overall W/# and Letter (without # option) Alternatives		**405243.96**	**154425.61**	**61.89%**	**1140.75**	**559.47**	**50.96%**	
Overall W/ ALL Alternatives		**405243.96**	**134403.29**	**66.83%**	**1140.75**	**498.18**	**56.33%**	

Stormwater Practices:

WD: wet detention
SW: street sweeping
VS: vacuum streets
B: biofiltration
I: Infiltration
PP: Permeable Pavers

APPENDIX E

STORM WATER FACILITY MAINTENANCE PLAN

Village of Hartland
Storm Water Facility Inspection and Maintenance Program
December 2016

Routine inspections and maintenance are necessary for the storm water treatment facilities to remove sediment, nutrients and other pollutants over time. In accordance with WPDES MS4 Permit no. WI-S050075-2, the Village of Hartland has developed the following approach to ensure inspections and maintenance of storm water facilities will occur on a routine basis.

Publicly Owned Storm Water Facilities: Village staff to inspect once every three years, and after large rain events (> 3 inches within 24 hours). Inspections shall occur between April 1st and October 15th.

- Complete inspection report form for each facility; submit to Director of Public Works within 7 days of inspection.
- Complete routine maintenance identified during inspection within 60 days.
- Record date maintenance was completed on inspection form; re-submit to Director of Public Works within 30 days from date of maintenance, to record and report in MS4 annual report.

Publicly Owned Storm Water Facility Locations

	Storm Water Facility	Address	General Location
1	Cottonwood Pond	801 Cottonwood Avenue	west side of Cottonwood Ave., across from Lindenwood Drive
2	James Drive Pond	700 Walnut Drive	downhill of north end of James Drive dead end, prior to Bark River and wetlands
3	Hartland South Elementary School Pond	651 E. Imperial Drive	east of school building
4	Nixon Park Splashpad Runoff Swale	175 E. Park Ave.	(east, south side of parking lot adjacent to Splashpad in Nixon Park
5	Nixon Park Pond	175 E. Park Ave.	southwest corner of Nixon Park, east of Bark River
6	Campus Drive infiltration pond – south	N/A	Campus Drive and CTH K
7	Campus Drive infiltration pond- north	N/A	Campus Drive and CTH K – west side of road
8	Centennial Park	700 CTH K	south side of CTH K
9	Centennial Park	700 CTH K	

Privately Owned Storm Water Facilities: Property owners or owners' representatives to inspect per frequency listed on Long-Term Maintenance Agreement, or every 3 years if an inspection frequency was not identified in a maintenance plan, and after large rain events (> 3 inches within 24 hours). Inspections shall occur between April 1st and August 30th.

- Complete inspection report form for each facility; submit to Director of Public Works within 14 days of inspection.
    - Send inspection reports to: Michael Einweck, Director of Public Works
      210 Cottonwood Avenue
      Hartland, WI 53029
    - If inspection is not completed at least once every 2 years, the Village will contract out the inspection and expenses will be charged back to property owner. Village to ensure half of privately owned storm water facilities have been inspected at least once every 2 years, through receipt of completed inspections or through inspections completed by Village staff.
- Complete routine maintenance identified during inspection within 30 days.
    1. If maintenance is not completed within 30 days, Village staff will contract out the maintenance; and maintenance expenses will be charged back to the property owner.
- Record date maintenance was completed on inspection form; re-submit to Director of Public Works within 30 days from date of maintenance, to record and report in MS4 annual report.

Outreach to Property Owners

The Village will add information about storm water pond maintenance to the Village web-site, including the 3 "Guidelines for Maintenance" handouts developed by Waukesha County for storm water pond owners.

A news release will be submitted to the local newspaper and will be included in the spring/summer newsletter to remind property owners to inspect storm water ponds.

Village staff will maintain a database of contact information for property owners with storm water facilities.

- Village staff will send a mailing reminder during spring to property owners who did not have their ponds inspected the prior year.
- Village staff will notify property owners of maintenance needs that were identified during a village-completed inspection

STORMWATER POND INSPECTION

Pond Information			
Pond ID:		Pond Type:	
Location:			
Subdivision:		Watershed:	
Capacity:		Acres:	
Overflow Elev:		100 Year Elev:	
Year Constructed:		Date Input:	
Water Quality:		Private:	

Inspection Details					
Inspector Name(s):					
Inspection Date:		Start Time:		End Time:	
Weather Condition:				Last Rainfall Date:	

Issue	Checked			Maintenance Needed			Comments
	Y	N	N/A	Y	N	N/A	
Dry Pond							
1. Standing water or wet spots?							
2. Sediment or trash accumulation?							
3. Low flow channels unobstructed?							
4. Other?							
Wet Pond							
1. Removal of floating debris required?							
2. Visible oil/chemical presence?							
3. Evidence of wave action?							
4. Safety shelf erosion or failure?							
5. Other?							
Infiltration Basin							
1. Standing water or wet spots?							
2. Sediment or trash accumulation?							
3. Under drain functioning?							
4. Other?							

STORMWATER POND INSPECTION

Issue	Checked			Maintenance Needed			Comments
	Y	N	N/A	Y	N	N/A	
Vegetation							
1. Adequate vegetation cover?							
2. Appropriate vegetation?							
3. Presence of invasive or undesirable vegetation/woody growth?							
4. Excessive nuisance aquatic vegetation present?							
5. Other?							
Sediment Forebays							
1. Is sediment accumulation >50%? If yes, then maintenance is needed immediately.							
2. Evidence of excessive velocity/ scour?							
3. Maintenance access clear of obstructions?							
4. Other?							
Embankment & Emergency Spillway							
1. Is the spillway level?							
2. Adequate Freeboard? (min 1' from top of bank to highest outlet)							
3. Embankment erosion evident?							
4. Cracking, bulging or sliding of embankment?							
5. Evidence of animal burrows?							
6. Seepage evident on exterior face of embankment?							
7. Vertical & horizontal alignment of top of dam as per plans?							
8. Emergency spillway clear of obstructions & debris?							
9. Maintenance access clear of obstruction?							
10. Other?							

STORMWATER POND INSPECTION

Issue	Checked			Maintenance Needed			Comments
	Y	N	N/A	Y	N	N/A	
Riser & Outfall Spillway							
1. Low flow orifice obstructed?							
2. Low flow trash rack debris/ corrosion?							
3. Weir trash rack debris/corrosion?							
4. Excessive sediment accumulation inside the riser?							
5. Sediment accumulation in outlet pipe?							
6. Outfall channels functioning?							
7. Under drain functioning?							
8. Slope protection or rip-rap failures?							
9. Other?							
Other							
1. Encroachments on pond or ease-ment area?							
2. Complaints from residents?							
3. Odor?							
4. Mowing required?							
5. Graffiti removal needed?							
6. Insects in excess?							
7. Public hazards?							
8. Other?							

Summary:	
Inspector Remarks:	

Village of Hartland

Erosion Control and Post-Construction Storm Water Permit Tracking Spreadsheet

Project Name	Permitee	Location	Erosion Control Plan Received	Erosion Control Permit issued	Erosion Control Permit No.	Storm Water Plan Received	Storm Water Management Plan Submittals			Storm Water Permit Issued	Storm Water Permit No.	Long Term Maintenance Agreement	As-Builts	Basin(s)	Storm Water Practice	Municipal Maintenance Inspection	Maintenance Issues Resolved	Comments
							Original	Rev.	Final									
Cottonwood Pond	Village of Hartland	800 (?) Cottonwood Ave.					November 13, 2000		7-Feb-12						~~Three (3) wet ponds~~			
Bark River Wetlands / Corp.	Village of Hartland	North side of 900 Walnut Ridge Dr.													wet pond			
Nixon Park Splashpad	Village of Hartland														bioswale			
JTS		1180 Walnut Ridge				2012	July 31, 2012						Yes					
Price Engineering		1100 Cottonwood Ave.				2012												
Foxwood Subdivision		SE corner of CTH KE & Red Oak Court													dry pond			
Lake Country Caring		603 Progress Drive													dry pond			
Culvers	Culver's	701 Industrial Court		Yes					18-Aug-10			Yes		CV-B01001 CV-B01002 CV-B01003 CV-B01004	Three (3) Rain Gardens			
Heraeus Electro-Nite Co (Hartland Industrial Building)		541 S. Industrial Ave.	Yes	Yes	17-83B	May 7, 2014			April 28, 2014					CV-B010D3	One (1) Bioretention Basin			
Hartland Service Center		400 Industrial Drive				2015	August 4, 2015							B003B3	One (1) Bioretention Basin			
West Capitol Drive Estates		619 W. Capitol Drive				2013 (March 11, 2014??)	2014		March 7, 2014					C114	2 wet ponds (1 ???)			
Sjoberg Addition	Sjoberg Tools, Inc.	531 S. Industrial Drive		Yes		2012	2012		March 2, 2012	###########		Yes		CV-B010A	One (1) Existing Wet Det. Pond One (1) Infiltration Area One (1) Bioretention Area			
Sanctuary of Hartland	Miller Marriott Custom Homes	East of Maple Ave. & Park Ave.					2015(???)		June 24, 2014					D190B3 D190B4 D190B7 D190B8	Two (2) Wet Detention Ponds Two (2) Infiltration Ponds One (1) Rain Garden			
Hartland River Walk	Hartland Riverwalk,	205 Lawn Street				March 8, 2016	October 7, 2015		February 11, 2016			Yes		D020A D020B	Two (2) Infiltration Chambers			
Sendik's (Hartbrook Mall)	Devo Management Co., LLC.	600 Hartbrooke Drive				2014	December 20, 2013					Yes		F068F3 F068F4 F068F5 F068F6 F068F7	Two (2) Existing Dry Ponds Three (3) Rain Gardens			
Former Bowling Alley		550 Hartbrooke Drive					2015											
Hartland Senior Living	Hartland Senior Living, LLC.	430 Merton Ave.				2015	2015		April 27, 2015			Yes			One (1) Underground Detention Device Three (3)			
Campus Drive		Campus Drive, south of CTH K, west of Arrowhead High School					March 14, 2011		June 22, 2011						Four (4) Infiltration basins			
Four Winds West	Four Winds Development, LLC.	West side of CTH E, north of CTH K, north of Arrowhead High School					July 24, 2015		October 9, 2015			Yes		K001 K002 K003 K004	Two (2) Wet Detention Ponds One (1) Wet Detention Forebay w/Infiltration Basin			
Four Winds East (Post?)		East Side of CTH E, north of CTH K, north and east of Swallow School							March 17, 2013					G1A G1B G1C G1D G1E G1F	Five (5) Wet Detention Ponds One (1) Infiltration areas			
Windrush	Sunrise Development, LLC.	N55 W28133 CTH K				2012 ????? April 23, 2015	Ferbruary 27, 2014		March 24, 2015			Yes		I001 I002 I003	One (1) Wet Detention Ponds Two (2) Infiltration Ponds			
Mary Hill subdivision		Greystone Blvd., norht of CTH K													wet ponds			
Bristlecone Pines		South of CTH K, west of CTH KE													wet ponds			
Lake Country Lutheran High School		northwest side of Campus Drive, north of Hwy 16													wet pond			
Summit Lakes Apartments		north of Windstone Drive and Hill Street													wet pond (?)			
St. Charles Church / School		313 Circle Drive													dry pond(?)			

Centenial Park		south of CTH K, east of Bark River													dry ponds (?)			
Willow Court and Chestnut Ridge Drive		west of intersection of Willow Ct. & Chestnut Drive													pond (?)			
Hartland South Elementary School		651 E. Imperial Drive													(smaller) wet pond			
Village Pond in Town of Delafield		south of RR Tracks, northeast of Manscfield Court													wet pond			
Waukesha Health Care, Inc.		1500 Walnut Ridge Drive													*not* a pond/facility			
Dorner Manufacturing Corp.		975 Cottonwood Drive				2015	2015		April 24, 2015						One (1) Existing Det. Pond			
Lake Country Racquet Club & Athletic Club		560 S. Industrial Drive				June 1, 2007	January 3, 2007		May 29, 2007					CV-B010R CV-B010R1 CV-B010F1	One (1) Infiltration Basin			
Hartland CBRF														F501 F502 F503				
RC Insurance	Briohn Building Corporation	Richards Road at Walnut Ridge Drive					August 28, 2006		September 25, 2006					B001U B001V	One (1) Retention Pond One (1) Infiltration Trench			
Dorner Basin Map														B275B				
Journal Sentinel Center		1010 Richards Road				May 17, 2007	March 23, 2007		May 14, 2007					B001T	One (1) Infiltration Basin			
Lake Country Lutheran School University														E144 E145 E146 E147				
Bark River Commerce Center		1025 Richards Road					September 24, 2008								Two (2) Detention/Infilt.			Not Constructed
IDI Distributors, Inc.	Equitable Holding Co. LLC	1165 Richards Road					July 31, 2006		September 6, 2006			Yes			One (1) Wet Pond One (1) Infiltration Basin			
Sullivan Corporation							January 20, 2009											Not Constructed
Holt Electric Motor		1515 Walnut Ridge Drive					December 29, 2015		January 6, 2016			Yes			One (1) Infiltration Basin			
Guthrie & Frey Building		1165 Richards Road					March 23, 2016											

APPENDIX F

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PROGRAM

VILLAGE OF HARTLAND
Illicit Discharge Detection and Elimination Program
Revised – May, 2017

The Village of Hartland has been conducting an Illicit Discharge Detection and Elimination (IDDE) program since 2010, when it was first required under the WPDES Municipal Separate Storm Sewer System (MS4) Permit no. WI-S050075-1. After reviewing the Department of Natural Resources' (WDNR) Program Guidance document no. 3800-2012-01 on Illicit Discharge Detection and Elimination programs, the Village has decided to revise the original program to focus on areas where problems are more likely to be detected.

The Village's revised IDDE program will break down the MS4 outfalls into 3 inspection categories:

1. Priority Outfalls to be inspected annually.
2. Non-Priority Major Outfalls to be inspected once per 5-year permit term.
3. Non-Priority Minor Outfalls to be inspected on a complaint basis or based on professional judgement of staff (not in the regular inspection rotation).

Location of MS4 Outfalls to be Inspected

Priority Outfalls to be Inspected Annually				
	Structure ID	**Inspection Category**	**Outfall Size**	**Outfall Location**
1	F029F	Priority (Major)	42	West of Rae Drive & Greenway Terrace
2	F039F	Priority (Major)	36	West end of Hartbrook Drive
3	E083	Priority (Major)	36	North Avenue, across from Hwy 16 Off-Ramp
4	D142A	Priority (Major)	36	Northwest of Intersection of Nixon Ave. and Renson Rd.
5	C113	Priority (Major)	60	Bark River at Railroad Tracks in Nixon Park
6	B136	Priority (Major)	30	North of 950 Walnut Ridge Drive
7	B001B	Priority (Major)	60	North of 600 Walnut Ridge Drive
8	A016A	Priority (Major)	36	East of Hartland – South Elementary School
9	B100	Priority (Major)	42	Northwest of 800 Rose Drive
10	B005B	Priority (Major)	18	South end of Progress Drive near Public Works Yard
11	C112	Priority (Minor)	15	Bark River at Lawn Street
12	D020A	Priority (Minor)	24	East side of Bark River north of Capitol Drive
13	C040	Priority (Minor)	15	West side of Bark River at Capitol Drive
14	D004D	Priority (Minor)	18	East side of Bark River South of Haight Drive
15	C176	Priority (Minor)	12	West side of Bark River at Haight Drive
16	E379F	Priority (Minor)	24	Lake Country Lutheran High School inlet to pond
17	C106	Priority (Minor)	15	West side of Bark River North of Park Ave

Non-Priority Major Outfalls to be Inspected Once Every 5 Years				
	Structure ID	**Inspection Category**	**Outfall Size**	**Outfall Location**
1	F021F	Major	42	South of 1503 East Bristlecone Drive
2	F018F	Major	48	South end of North Blue Spruce Circle
3	F01F	Major	48	East of 700 Ponderosa Drive
4	F005F	Major	36	North of 514 North Ponderosa Drive
5	F008F	Major	54	South side of East Arlene Drive
6	F009F	Major	54	South side of East Arlene Drive
7	F014F	Major	40	Coco Creek at East Juniper Way
8	F043F	Major	24	Northwest of Intersection of STH 16 and CTH KC
9	D190	Major	18x30	Northwest side of CTH E and railroad tracks
10	A14A	Major	24x36	West side of CTH E at Hartwood Lane
11	A372	Major	36	North side of Lindenwood Drive west of CTH E
12	B275	Major	42	West of Cottonwood Wayside /south of Cottonwood Pond
13	A474	Major	36	North side of CTH KE, east of 1100 Cottonwood Avenue
14	A488	Major	43	Southwest of Intersection of CTH KE & River Reserve Drive

Criteria used to designate an outfall as a "Priority" included: land-use (industrial/business parks, institutional, retail/commercial), amount of imperviousness in a drainage area, and approximate age of infrastructure. The Village of Hartland has experienced new development and redevelopment growth in the past 2 decades, with new or replaced infrastructure which minimizes the potential for illicit discharges due to older or failing infrastructure. Major outfalls in these new or redeveloped areas were not included in the priority outfall category.

Village staff have found one discharge that required follow-up under the previous IDDE program since 2010. That situation was resolved, and subsequent inspections have not resulted in further discharges. This outfall was not included in the priority category.

The remainder of the MS4 outfalls in the Village of Hartland are categorized as "minor": pipe sizes of less than 36 inches in diameter associated with a drainage area of less than 50 acres or an industrial land use of less than 2 acres. These outfalls will not fall into the annual or once every 5 years' inspection rotation, but may be inspected if a complaint is received or if circumstances change and village staff determine it would be beneficial to inspect any of these locations.

There are a few areas with swales within the Village limits. Swale system can be inspected by visual observations for dead vegetation due to excessive standing water or pollutants in discharges that would kill the vegetation; staining on pipes and structures that drain to the swales, staining or water marks on culverts in swales, etc. Visual observations of the swale systems should be done on a complaint basis or as staff determine necessary.

2017 Illicit Discharge Detection and Elimination Map
Village of Hartland, Wisconsin

BEAVER LAKE

OCONOMOWOC RIVER (25)
141.24 Acres

BARK RIVER (55)
2,427.76 Acres

UPPER FOX RIVER - IL
910.92 Acres

Bark River

Coco Creek

NIXON PARK

ID-1 ID-2 ID-4 ID-5 ID-6 ID-7 ID-8 ID-9 ID-10 ID-11 ID-12 ID-13 ID-14 ID-15 ID-16 ID-17

Downtown North Avenue

0 300 600 1,200 1,800
Feet

Village of Hartland

Ruekert · Mielke

Legend

- Priority Major Outfall
- Priority Minor Outfall
- Non Priority Major Outfall
- Non Priority Minor Outfall
- Storm Sewer
- Grass Swales
- Reachshed Boundaries
- Waters of the State
- Grass Swale Basin
- Infiltration Basin
- Wet Detention Basin
- Filter Strip Basin
- Infiltration Pond
- Wet Detention Pond
- Open Water
- Wetlands
- Res - Low Density
- Res - Med Density
- Res - High Density
- Commercial-Downtown
- Commercial - Office Park
- Commercial-Strip
- Industrial - LI
- Industrial - MI
- Institutional
- Park & Open Space
- Transportation
- Hartland Village Limits

0 100 200 400
Feet

I:\Projects\09_Hartland\047\2016\Hartland\IDDE_2017.mxd

Date: January, 2017

Ruekert·Mielke
engineering solutions for a working world

VILLAGE OF HARTLAND
ILLICIT DISCHARGE FIELD SCREENING SHEET

SECTION 1: BACKGROUND DATA

Subwatershed:		Outfall ID:
Today's date:		Time (Military):
Investigators:		Form completed by:
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:
Nearest Intersection / Location:		
Photo #s:		Land use in drainage area:
Notes (e.g., origin of outfall, if known):		

SECTION 2: OUTFALL DESCRIPTION

Location	Material	Shape	Dimensions (in.)	Submerged
☐ Closed Pipe ☐ Open Drainage				
Flow Present?	☐ Yes ☐ No *If No, Skip to Section 5*			
Flow Description	☐ Trickle ☐ Moderate ☐ Substantial			

SECTION 3: QUANTITATIVE CHARACTERIZATION

Flow Depth	Flow Width	Measured Length	Time of Travel	Volume	Time To Fill	Temperature (F)	pH	Ammonia (PPM)

SECTION 4:
PHYSICAL INDICATORS FOR FLOWING OUTFALLS ONLY

Is Any Physical Indicator Present in the flow? ☐YES ☐NO

INDICATOR	DESCRIPTION
☐ Odor	☐ Sewage ☐ Rancid/Sour ☐ Petroleum/Gas ☐ Sulfide ☐ Other : _____
☐ Color	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other: _____
☐ Turbidity	☐ 1 - Slight Cloudiness ☐ 2 - Cloudy ☐ 3 - Opaque
☐ Floatables	☐ Sewage (Toilet Paper, Etc.) ☐ Suds ☐ Petroleum (Oil Sheen) ☐ Other : _____

SECTION 5:
PHYSICAL INDICATORS FOR BOTH FLOWING AND NON-FLOWING OUTFALL

Are Any Physical Indicators that are not related to flow present? ☐**Yes** ☐**No**

INDICATOR	DESCRIPTION
☐ Outfall Damage	☐ Spalling, Cracking or Chipping ☐ Corrosion ☐ Peeling Paint
☐ Deposits/Stains	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:_____
☐ Abnormal Vegetation	☐ Excessive ☐ Inhibited
☐ Poor Pool Quality	☐ Odors ☐ Suds ☐ Floatables ☐ Yellow ☐ Oil Sheen ☐ Excessive Algae ☐ Other: _____

SECTION 6: DATA COLLECTION

1. Sample for the lab?	☐ Yes	☐ No
2. If yes, collected from:	☐ Flow	☐ Pool

SECTION 7: COMMENTS OR OTHER CONCERNS (e.g., trash or needed infrastructure repairs)?

Village of Hartland

APPENDIX G

PUBLIC WORKS YARD STORM WATER POLLUTION PREVENTION PLAN

Village of Hartland Storm Water Pollution Prevention Plan for Municipal Property

Site: **Village of Hartland Public Works Garage Site**
701 Progress Drive, Hartland, WI

Contact info.: **Mike Einweck, Director of Public Works**
262-367-2714
mikee@villageofhartland.com

Site Description

The property located at 701 Progress Drive is the central location for Public Works Department activities and storage. The main garage, salt shed, and outdoor storage areas are utilized by Public Works staff. In addition, other village departments use the fueling center, storage sheds and outdoor storage areas, including the Village of Hartland Police Department and the Village Fire Department.

The Public Works yard is surrounded by Progress Drive on the north, industrial park businesses to the west and northwest, and wetlands adjacent to the Bark River on the south and east. The wetlands to the south and east lie downhill approximately 10 – 12 feet below the yard elevation, and are primarily dominated by cattails. The Bark River is approximately 375 feet away from the Public Works yard at the closest point. A tributary to the Bark River begins near the bottom of the hill near the east side of the yard, then flows in a south/southeastern direction toward the Bark River. A fence surrounds the site and the entry way gate is locked during non-business hours, preventing the dumping of un-anticipated materials.

The Public Works yard is the former site of the Village of Hartland's Waste Water Treatment Plant. The plant was built in 1957 and was in operation until 1983 when the Village converted to the Del-Hart plant downstream of the City of Delafield. The Village's Treatment Plant was demolished and the Public Works garage was constructed. The yard and buildings are approximately 4.5 acres in size, and are organized to minimize clutter and reduce potential runoff concerns.

Runoff Prevention Practices and Maintenance Activities

The Village of Hartland has been covered under the WPDES Municipal Storm Separate Sewer System (MS4) Discharge Permit WI-S050075 since 2006. During the first permit term, Village staff developed and submitted a Storm Water Pollution Prevention Plan (SWPPP) for the Public Works yard, which helped identify efficiencies and pollution prevention practices that could be installed to protect the nearby water resources. Staff have gone further in removing discarded materials that have been stored in the yard and consolidating other items into smaller, more manageable areas, thus removing potential sources of pollution. Removing outdated equipment and consolidating materials on site also means fewer runoff prevention practices are necessary, and less time installing, maintaining

and inspecting these practices associated with this task. Remaining materials that are stored outdoors are primarily items that would typically be used outdoors, such as wood, sign posts, barricades, storm sewer materials, etc.

Runoff from the Village's Public Works yard typically sheet flows across the pavement in a southeasterly direction. The pavement changes to a gravel yard approximately 180 feet south of the main garage. Runoff from the pavement area partially infiltrates in to the gravel area rather than flowing in to the wetlands to the east. The Village of Hartland evaluated the potential for runoff pollution resulting from the Public Works yard during the first MS4 permit term, and has implemented measures to reduce the impacts of this source to the nearby rivers and wetlands. The following actions and improvements have been implemented at the 701 Progress Drive yard:

- Grass swales
- Bays around stockpiled material
- Salt shed
- Drains in main garage lead to sanitary sewer
- Fuel Center with canopy
- Covered dumpsters

Maintenance of these practices is critical to proper functioning. Without inspections or maintenance, debris and pollutants such as sediment, metals, nutrients, etc., that are captured can become a source of pollution if excess amounts are carried out with rain and snow melt in high concentrations through the treatment device. Any inspections and maintenance of storm water facilities should be documented and recorded for comparison and evaluation of the performance of the practice in the future.

Stockpiles of loose aggregate are stored away from the swales and wetlands in the seasonal bulk storage area on the east side of the yard and also in an older, covered shed. Additional bulk storage piles are kept in 3-sided bays. Any material that spills or is tracked away from the immediate storage area is swept up and deposited back onto the piles.

Photo 1: Bulk material stored in bays on east side of yard

Photo 2: Bulk materials stored under cover in older shed

Loose salt that spills or is tracked away from the shed entrance during delivery is swept up and placed in the shed. Any excess salt that spills during loading of trucks during a snow/ice event is also swept up and placed back in the salt shed. The shed itself is designed to meet the requirements of Trans 207, Wisconsin Administrative Code.

The lawn on the north side of the garage along Progress Drive is mowed weekly or as needed, depending on the weather. The grass and weeds within the yard is typically cut 3 times per year.

Temporary storage of parks items such as park benches, picnic tables, garbage & recycling barrels, etc., occupy space around the perimeter of the salt shed in winter until crews deliver these items to Village parks in the spring.

Photo 3: Temporary, seasonal storage around salt shed (during winter months)

The fueling center is used by many Village Departments. Employee training includes review of the spills procedures and location of the spills kit. The fuel center is covered, and controls have been installed to regulate the amount of fuel pumped each time. An identification number of the particular vehicle to be filled is required to be entered into the pump before any fuel is dispersed. The maximum amount of fuel pumped to a vehicle depends on the size of the fuel tank for that particular vehicle and. These features contribute to less fuel available for spills or potential discharges to the nearby wetlands and river.

The floor drains in the main garage are connected to the sanitary sewer system, rather than the storm sewer system. Any fluids from vehicle maintenance or other activities inside the garage are directed through this system to the Wastewater Treatment Plant. Floor drains are cleared of debris on an as-needed basis. An oil/grease separator allows recurring clean-out and maintenance of the system.

Photo 4: Fueling center at Public Works yard.

Recommendations to Enhance Runoff Protection

Village staff have previously taken steps to implement runoff control practices and to minimize the materials that could be sources of runoff pollution at the Public Works yard on Progress Drive. Current recommendations include:

1. Allowing grass to grow to at least 4 – 6 inches in swales to filter particles in runoff prior to discharging to the wetlands.

2. Sweep up any spilled salt and return into inventory.

3. A 3-sided bay around the street sweepings would prevent runoff from carrying the collected particles off-site; a tarp or cover over the street sweepings pile would further reduce the potential for runoff from this material.

Spills Plan

Dry materials that spill are swept up and either disposed of or placed for future use, if possible. (Example: dry salt spilled on the ground can be swept up and put back in the salt pile for use in the future.)

Liquids that spill on the ground are absorbed, with the absorption materials disposed of properly depending on the liquid.

Staff are trained on which authorities to contact depending on the situation, such as the Fire Department, Police Department, or the Wisconsin Department of Natural Resources. (Example: contact Wisconsin Department of Natural Resources for fuel spills at **1-800-943-0003** for any materials or liquids that would discharge to the wetlands south and east of the yard as the result of an incident.)

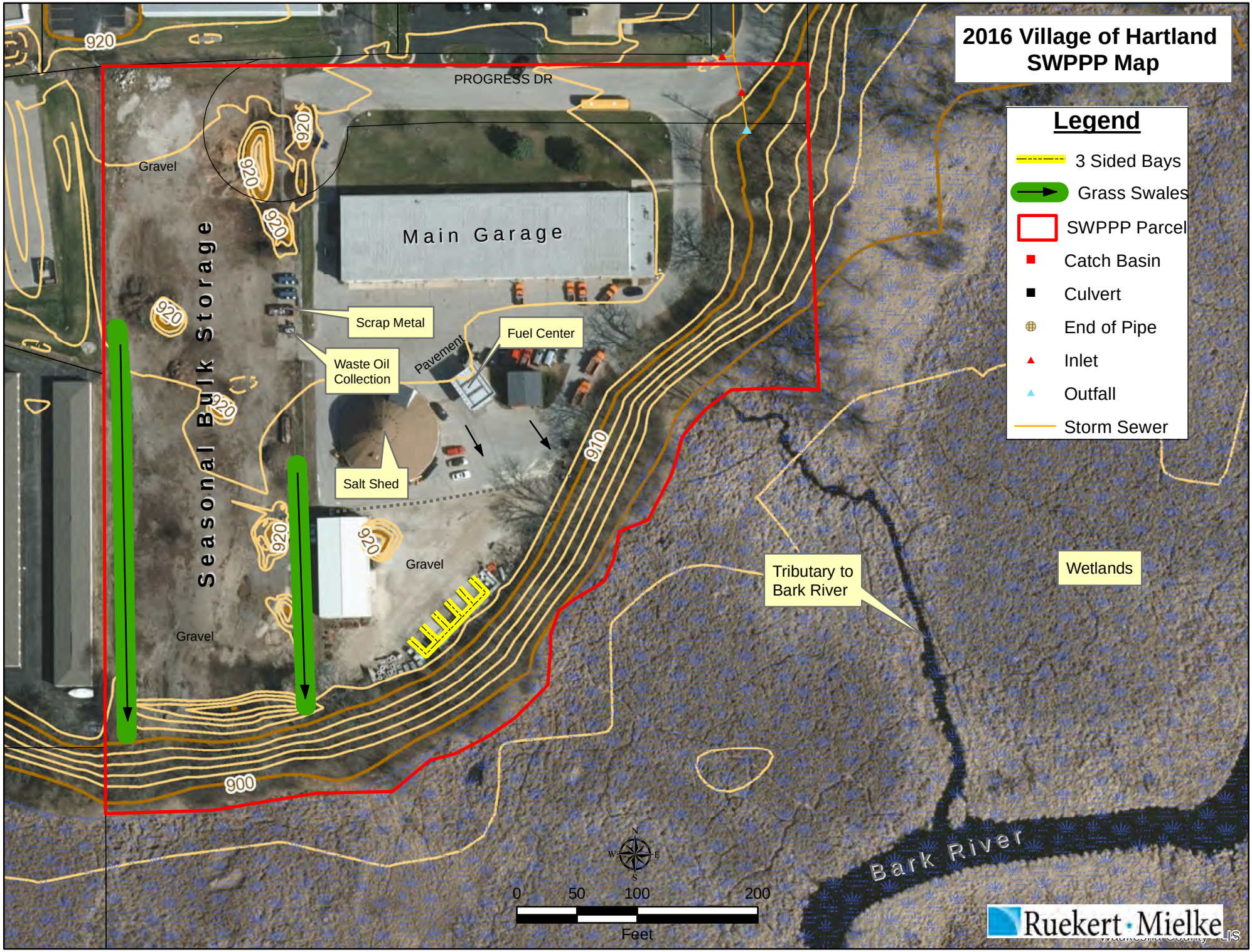
New staff are educated on the spills plan when they start, and any policy changes are communicated to appropriate staff at the time of the changes. As part of the Storm Water Pollution Prevention Plan, the spills plan will be evaluated yearly and any changes will be summarized in the Village's MS4 annual report.

Employee Training

Public Works Department training is an on-going activity for staff. Changes in procedure are communicated with appropriate staff, and new staff receive training on safety procedures and overall operations of the department. Any portions of the SWPPP, including the spills plan, that affect staff in other departments are shared with those departments.

Inspections

Routine visual inspections are conducted every few months, with a full inspection at least once per year. Items noted on the inspection reports are corrected as soon as possible. The yard is evaluated on a recurring basis to improve operations.



I:\Projects\09_Hartland\047\2016\SWPPP.mxd

STORM WATER POLLUTION PREVENTION PLAN (SWPPP) INSPECTION FORM FOR MUNICIPAL FACILITIES

Site:	
Location:	
Inspector/Title:	
Date:	
Last Inspection (Date):	

Storm Water Pollution Prevention Plan

Has a storm water pollution prevention plan been developed for this site? Yes☐ No☐

Title of Plan: _____

Date of Plan: _____

Does the SWPP include a site map, list of pollutant sources, pollutant control practices to be inspected, and maintenance procedures? Yes☐ No☐
(Indicate any items that are *not* included):

_____

Vehicle Maintenance, Washing and Fueling

	Activity/Practice	Inspected?	Activity/ Practice Adequate?	Corrective Action Needed & Notes
1	Vehicle maintenance area drains to sanitary sewer system	Yes☐ No☐ N/A☐	Yes☐ No☐	
2	Vehicle maintenance area has oil-grease separator in floor drains	Yes☐ No☐ N/A☐	Yes☐ No☐	
3	Floor drains are clean	Yes☐ No☐ N/A☐	Yes☐ No☐	
4	Vehicle washing completed inside building	Yes☐ No☐ N/A☐	Yes☐ No☐	
5	Vehicle washing drains to sanitary system	Yes☐ No☐ N/A☐	Yes☐ No☐	
6	Vehicle fueling center has canopy/cover	Yes☐ No☐ N/A☐	Yes☐ No☐	
7	Vehicle fueling center has clearly labeled spill kit nearby	Yes☐ No☐ N/A☐	Yes☐ No☐	
8	Vehicle fueling center has oil-grease separators in nearby storm drains	Yes☐ No☐ N/A☐	Yes☐ No☐	

Hazardous Waste Management

	Activity/Practice	Inspected?	Activity/ Practice Adequate?	Corrective Action Needed & Notes
1	Hazardous materials and containers are stored indoors	Yes☐ No☐ N/A☐	Yes☐ No☐	
2	Containers of hazardous materials are in good condition	Yes☐ No☐ N/A☐	Yes☐ No☐	

Waste Management

	Activity/Practice	Inspected?	Activity/ Practice Adequate?	Corrective Action Needed & Notes
1	Dumpsters are covered	Yes☐ No☐ N/A☐	Yes☐ No☐	
2	Full dumpsters are hauled out on a regular basis	Yes☐ No☐ N/A☐	Yes☐ No☐	
3	Piles of miscellaneous debris are sorted and disposed of on a regular basis	Yes☐ No☐ N/A☐	Yes☐ No☐	
4	Street sweepings are covered	Yes☐ No☐ N/A☐	Yes☐ No☐	
5	Street sweepings are stored in containers or have barriers or perimeter controls to minimize runoff impacts	Yes☐ No☐ N/A☐	Yes☐ No☐	

Material Storage

	Activity/Practice	Inspected?	Activity/ Practice Adequate?	Corrective Action Needed & Notes
1	Runoff from bulk storage is contained on low side by barriers, bays or other perimeter controls	Yes☐ No☐ N/A☐	Yes☐ No☐	
2	Bulk storage piles are stabilized/vegetated	Yes☐ No☐ N/A☐	Yes☐ No☐	
3	Materials stored under cover/inside buildings	Yes☐ No☐ N/A☐	Yes☐ No☐	
4	Area near salt shed is clear of excess/spilled/tracked salt	Yes☐ No☐ N/A☐	Yes☐ No☐	
5	Excess/spilled/tracked salt is swept up and added to bulk salt pile	Yes☐ No☐ N/A☐	Yes☐ No☐	
6	Underground runoff containment is emptied on a regular basis	Yes☐ No☐ N/A☐	Yes☐ No☐	

Runoff Controls

	Activity/Practice	Inspected?	Activity/ Practice Adequate?	Corrective Action Needed & Notes
1	Grass filter strips have at least 70% uniform vegetation growth	Yes☐ No☐ N/A☐	Yes☐ No☐	
2	Grass filter strips typically have 6 inches or more of vegetation	Yes☐ No☐ N/A☐	Yes☐ No☐	
3	Storm water pond inlets/outlets are stable	Yes☐ No☐ N/A☐	Yes☐ No☐	
4	Storm water berms are vegetated	Yes☐ No☐ N/A☐	Yes☐ No☐	
5	Storm water pond berms are stable (no erosion, tree roots or animal boroughs)	Yes☐ No☐ N/A☐	Yes☐ No☐	
6	Infiltration basins/rain gardens have at least 70% plant growth	Yes☐ No☐ N/A☐	Yes☐ No☐	
7	Infiltration basins/rain gardens are maintained regularly, and in the spring and fall	Yes☐ No☐ N/A☐	Yes☐ No☐	
8	Infiltration basins/rain gardens drain down within 24 hours (*based on post-rain event observations)*	Yes☐ No☐ N/A☐	Yes☐ No☐	

Spills Program

	Activity/Practice	Inspected?	Activity/ Practice Adequate?	Corrective Action Needed & Notes
1	Written program is available for employees	Yes☐ No☐ N/A☐	Yes☐ No☐	
2	Employees know where written program is located	Yes☐ No☐ N/A☐	Yes☐ No☐	
3	Written program is evaluated annually	Yes☐ No☐ N/A☐	Yes☐ No☐	

Employee Training

	Activity/Practice	Inspected?	Activity/ Practice Adequate?	Corrective Action Needed & Notes
1	New employees are trained on SWPPP	Yes☐ No☐ N/A☐	Yes☐ No☐	
2	Annual or more frequent training provided to employees on SWPPP	Yes☐ No☐ N/A☐	Yes☐ No☐	

	Recommendations/Correction	Completed On (Date)	Initials
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

APPENDIX H

EROSION CONTROL AND STORM WATER ORDINANCE

VILLAGE OF HARTLAND

ORDINANCE NO. 839-16

AN ORDINANCE TO AMEND CHAPTER 76 OF THE VILLAGE OF HARTLAND MUNICIPAL CODE PERTAINING TO STORMWATER MANAGEMENT

THE VILLAGE BOARD OF THE VILLAGE OF HARTLAND DO ORDAIN AS FOLLOWS:

Section 1: Chapter 76 of the Village of Hartland Municipal Code of Ordinances pertaining to Stormwater Management is hereby repealed in its entirety and replaced with the following.

ARTICLE I. - IN GENERAL

Sec. 76-1. - Definitions. The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Adequate sod, or self-sustaining vegetative cover means maintenance of sufficient vegetation types and densities such that the physical integrity of the streambank or lakeshore is preserved. Self-sustaining vegetative cover includes grasses, forbs, sedges and duff layers of fallen leaves and woody debris.

Administering authority means a governmental employee, or a regional planning commission empowered under Wis. Stats. § 62.234 that is designated by the village.

Agricultural facilities and practices has the meaning given in Wis. Stats. § 281.16 (1).

Average annual rainfall means a calendar year of precipitation, excluding snow, which is considered typical.

Best management practice or BMP means structural or non-structural measures, practices, techniques or devices employed to avoid or minimize soil, sediment or pollutants carried in runoff to waters of the state.

Business day means a day the office of the director of public works/building inspector/village engineer is routinely and customarily open for business.

Cease and desist order means a court-issued order to halt land disturbing construction activity that is being conducted without the required permit.

Connected imperviousness means an impervious surface that is directly connected to a separate storm sewer or water of the state via an impervious flow path.

Construction site means an area upon which one or more land disturbing construction activities occur, including areas that are part of a larger common plan of development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan.

Design storm means a hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall.

Development means residential, commercial, industrial or institutional land uses and associated roads.

Director of public works means the Village of Hartland Director of Public Works or

designee.

Division of land means either a subdivision or minor land division, as defined by chapter 50, Land subdivision.

Effective infiltration area means the area of the infiltration system that is used to infiltrate runoff and does not include the area used for site access, berms or pretreatment.

Erosion means the process by which the land's surface is worn away by the action of wind, water, ice or gravity.

Erosion and sediment control plan means a comprehensive plan developed to address pollution caused by erosion and sedimentation of soil particles or rock fragments during construction.

Exceptional resource waters means waters listed in § NR 102.11, Wis. Adm. Code.

Extraterritorial jurisdiction means extraterritorial plat approval jurisdiction as defined by section 50-2 of the Village of Hartland Land Subdivision Ordinance.

Filtering layer means soil that has at least a 3-foot deep layer with at least 20 percent fines; or at least a 5-foot deep layer with at least 10 percent fines; or an engineered soil with an equivalent level of protection as determined by the regulatory authority for the site.

Final stabilization means that all land disturbing construction activities at the construction site have been completed and that a uniform perennial vegetative cover has been established, with a density of at least 70 percent of the cover, for the unpaved areas and areas not covered by permanent structures, or employment of equivalent permanent stabilization measures.

Financial guarantee means a performance bond, maintenance bond, surety bond, irrevocable letter of credit, or similar guarantees submitted to the director of public works by the responsible party to assure that requirements of the ordinance are carried out in compliance with the stormwater management plan.

Governing body means the village board of trustees.

Illicit connection means any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including, but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been allowed, permitted, or approved by a government agency, prior to the adoption of this article.

Impervious surface means an area that releases as runoff all or a large portion of the precipitation that falls on it, except for frozen soil. Rooftops, sidewalks, driveways, gravel or paved parking lots and streets are examples of areas that typically are impervious.

In-fill area means an undeveloped area of land located within existing development.

Infiltration means the entry of precipitation or runoff into or through the soil.

Infiltration system means a device or practice such as a basin, trench, rain garden or swale designed specifically to encourage infiltration, but does not include natural infiltration in pervious surfaces such as lawns, redirecting of rooftop downspouts onto lawns or minimal infiltration from practices, such as swales or road side channels designed for conveyance and pollutant removal only.

Karst feature means an area or geologic feature subject to bedrock dissolution so that it is likely to provide a conduit to groundwater, and may include caves, enlarged fractures, mine features, exposed bedrock surfaces, sinkholes, springs, seeps or swallets.

Land development activity means any construction related activity that results in the

addition or replacement of impervious surfaces such as rooftops, roads, parking lots, and other structures. Measurement of areas impacted by land development activity includes areas that are part of a larger common plan of development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan.

Land disturbing construction activity means any man-made alteration of the land surface resulting in a change in the topography or existing vegetative or non-vegetative soil cover, that may result in runoff and lead to an increase in soil erosion and movement of sediment into waters of the state. Land disturbing construction activity includes activities such as clearing and grubbing, demolition, excavating, pit trench dewatering, filling, grading and other similar activities.

Maintenance agreement means a legal document that provides for long-term maintenance of stormwater management practices.

MEP or maximum extent practicable means a level of implementing best management practices in order to achieve a performance standard specified in this chapter which takes into account the best available technology, cost effectiveness and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties and geographic features. MEP allows flexibility in the way to meet the performance standards and may vary based on the performance standard and site conditions.

New development means development resulting from the conversion of previously undeveloped land or agricultural land uses.

Off-site means located outside the property boundary described in the permit application.

On-site means located within the property boundary described in the permit application.

Ordinary high-water mark has the meaning given in Wis. Admin. Code § NR 115.03(6).

Outstanding resource waters means waters listed in Wis. Admin. Code § NR 102.10.

Percent fines means the percentage of a given sample of soil, which passes through a #200 sieve.

Performance standard means a narrative or and objective, measurable number specifying the minimum acceptable outcome for a facility or practice.

Permit means a written authorization issued by the director of public works/building inspector/village engineer to an applicant to conduct land disturbing construction activity or to discharge post-construction runoff to waters of the state.

Permit administration fee means a sum of money paid to the [administering authority] by the permit applicant for the purpose of recouping the expenses incurred by the authority in administering the permit.

Person means any individual, association, organization, partnership, firm, corporation or other entity recognized by law and acting either as the owner or as the owner's agent.

Pervious surface means an area that releases as runoff a small portion of the precipitation that falls on it. Lawns, gardens, parks, forests or other similar vegetated areas are examples of surfaces that typically are pervious.

Pollutant has the meaning given in Wis. Stat. § 283.01(13).

Pollution has the meaning given in Wis. Stat. § 281.01(10).

Post-construction site means a construction site following the completion of land disturbing construction activity and final site stabilization.

Pre-development condition means the extent and distribution of land cover types present before the initiation of land disturbing construction activity, assuming that all land uses prior to

development activity are managed in an environmentally sound manner.

Preventive action limit has the meaning given in Wis. Admin. Code § NR 140.05(17).

Redevelopment means areas where development is replacing older development.

Responsible party means a landowner or any entity holding fee title, an easement or other interest in the property, which allows the person to undertake land disturbing construction activity or maintenance of storm water BMPs on the property.

Runoff means stormwater or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.

Sediment means settleable solid material that is transported by runoff, suspended within runoff or deposited by runoff away from its original location.

Separate storm sewer means a conveyance or system of conveyances including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets all of the following criteria:

(1) Is designed or used for collecting water or conveying runoff.
(2) Is not part of a combined sewer system.
(3) Is not draining to a stormwater treatment device or system.
(4) Discharges directly or indirectly to waters of the state.

Site means the entire area included in the legal description of the land on which the land disturbing construction activity occurred or is proposed is the permit application.

Stop work order means an order issued by the director of public works/building inspector/village engineer that requires all construction activity on the site be stopped.

Storm drain system means publicly-owned facilities by which stormwater is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

Stormwater management plan means a comprehensive plan designed to reduce the discharge of pollutants from stormwater after the site has under gone final stabilization following completion of the construction activity.

Stormwater management system plan is a comprehensive plan designed to reduce the discharge of runoff and pollutants from hydrologic units on a regional or municipal scale.

Technical standard means a document that specifies design, predicted performance and operation and maintenance specifications for a material, device or method.

Top of the channel means an edge, or point on the landscape, landward from the ordinary high water mark of a surface water of the state, where the slope of the land begins to be less than 12 percent continually for at least 50 feet. If the slope of the land is 12 percent or less continually for the initial 50 feet, landward from the ordinary high water mark, the top of the channel is the ordinary high water mark.

TR-55 means the United States Department of Agriculture, Natural Resources Conservation Service (previously Soil Conservation Service), Urban Hydrology for Small Watersheds, Second Edition, Technical Release 55, June 1986.

Type II distribution means a rainfall type curve as established in the "United States Department of Agriculture, Soil Conservation Service, Technical Paper 149, published 1973". The Type II curve is applicable to all of Wisconsin and represents the most intense storm pattern.

Waters of the state has the meaning given in Wis. Stats. § 281.01 (18).

Sec. 76-2. - Authority.

(a) This article is adopted by the Village of Hartland under the authority granted by Wis. Stats. § 61.354. This article supersedes all provisions of an ordinance previously enacted under Wis. Stats. § 61.35 that relate to stormwater management regulations. Except as otherwise specified in Wis. Stats. § 61.354, Wis. Stats. § 61.35 applies to this article and to any amendments to this article.

(b) The provisions of this article are deemed not to limit any other lawful regulatory powers of the same governing body.

(c) The Village of Hartland hereby designates the director of public works/village engineer/building inspector, or their respective designees, to administer and enforce the provisions of this article.

(d) The requirements of this article do not pre-empt more stringent stormwater management requirements that may be imposed by any of the following:

(1) Wisconsin Department of Natural Resources administrative rules, permits or approvals including those authorized under Wis. Stats. §§ 281.16 and 283.33.

(2) Targeted non-agricultural performance standards promulgated in rules by the Wisconsin Department of Natural Resources under § NR 151.004, Wis. Adm. Code.

Sec. 76-3. - Findings of fact.

The Village of Hartland finds that uncontrolled, post-construction runoff has a significant impact upon water resources and the health, safety and general welfare of the community and diminishes the public enjoyment and use of natural resources. Specifically, uncontrolled post-construction runoff can:

(1) Degrade physical stream habitat by increasing stream bank erosion, increasing streambed scour, diminishing groundwater recharge, diminishing stream base flows and increasing stream temperature.

(2) Diminish the capacity of lakes and streams to support fish, aquatic life, recreational and water supply uses by increasing pollutant loading of sediment, suspended solids, nutrients, heavy metals, bacteria, pathogens and other urban pollutants.

(3) Alter wetland communities by changing wetland hydrology and by increasing pollutant loads.

(4) Reduce the quality of groundwater by increasing pollutant loading.

(5) Threaten public health, safety, property and general welfare by overtaxing storm sewers, drainage ways, and other minor drainage facilities.

(6) Threaten public health, safety, property and general welfare by increasing major flood peaks and volumes.

(7) Undermine floodplain management efforts by increasing the incidence and levels of flooding.

Sec. 76-4. - Purpose and intent.

(a) Purpose. The general purpose of this article is to establish long-term, post-construction runoff management requirements that will diminish the threats to public health, safety, welfare and the aquatic environment. Specific purposes are to:

(1) Further the maintenance of safe and healthful conditions.

(2) Prevent and control the adverse effects of stormwater; prevent and control soil erosion; prevent and control water pollution; protect spawning grounds, fish and aquatic life;

control building sites, placement of structures and land uses; preserve ground cover and scenic beauty; and promote sound economic growth.

(3) Control exceedance of the safe capacity of existing drainage facilities and receiving water bodies; prevent undue channel erosion; control increases in the scouring and transportation of particulate matter; and prevent conditions that endanger downstream property.

(4) Minimize the amount of pollutants discharged from the separate storm sewer to protect the waters of the state.

(5) Limit nonpoint runoff pollution in order to achieve water quality standards.

(b) Intent. It is the intent of the Village of Hartland that this article regulates post-construction stormwater discharges to waters of the state. This article may be applied on a site-by-site basis. The Village of Hartland recognizes, however, that the preferred method of achieving the stormwater performance standards set forth in this article is through the preparation and implementation of comprehensive, systems-level stormwater management plans that cover hydrologic units, such as watersheds, on a municipal and regional scale. Such plans may prescribe stormwater devices, practices or systems, any of which may be designed to treat runoff from more than one site prior to discharge from the site(s). Where such plans are in conformance with the performance standards developed under Wis. Stats. § 281.16 for regional stormwater management measures and have been approved by the Village of Hartland, it is the intent of this article that the approved plan be used to identify post-construction management measures acceptable for the community.

Sec. 76-5. - Applicability and jurisdiction.

(a) Applicability.

(1) Where not otherwise limited by law, this article applies to land development activity that results in one or more acres of land disturbing construction activity.

(2) A site that meets any of the criteria in this paragraph is exempt from the requirements of this article:

a. A site having less than ten percent impervious area based on complete development of the post-construction site, provided the cumulative area of all parking lots and rooftops is less than one acre. However the exemption of this paragraph does not include exemption from the protective area standard of this ordinance.

b. Nonpoint discharges from agricultural facilities and practices conducted 50 or more feet from any navigable stream or waterway.

c. Nonpoint discharges from silviculture activities conducted 50 or more feet from any navigable stream or waterway.

d. Underground utility construction such as but not limited to water, sewer and other lines. This exemption does not apply to the construction of any above ground structures associated with utility construction.

(3) Notwithstanding the applicability requirements in paragraph (a) this article applies to land development activity of any size that, in the opinion of the director of public works, village engineer, or building inspector, is likely to result in runoff that exceeds the safe capacity of the existing drainage facilities or receiving body of water, that causes undue channel erosion, that increases water pollution by scouring or the transportation of particulate matter or that endangers property or public safety.

(b) Jurisdiction. This article applies to land development activities within the boundaries and jurisdiction of the Village of Hartland, as well as the division of land in the village's

extraterritorial jurisdiction.

Sec. 76-6. - Technical standards and design methods.

All drainage facilities and practices required to comply with this article shall incorporate technical standards and design methods specified in the document Village of Hartland Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the director of public works/village engineer. Where not superseded by stricter requirements in Village of Hartland Erosion Control and Stormwater Management Requirements, the following standards are also incorporated by reference:

(1) Design guidance and technical standards identified or developed by the Wisconsin Department of Natural Resources under subchapter V of chapter NR 151, Wis. Adm. Code or the current state runoff program administrative codes.

(2) Other technical standards not identified or developed in subsection (1), may be used provided that the methods have been approved by the director of public works/village engineer.

Sec. 76-7. - Performance standards.

(a) *Responsible party.* The entity holding fee title to the property shall be responsible for either developing and implementing a stormwater management plan, or causing such plan to be developed and implemented through contract or other agreement. This plan shall be developed in accordance with section 76-8, which incorporates the requirements of this section.

(b) *Plan.* A written plan shall be developed in accordance with section 76-8 and implemented for applicable land development activities.

(c) *Stormwater management performance standards.* All drainage facilities and practices required to comply with this article shall meet performance standards specified in the document Village of Hartland Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the director of public works/village engineer.

(d) *Location and regional treatment option.*

(1) Stormwater management facilities required to meet this article may be located on-site or off-site as part of a stormwater device, practice or system.

(2) The director of public works/village engineer may approve off-site management measures provided that all of the following conditions are met:

a. The director of public works/village engineer determines that the post-construction runoff is covered by a stormwater management system plan that is approved by Village of Hartland and that contains management requirements consistent with the purpose and intent of this article.

b. The off-site facility meets all of the following conditions:

1. The facility will be in place before the need for the facility arises as a result of on-site construction activities.

2. The facility is designed and adequately sized to provide a level of stormwater control equal to or greater than that which would be afforded by on-site practices meeting the performance standards of this article.

3. The facility has a legally obligated entity responsible for its long-term operation and maintenance.

4. Where a regional stormwater management option exists such that the director of public works/village engineer may exempt the applicant from all or part of the

minimum on-site stormwater management requirements, the applicant shall be required to pay a fee in an amount determined by the director of public works/village engineer. In determining the fee for post-construction runoff, the director of public works/village engineer shall consider an equitable distribution of the cost for land, engineering design, construction, and maintenance of the regional treatment option.

(e) *Alternate requirements.* The director of public works/village engineer may establish alternative stormwater management requirements to those set forth in the village's erosion control and stormwater management requirements, if the director of public works/village engineer determines that an added level of protection is needed for to address downstream stormwater management issues; or that extraordinary hardships or practical difficulties may result from strict compliance with these regulations. Exceptions or waivers to stormwater management requirements set forth in this article and the village's erosion control and stormwater management requirements shall be considered in accordance with section 76-12.

Sec. 76-8. - Permitting requirements, procedures, and fees.

(a) *Permit required.* No responsible party may undertake a land disturbing construction activity without receiving a stormwater management permit from the building inspector/ director of public works prior to commencing the proposed activity.

(b) *Permit application and fees.* Unless specifically excluded by this article, any responsible party desiring a permit shall submit to the building inspector/director of public works a permit application made on a form provided by village for that purpose.

(1) Unless otherwise excepted by this article, a permit application must be accompanied by a stormwater management plan, a maintenance agreement (where required) and, where not otherwise covered by a developer's agreement, a non-refundable permit administration fee. The permit administration fee, where applicable, shall be consistent with a fee schedule maintained by the village.

(2) The stormwater management plan shall be prepared to meet the requirements of sections 76-6 and 76-8, the maintenance agreement shall be prepared to meet the requirements of 76-9, the financial guarantee shall meet the requirements of 76-10, and fees shall be those established by the village as set forth in the schedule of fees established by the village board from time-to-time.

(c) *Review and approval of permit application.* The building inspector/ director of public works shall review any permit application that is submitted with a stormwater management plan, maintenance agreement, and the required fee. The following approval procedure shall be used:

(1) The village staff may request additional information if required for a complete permit application.

(2) If the stormwater permit application, plan and maintenance agreement are approved, or if an agreed upon payment of fees in lieu of stormwater management practices is made, the village staff shall issue the permit.

(3) If the stormwater permit application, plan or maintenance agreement is disapproved, the village staff shall detail in writing the reasons for disapproval.

(4) Prior to commencing the land development activity, the project may be subject to additional approvals under the village's code.

(d) *Permit requirements.* All permits issued under this article shall be subject to the following conditions, and holders of permits issued under this article shall be deemed to have accepted these conditions. The building inspector/director of public works may suspend or

revoke a permit for violation of a permit condition by issuing written notification to the responsible party. An action to suspend or revoke a permit may be appealed in accordance with section 76-15.

(1) Compliance with a permit issued under this article does not relieve the responsible party of the responsibility to comply with any other applicable federal, state, and local laws and regulation(s).

(2) The responsible party shall design and install all structural and non-structural stormwater management measures in accordance with the approved stormwater management plan and this permit.

(3) The responsible party shall notify the director of public works/village engineer/building inspector at least two business days before commencing any work in conjunction with the stormwater management plan, and within three business days upon completion of the stormwater management practices.

(4) Installations required as part of this article shall be certified "as built" by a licensed professional engineer. Completed stormwater management practices must pass a final inspection by the director of public works/village engineer or their designee to determine compliance with the approved stormwater management plan and ordinance. The director of public works/village engineer or its designee shall notify the responsible party in writing of any changes required in such practices to bring them into compliance with the conditions of this permit.

(5) The responsible party shall notify the director of public works/village Engineer of any proposed modifications to an approved stormwater management plan prior to incorporation into the stormwater management plan.

(6) The responsible party shall maintain all stormwater management practices in accordance with the stormwater management plan until the practices either become the responsibility of the village, or are transferred to subsequent private owners as specified in the approved maintenance agreement.

(7) The responsible party authorizes the village to perform any work or operations necessary to bring stormwater management measures into conformance with the approved stormwater management plan, and consents to a special assessment or charge against the property as authorized under subch. VII of Wis. Stats. ch. 66, or to charging such costs against the financial guarantee posted under section 76-10.

(8) Activities that are not in compliance with the approved stormwater management plan shall constitute a public nuisance and the responsible party shall repair, at the responsible party's own expense, all damage to adjoining facilities and drainage ways caused by runoff, where such damage is caused by such activities.

(9) The responsible party shall permit property access to the director of public works/village engineer or its designee for the purpose of inspecting the property for compliance with the approved stormwater management plan and this permit.

(10) Where site development or redevelopment involves changes in direction, increases in peak rate and/or total volume of runoff from a site, the village board may require the responsible party to make appropriate legal arrangements with affected property owners.

(11) The responsible party is subject to the enforcement actions and penalties detailed in section 76-13, if the responsible party fails to comply with the terms of a permit issued under this chapter.

(e) *Permit conditions.* Permits issued under this subsection may include conditions

established by the village related to the requirements needed to meet the performance standards in 76-6 or a financial guarantee as provided for in section 76-10.

(f) Permit duration. Permits issued under this section shall be valid from the date of issuance through the date the village notifies the responsible party that all stormwater management practices have passed the final inspection required under subsection (d)(4). The permit shall be invalid if work is not commenced within one year of permit issuance.

Sec. 76-9. - Stormwater management plan.

(a) *Plan requirements.* A stormwater management plan shall be prepared and submitted to the village director of public works/village engineer. The stormwater management plan shall include, at a minimum, information required in the village's erosion control and stormwater management requirements, maintained and periodically updated by the director of public works/village engineer. The director of public works may waive certain submittal requirements if reasonably determined by the director of public works/village engineer to be unnecessary to demonstrate compliance with ordinance standards.

(b) *Alternate requirements.* The director of public works/village engineer may prescribe alternative submittal requirements for applicants seeking an exemption to on-site stormwater management performance standards under subsection 76-7(e) or section 76-13.

Sec. 76-10. - Maintenance agreement.

(a) *Maintenance agreement required.* The maintenance agreement required under subsection 76-7(b) for stormwater management practices shall be an agreement between the village and the responsible party to provide for maintenance of stormwater practices beyond the duration period of this permit. The maintenance agreement shall be filed with the Waukesha County Register of Deeds as a property deed restriction so that it is binding upon all subsequent owners of the land served by the stormwater management practices.

(b) *Agreement provisions.* The maintenance agreement shall contain the following information and provisions and be consistent with the maintenance plan required by subsection 76-7(b).

(1) Identification of the stormwater facilities and designation of the drainage area served by the facilities.

(2) A schedule for regular maintenance of each aspect of the stormwater management system consistent with the stormwater management plan required under subsection 76-7(b).

(3) Identification of the property or easement owner, organization or county, or village responsible for long term maintenance of the stormwater management practices identified in the stormwater management plan required under subsection 76-7(b).

(4) Requirement that the responsible party(s), organization, or county, or town shall maintain stormwater management practices in accordance with the schedule included under subsection (b)(2) above.

(5) Authorization for the village staff or contractors to access the property to conduct inspections of stormwater management practices as necessary to ascertain that the practices are being maintained and operated in accordance with the agreement.

(6) Agreement that the party designated under subsection (b)(3), as responsible for long term maintenance of the stormwater management practices, shall be notified by the village of maintenance problems which require correction. The specified corrective actions shall be

undertaken within a reasonable time frame as set by the village.

(7) Authorization for the village to perform the corrected actions identified in the inspection report if the responsible party designated under subsection (b)(3) does not make the required corrections in the specified time period. The village finance director shall enter the amount due on the tax rolls and collect the money as a special assessment or charge against the property pursuant to subch. VII of Wis. Stats. Ch. 66 as amended from time-to-time.

Sec. 76-11. - Financial guarantee.

(a) *Establishment of the guarantee.* The village board may require the submittal of a financial guarantee, the form and type of which shall be acceptable to the village attorney. The financial guarantee shall be in an amount determined by the director of public works/village engineer to be the estimated cost of construction and the estimated cost of maintenance of the stormwater management practices during the period initial construction phase of the underlying development. The financial guarantee shall give the village the authorization to use the funds to complete the stormwater management practices if the responsible party defaults or does not properly implement the approved stormwater management plan, upon written notice to the responsible party by the administering authority that the requirements of this article have not been met.

(b) *Conditions for release.* Conditions for the release of the financial guarantee are as follows:

(1) The village board shall release the portion of the financial guarantee established under this section, less any costs incurred by the village to complete installation of practices, upon submission of "as built plans" by a Wisconsin licensed professional engineer. The director of public works/village engineer may recommend provisions for a partial pro-rata release of the financial guarantee based on the completion of various development stages.

(2) The director of public works/village engineer shall release the portion of the financial guarantee established under this section to assure maintenance of stormwater practices and facilities, less any costs incurred by the village, at such time that the practice or facility and underlying development are completed.

Sec. 76-12. - Fee schedule.

The fees referred to in other sections of this article shall be established by the village and may from time to time be modified by resolution. A schedule of fees shall be available at the village clerk's office.

Sec. 76-13. - Exceptions and waivers.

(a) *Generally.* Where the village finds that extraordinary hardships or practical difficulties may result from strict compliance with these regulations and/or the purposes of these regulations may be served to a greater extent by an alternative proposal, it may approve exceptions and waivers to these regulations so that substantial justice may be done and the public interest secured, provided the exception or waiver shall not have the effect of nullifying the intent and purpose of these regulations; and further provided the director of public works/village engineer shall not approve exceptions and waivers unless they shall make findings based upon the evidence presented to them that all of the following conditions are met by the petitioner.

(1) The granting of the exception or waiver will not be detrimental to the public safety, health, or welfare or injurious to other property;

(2) The conditions upon which the request is based are unique to the property for which the relief is sought and are not applicable generally to other property;

(3) Because of the location or conditions affecting the specific property involved, a particular hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations is carried out;

(4) The relief sought will not materially alter the provisions of any existing stormwater management plan within the village except that this document may be amended in the manner prescribed by law;

(5) The granting of the exception or waiver will not result in a violation of state or federal laws or permits.

(b) *Conditions*. In approving exceptions or waivers, the director of public works/village engineer may require such conditions as will, in their judgment, reasonably secure substantially the purposes described in this article and accompanying written stormwater management and erosion control requirements.

(c) *Procedures*. A petition for an exception or waiver shall be submitted in writing by the responsible party at the time when the development is filed for the consideration of the director of public works/village engineer. The petition shall state fully the grounds for the application and all of the facts relied upon by the petitioner.

Sec. 76-14. - Inspection and enforcement.

(a) The director of public works/village engineer/building inspector, or designee may access the site periodically to inspect stormwater management practices and facilities to evaluate compliance with the approved stormwater management plan.

(b) Any land disturbing construction activity or post-construction runoff initiated after the effective date of this article by any person, firm, association, or corporation subject to the ordinance provisions shall be deemed a violation unless conducted in accordance with the requirements of this article.

(c) The director of public works/building inspector shall provide written notice to the responsible party by of any non-complying land disturbing construction activity or post-construction runoff. The notice shall describe the nature of the violation, remedial actions needed, a schedule for remedial action, and additional enforcement action which may be taken.

(d) Upon receipt of written notification from the director of public works under subsection (b) above, the responsible party shall correct work that does not comply with the stormwater management plan or other provisions of this permit. The responsible party shall make corrections as necessary to meet the specifications and schedule set forth by the director of public works/village engineer in the notice.

(e) If the violations to a permit issued pursuant to this article are likely to result in damage to properties, public facilities, or waters of the state, the director of public works/village engineer may enter the land and take emergency actions necessary to prevent such damage. The costs incurred by the village plus interest and legal costs shall be billed to the responsible party as a special charge under Wis. Stats. Ch. 66.

(f) The director of public works/building inspector/village engineer are authorized to post a stop work order on all land disturbing construction activity that is in violation of this article, or to request the village attorney to obtain a cease and desist order in any court with jurisdiction.

(g) The director of public works/village engineer/building inspector may revoke a permit issued under this article for non-compliance with ordinance provisions.

(h) Any permit revocation, stop work order, or cease and desist order shall remain in effect unless retracted by the director of public works, village engineer, building inspector, village administrator, or village attorney, the village board of trustees, or by a court with jurisdiction.

(i) The director of public works/village engineer/building inspector are authorized to refer any violation of this article, or of a stop work order, or of a cease and desist order issued pursuant to this article, to the village attorney for the commencement of further legal proceedings in any court with jurisdiction.

(j) Any person, firm, association, or corporation violating the provisions of this article shall be subject to penalties as provided in section 1-4 of this Code. Each day of each violation shall constitute a separate offense.

(k) Compliance with the provisions of this article may also be enforced by injunction in any court with jurisdiction. It shall not be necessary to prosecute for forfeiture or a cease and desist order before resorting to injunction proceedings.

(l) When the director of public works/village engineer/building inspector determines that the holder of a permit issued pursuant to this article has failed to follow practices set forth in the stormwater management plan, or has failed to comply with schedules set forth in said stormwater management plan, the director of public works/village engineer/building inspector, or their designee, may enter upon the land and perform the work or other operations necessary to bring the condition of said lands into conformance with requirements of the approved plan. The director of public works/village engineer/building inspector shall keep a detailed accounting of the costs and expenses of performing this work. These costs and expenses shall be deducted from any financial security posted pursuant to section 76-11 of this article. Where such a security has not been established, or where such a security is insufficient to cover these costs, the costs and expenses shall be entered on the tax roll as a special charge against the property and collected with any other taxes levied thereon for the year in which the work is completed.

Sec. 76-15. - Appeals.

(a) *Board of zoning appeals.* The board of zoning appeals, created pursuant to section 46-121 of this Code pursuant to Wis. Stats. § 61.35(7)(e) shall hear and decide appeals where it is alleged that there is error in any order, decision or determination made by the director of public works/village engineer/building inspector in administering this article. The board shall also use the rules, procedures, duties, and powers authorized by statute in hearing and deciding appeals. Upon appeal, the board may authorize variances from the provisions of this article that are not contrary to the public interest, and where owing to special conditions a literal enforcement of the ordinance will result in unnecessary hardship.

(b) *Who may appeal.* Appeals to the board of appeals may be taken by any aggrieved person or by an officer, department, or board of the Village of Hartland affected by any decision of the director of public works/village engineer/building inspector.

Sec. 76-16. - Severability.

If any section, clause, provision or portion of this article is judged unconstitutional or invalid by a court of competent jurisdiction, the remainder of the ordinance shall remain in force and not be affected by such judgment.

Secs. 76-17—76-30. - Reserved.

ARTICLE II. - ILLICIT STORMWATER DISCHARGES AND CONNECTIONS

Sec. 76-31. - Definitions.
The words, terms and phrases as defined in Section 76-1 of this chapter, shall have the meanings ascribed to them when used in this section, except where the context clearly indicates a different meaning.

Sec. 76-32. - Discharges prohibited.
No person shall discharge, spill or dump substances or materials that are not entirely composed stormwater into receiving bodies of water or onto driveways, sidewalks, parking lots or other areas that drain into the storm drainage system. Unless otherwise approved by the director of public works/village engineer, no person shall discharge roof drains, yard drains or sump pumps onto streets, sidewalks, or other areas within village right-of-way that drain into the storm drainage system. Roof drains, yard drains, and sump pumps shall discharge onto pervious areas at grade on private property.

Sec. 76-33. - Connections prohibited.
The construction, use, maintenance or continued existence of illicit connections to the storm drainage system is prohibited. This prohibition expressly includes, without limitation, illicit connections made prior to the adoption of this article, regardless of whether the connections was permissible under law or practice applicable or prevailing at the time of connection. Unless otherwise approved by the director of public works/village engineer, roof drain and sump pump discharge connections to the storm drainage system shall be prohibited.

Sec. 76-34. - Exemptions.
The following activities are exempt from the provisions of this section unless found to have an adverse impact on the stormwater:

(1) Discharges authorized by a permit issued by the Wisconsin Department of Natural Resources.

(2) Discharges resulting from fire fighting activities.

(3) Discharges from uncontaminated ground water, potable water source, air conditioning condensation, springs, lawn watering, individual residential car washing, water main and hydrant flushing and swimming pools if the water has been dechlorinated.

Sec. 76-35. - Enforcement.

(a) Any person, firm, association, or corporation violating the provisions of this article shall be subject to penalties as provided in section 1-4 of this Code. Each day of each violation shall constitute a separate offense.

(b) Compliance with the provisions of this article may also be enforced by injunction in any court with jurisdiction. It shall not be necessary to prosecute for forfeiture or a cease and desist order before resorting to injunction proceedings.

Secs. 76-36—76-50. - Reserved.

ARTICLE III. - CONSTRUCTION SITE EROSION CONTROL

Sec. 76-51. - Definitions.
The words, terms and phrases as defined in Section 76-1 of this chapter, shall have the meanings ascribed to them when used in this section, except where the context clearly indicates a different meaning.

Sec. 76-52. - Authority.
(a) This article is adopted under the authority granted by Wis. Stats. § 61.354 and 281.33, Wis. Stats. This article supersedes all provisions of any previously enacted ordinance related to construction site erosion control. Except as otherwise specified in Wis. Stats. §§ 61.35 and 61.354 applies to this article and to any amendments to this article.
(b) The provisions of this article are deemed not to limit any other lawful regulatory powers of the same governing body.
(c) The village hereby designates the director of public works/building inspector/village engineer to administer and enforce the provisions of this article.
(d) The requirements of this article do not pre-empt more stringent erosion and sediment control requirements that may be imposed by any of the following:
(1) Wisconsin Department of Natural Resources administrative rules, permits or approvals including those authorized under Wis. Stats. §§ 281.16 and 283.33.
(2) Targeted non-agricultural performance standards promulgated in rules by the Wisconsin Department of Natural Resources under Wis. Admin. Code § NR 151.004or the current state runoff program administrative codes

Sec. 76-53. - Findings of fact.
The village finds that runoff from land disturbing construction activity may carry a significant amount of sediment and other pollutants into ground and surface waters and waterways in the village.

Sec. 76-54. - Purpose.
It is the purpose of this article to further the maintenance of safe and healthful conditions; prevent and control water pollution; prevent and control soil erosion; protect spawning grounds, fish and aquatic life; control building sites, placement of structures and land uses; preserve ground cover and scenic beauty; and promote sound economic growth, by minimizing the amount of sediment and other pollutants carried by runoff or discharged from land disturbing construction activity to ground and surface waters and waterways in village.

Sec. 76-55. - Applicability and jurisdiction.
(a) Any land disturbing activity shall be subject to erosion and sediment control provisions of this article, if:
(1) A subdivision plat would result, or if construction of buildings on platted lots results;
(2) A certified map would result, or if construction of buildings on certified survey map lots results;
(3) An area of 4,000 square feet or greater will be disturbed by excavation, grading, filling, or other earth moving activities, resulting in a loss or removal of protective ground cover,

vegetations;

(4) Excavation, fill, or any combination thereof, will exceed 400 cubic yards; or more than 15 cubic yards within areas specified by the Waukesha County Shoreland and Floodland Protection Ordinance;

(5) Any public (federal, state or local) street, road or highway is to be constructed, enlarged, relocated, or substantially reconstructed;

(6) Any watercourse is to be changed, enlarged or materials are removed from a river, stream, swamp, or lake bed; or

(7) Any utility work in which underground conduits, piping, wiring, water lines, sanitary sewers, storm sewers or similar structures will be laid, repaired, replaced or enlarged, if such work involves more than 300 linear feet of each disturbance;

(8) Grading, removal of protective ground cover or vegetation, excavation, landfilling or land disturbing activity within 200 feet of a lake, stream, or wetland when work affects more than ten cubic yards of material.

(b) This article does not apply to the following:

(1) A construction project that is exempted by federal statutes or regulations from the requirement to have a national pollutant discharge elimination system permit issued under Chapter 40, Code of Federal Regulations, part 122, for land disturbing construction activity.

(2) Nonpoint discharges from agricultural facilities and practices that are conducted more than 50 feet from any navigable waterway or wetlands.

(3) Nonpoint discharges from silviculture activities that are conducted more than 50 feet from any navigable waterway or wetlands.

(4) Routine maintenance for project sites under one-half-acre of land disturbance if performed to maintain the original line and grade, hydraulic capacity or original purpose of the facility.

(c) Notwithstanding the applicability requirements in paragraph (a), this article applies to construction sites of any size that, in the opinion of the village staff, are likely to result in runoff that exceeds the safe capacity of the existing drainage facilities or receiving body of water, that causes undue channel erosion, that increases water pollution by scouring or the transportation of particulate matter or that endangers property or public safety.

Sec. 76-56. - Jurisdiction.

This article applies to land disturbing construction activities on lands within the boundaries and jurisdiction of the Village of Hartland.

Sec. 76-57. - Technical standards.

(a) Design criteria, standards and specifications. All drainage facilities and practices required to comply with this article shall incorporate technical standards and design methods specified in the document Village of Hartland Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the director of public works/village engineer. Where not superseded by stricter requirements in Village of Hartland Erosion Control and Stormwater Management Requirements, the following standards are also incorporated by reference:

(1) Design guidance and technical standards identified or developed by the Wisconsin Department of Natural Resources under subchapter V of Wis. Admin. Code chapter

NR 151.

(2) Soil loss prediction tools (such as the Universal Soil Loss Equation (USLE)) when using an appropriate design storm and precipitation distribution, and when considering the geographic location of the site and the period of disturbance.

(b) Other standards. Other technical standards not identified or developed in subsection (a), may be used provided that the methods have been approved by the director of public works/village engineer/building inspector.

Sec. 76-58. - Performance standards.

(a) Responsible party. The entity holding fee title to the property shall be responsible for either developing and implementing an erosion and sediment control plan, or causing such plan to be developed and implemented through contract or other agreement. This plan shall be developed in accordance with section 76-60, that incorporates the requirements of this section.

(b) Plan. A written plan shall be developed in accordance with section 76-9 and implemented for applicable land development activities.

(c) Erosion and sediment control performance standards. All drainage facilities and practices required to comply with this article shall meet performance standards specified in the document Village of Hartland Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the director of public works/village engineer.

(d) Location. The BMPs used to comply with this section shall be located prior to runoff entering any lake, stream, river, swamp, or wetlands or any stormwater management system.

(e) Alternate requirements. The director of public works/building inspector/village engineer may establish alternative erosion and sediment control requirements to those set forth in Village of Hartland Erosion Control and Stormwater Management Requirements, if the director of public works/building inspector/village engineer determines that an added level of protection is needed or that extraordinary hardships or practical difficulties may result from strict compliance with these regulations. Exceptions or waivers to requirements set forth in this article and Village of Hartland Erosion Control and Stormwater Management Requirements shall be considered in accordance with section 76-13.

Sec. 76-59. - Permitting requirements, procedures and fees.

(a) *Permit required.* No responsible party may commence a land disturbing construction activity subject to this article without receiving prior approval of an erosion and sediment control plan for the site and a permit from the director of public works/building inspector/village engineer.

(b) *Permit application and fees.* The responsible party desiring to undertake a land disturbing construction activity subject to this article shall submit an application for a permit and an erosion and sediment control plan that meets the requirements of section 76-8. The applicant shall pay an application fee consistent with the fee schedule maintained by the village clerk. By submitting an application, the applicant is authorizing the village staff to enter the site to obtain information required for the review of the erosion and sediment control plan.

(c) *Review and approval of permit application.* The director of public works/building inspector/village engineer shall review any permit application that is submitted with an erosion and sediment control plan, and the required fee. The following approval procedure shall be used:

(1) The director of public works/building inspector/village engineer may request additional information if required for a complete application within 15 business days of receipt

of any permit application. Within 30 business days of the receipt of a complete permit application, including all items as required by subsection (b), the director of public works/building inspector/village engineer shall inform the applicant whether the application, plan and maintenance agreement are approved or disapproved based on the requirements of this article.

(2) If the permit application and plan are approved, the director of public works/building inspector/village engineer shall issue the permit.

(3) If the permit application or plan is disapproved, the director of public works/building inspector/village engineer shall state in writing the reasons for disapproval.

(d) *Financial guarantee.* As a condition of approval and issuance of the permit, the director of public works/building inspector/village engineer may require the applicant to deposit a surety bond or irrevocable letter of credit to guarantee a good faith execution of the approved erosion control plan and any permit conditions. The amount of financial guarantee required under this section shall be established by the director of public works/building inspector/village engineer, in his or her discretion, taking into consideration the projected cost of the BMPs and other facilities required in the approved erosion control plan together with a reasonable estimate of the cost of site stabilization and/or cleanup in the event of noncompliance with the approved erosion control plan.

(e) *Permit requirements.* All permits shall require the responsible party to:

(1) Notify the director of public works/building inspector/village engineer three full village business days prior to commencing any land disturbing construction activity.

(2) Notify the director of public works/building inspector/village engineer of completion of any BMPs within three full village business days after their installation.

(3) Obtain permission in writing from the director of public works/building inspector/village engineer prior to any modification pursuant to subsection 76-9(b) of the erosion and sediment control plan.

(4) Install all BMPs as identified in the approved erosion and sediment control plan.

(5) Maintain all road drainage systems, stormwater drainage systems, BMPs and other facilities identified in the erosion and sediment control plan.

(6) Repair any siltation or erosion damage to adjoining surfaces and drainage ways resulting from land disturbing construction activities and document repairs in a site erosion control log. Remove accumulated sediment from downstream culverts, storm sewers, and other drainage facilities. Remove accumulated sediment from waterways upon obtaining of necessary permit(s) from the Wisconsin Department of Natural Resources.

(7) Inspect the BMPs within 24 hours after each rain of 0.5 inches or more which results in runoff during active construction periods, and at least once each week, make needed repairs and document the findings of the inspections in a site erosion control log with the date of inspection, the name of the person conducting the inspection, and a description of the present phase of the construction at the site.

(8) Allow the village staff to enter the site for the purpose of inspecting compliance with the erosion and sediment control plan or for performing any work necessary to bring the site into compliance with the control plan. Keep a copy of the erosion and sediment control plan at the construction site.

(f) *Permit conditions.* Permits issued under this section may include conditions established by director of public works/building inspector/village engineer in addition to the requirements set forth in subsection (e), where needed to assure compliance with the

performance standards in section 76-7.

(g) *Permit duration.* Permits issued under this section shall be valid for a period of 180 days, or the length of the building permit or other construction authorizations, whichever is longer, from the date of issuance. The permit duration may be extended one or more times for up to an additional 180 days. The director of public works/building inspector/village engineer may require additional BMPs as a condition of the extension if they are necessary to meet the requirements of this article.

(h) *Maintenance.* The responsible party throughout the duration of the construction activities shall maintain all BMPs necessary to meet the requirements of this article until the site has undergone final stabilization.

Sec. 76-60. - Erosion and sediment control plan and amendments.

(a) Plan *requirements.* An erosion and sediment control plan shall be prepared and submitted to the director of public works/building inspector/village engineer. The erosion and sediment control plan shall include, at a minimum, information required in the Village of Hartland Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the director of public works/village engineer.

(b) *Amendments.* The applicant shall submit an amended plan for review and approval by the village director of public works/building inspector/village engineer together with the amended plan review fee established under section 76-9 within three days of the occurrence of any of the following events:

(1) There is a change in design, construction, operation or maintenance at the site which has the reasonable potential for the discharge of pollutants to waters of the state and which has not otherwise been addressed in the plan.

(2) The actions required by the plan fail to reduce the impacts of pollutants carried by construction site runoff.

(3) The director of public works/building inspector/village engineer notifies the applicant of changes needed in the plan to comply with this article or the Village of Hartland Erosion Control and Stormwater Management Requirements.

Sec. 76-61. - Fee schedule.

The fees referred to in other sections of this article shall be established by the village board and may from time to time be modified by resolution. A schedule of the fees established by the village board shall be available at the village clerk's office

Sec. 76-62. - Inspection.

(a) The director of public works/village engineer, building inspector, or designee may access the site for the purpose of inspecting installation and construction of best management practices at any time between initiation of construction activities and final inspection/release of the project guarantee.

(b) If land disturbing construction activities are being carried out without a permit required by this article, the director of public works/building inspector/village engineer may enter the land pursuant to the provisions of Wis. Stats. §§ 66.0119(1), (2), and (3).

Sec. 76-63. - Exceptions and waivers.

(a) *General.* Where the director of public works/building inspector/village engineer finds

that extraordinary hardships or practical difficulties may result from strict compliance with these regulations and/or the purposes of these regulations may be served to a greater extent by an alternative proposal, they may approve exceptions and waivers to these regulations so that substantial justice may be done and the public interest secured, provided the exception or waiver shall not have the effect of nullifying the intent and purpose of these regulations; and further provided the director of public works/village engineer shall not approve exceptions and waivers unless they shall make findings based upon the evidence presented to it that all of the following conditions are met by the petitioner.

(1) The granting of the exception or waiver will not be detrimental to the public safety, health, or welfare or injurious to other property;

(2) The conditions upon which the request is based are unique to the property for which the relief is sought and are not applicable generally to other property;

(3) Because of the location or conditions affecting the specific property involved, a particular hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations is carried out;

(4) The relief sought will not materially alter the provisions of any existing regional stormwater management plan except that this document may be amended in the manner prescribed by law.

(5) The granting of the exception or waiver will not result in a violation of state or federal laws or permits.

(b) *Conditions*. In approving exceptions or waivers, the director of public works/building inspector/village engineer may require such conditions as will in their judgment secure substantially the purposes described in this article and accompanying written stormwater management and erosion control requirements.

(c) *Procedures*. A petition for an exception or waiver shall be submitted in writing by the responsible party at the time when the development is filed for the consideration of the director of public works/building inspector/village engineer. The petition shall state fully the grounds for the application and all of the facts relied upon by the petitioner.

Sec. 76-64. - Enforcement.

(a) The director of public works/building inspector/village engineer may post a stop-work order if any of the following occurs:

(1) Any land disturbing construction activity regulated under this article is being undertaken without a permit.

(2) The erosion and sediment control plan is not being implemented in a good faith manner.

(3) The conditions of the permit are not being met.

(b) If the responsible party does not cease activity as required in a stop-work order posted under this section or fails to comply with the erosion and sediment control plan or permit conditions, the director of public works/building inspector/village engineer may revoke the permit.

(c) If the responsible party, where no permit has been issued, does not cease the activity after being notified by the director of public works/building inspector/village engineer, or if a responsible party violates a stop-work order posted under subsection (a), the director of public works/building inspector/village engineer may request the village attorney to obtain a cease and desist order in any court with jurisdiction together with applicable penalties under subsection (f).

(d) The board of zoning appeals may retract a stop-work order issued under subsection (a) or a permit revocation under subsection (b).

(e) After posting a stop-work order under subsection (a), the director of public works/building inspector/village engineer may issue a notice of intent to the responsible party of its intent to perform work necessary to comply with this article. Village staff or contractors may go on the land and commence the work after issuing the notice of intent. The costs of the work performed under this subsection by the village board, plus interest at the rate authorized by the village board shall be billed to the responsible party. In the event a responsible party fails to pay the amount due, the clerk shall enter the amount due on the tax rolls and collect as a special charge against the property pursuant to subch. VII of Wis. Stats. ch. 66.

(f) Any person violating any of the provisions of this article shall be subject to penalties under section 1-4 of this Code of Ordinances. Each day a violation exists shall constitute a separate offense.

(g) Compliance with the provisions of this article may also be enforced by injunction in any court with jurisdiction. It shall not be necessary to prosecute for forfeiture or a cease and desist order before resorting to injunction proceedings.

Sec. 76-65. - Appeals.

(a) *Board of zoning appeals.* The board of zoning appeals created pursuant to section 46-121 et seq. pursuant to Wis. Stats. § 61.35(7)(e).

(1) Shall hear and decide appeals where it is alleged that there is error in any order, decision or determination made by the director of public works/building inspector/village engineer in administering this article except for cease and desist orders obtained under section 76-14.

(2) Upon appeal, may authorize variances from the provisions of this article which are not contrary to the public interest and where owing to special conditions a literal enforcement of the provisions of the ordinance will result in unnecessary hardship; and

(3) Shall use the rules, procedures, duties and powers authorized by statute in hearing and deciding appeals and authorizing variances.

(b) *Who may appeal.* Appeals to the board of appeals may be taken by any aggrieved person or by any office, department, board, or the Village of Hartland affected by any decision or order of the director of public works/building inspector/village engineer within 30 days of such decision or order.

Section 2: If any section, sentence, clause, phrase or portion of this ordinance is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct and independent provision, and such holding shall not affect the validity of the remainder of such ordinance.

Section 3: This Ordinance shall take effect and be in full force after adoption and proper publication.

Adopted this 23rd day of May, 2016.

VILLAGE OF HARTLAND

By: _____
David C. Lamerand, Village President

ATTEST:

_____
Darlene Igl, MMC, WCPC, Village Clerk

VILLAGE OF HARTLAND INCORPORATED SEAL JANUARY 18, 1892 WISCONSIN

APPENDIX I

EROSION CONTROL AND STORM WATER ORDINANCE SUPPORTING DOCUMENTS

NOTE: THE FOLLOWING DOCUMENTS WERE COMPLETED AS PART OF PREVIOUS PLANNING EFFORTS, AND HAVE BEEN INCLUDED HERE AS REFERENCE DOCUMENTS AND FOR CONSIDERATION FOR FUTURE REVISIONS.

AGREEMENT TO MAINTAIN
STORMWATER FACILITIES
BY AND BETWEEN
THE VILLAGE OF HARTLAND AND
_____, AND
ITS HEIRS, SUCCESSORS, OR ASSIGNS

The upkeep and maintenance of stormwater facilities and the implementation of pollution source control best management practices (BMPs) is essential to the protection of water resources in the Village of Hartland. All property owners are expected to conduct business in a manner that minimizes impacts of stormwater runoff. This Agreement contains specific provisions with respect to maintenance of stormwater facilities. The authority to require maintenance and pollution source control is provided in the Village of Hartland Stormwater Management Zoning Ordinance.

FACILITY LOCATION AND AREA SERVED (Attach Map if Necessary):

This space reserved for recording data

Return To:

Parcel Identification No./Tax Key No.

Whereas, Owner has constructed improvements, including but not limited to, buildings, pavement, and stormwater facilities on the property described above. In order to further the goals of the stormwater management goals of the Village of Hartland, the City and Owner hereby enter into this Agreement. The responsibilities of each party to this Agreement are identified below.

OWNER SHALL:

(1) Implement the stormwater facility maintenance plan included herein as Attachment A.

(2) Implement the stormwater management plan included herein as Attachment B.

(3) Allow the Director of Public Works or designee to access the property to conduct inspections of storm water management practices as necessary to ascertain that the practices are being maintained and operated in accordance with the agreement.

(4) Undertake corrective actions required by Village within a reasonable time frame as set by the Director of Public Works.

(5) Maintain a record of steps taken to implement the programs referenced in (1) and (2) above. Record shall be available for inspection by Village staff at Owners business during normal business hours. The record shall catalog the action taken, who took it, when it was done, how it was done, and any problems encountered or follow-on actions recommended.

THE VILLAGE OF HARTLAND SHALL:

(1) Provide technical assistance to Owner in support of its operation and maintenance activities conducted pursuant to its maintenance and source control programs. Said assistance shall be provided upon request, and as Village time and resources permit.

(2) Maintain public records of the results of the site inspections, inform the party responsible for maintenance of the inspection results, and specifically indicate any corrective actions required to bring the storm water management practice into proper working condition.

(3) Notify the Owner of maintenance problems that require correction.

REMEDIES:

(1) If corrective actions required by the Village are not completed within the time set by the Director of Public Works, written notice will be sent to the persons who were given notice stating the Village intention to perform such maintenance and bill the owner for all incurred expenses.

(2) If at any time the Village determines that the existing system creates any imminent threat to public health or welfare, the Director of Public Works may take immediate measures to remedy said threat. No notice to the persons listed in (1), above, shall be required under such circumstances.

(3) The owner grants unrestricted authority to the Village for access to any and all stormwater system features for the purpose of performing maintenance or repair as may become necessary under Remedies (1) and/or (2).

(4) The persons listed in (1), above, shall assume all responsibility for the cost of any maintenance and for repairs to the stormwater facility. Such responsibility shall include reimbursement to the Village within 30 days of the receipt of the invoice for any such work performed. Overdue payments will require payment of interest at the current legal rate for liquidated judgments. If legal action ensues, any costs or fees incurred by the Village will be borne by the parties responsible for said reimbursements.

(5) The owner hereby grants to the Village a lien against the above-described property in an amount equal to the cost incurred by the Village to perform the maintenance or repair work described herein.

This Agreement is intended to protect the value and desirability of the real property described

above and to benefit all the citizens of the Village. It shall run with the land and be binding on all parties having or acquiring from Owner or their successors any right, title, or interest in the property or any part thereof, as well as their title, or interest in the property or any part thereof, as well as their heirs, successors, and assigns. They shall inure to the benefit of each present or future successor in interest of said property or any part thereof, or interest therein, and to the benefit of all citizens of the Village.

_____

_____

STATE OF WISCONSIN)
) ss
COUNTY OF _____)

On this day and year above personally appeared before me, a Notary Public in and for the State of Wisconsin duly commissioned and sworn, personally appeared _____, to me known to be the _____ of _____ and acknowledge the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that _____ is authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal the day and year first above written.

_____

Notary Public in and for the State of
Wisconsin, residing in _____

My Commission Expires: _____

Dated at Hartland, Wisconsin, this _____ day of _____, _____.

VILLAGE OF HARTLAND

By:_____
Authorized Agent for the Village of Hartland

VILLAGE OF HARTLAND
GENERAL INFORMATION
CONSTRUCTION SITE EROSION CONTROL PERMIT APPLICATION

Official Use Only	
Date Received	_____
Number	_____
Fee Received	_____
Reviewer	_____

Send Application to:

Village of Hartland
210 Cottonwood Avenue
Hartland, WI 53209

Instructions: Please type or print. Read all instructions before completing application.

Name of Project:
_____

Applicant/Entity Receiving Permit

Name of Applicant: _____
First Name of Contact: _____Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: ___
Telephone Number: (____) _____
Fax Number: (____)_____
E-mail Address_____

Property Owner

First Name: _____ Last Name: _____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: _____
Telephone Number: (_____) _____
Parcel Identification Number(s): _____
E-mail Address_____

Engineer (Where Applicable)

Name of Firm: _____
First Name of Contact: _____Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: ____
Telephone Number: (_____) _____
Fax Number: (_____)_____
E-mail Address_____

Village of Hartland
Construction Site Erosion Control Plan
Application Checklist

Permit #: _____

Project Name: _____ **Date:** _____

Please check the appropriate box: I = Included; NA = Non-Applicable *(If "NA" is checked, an explanation must be entered.)*

Plan Requirement	I	NA	Explanation/Location in Plan
A. Submittal Requirements			
1. Permit Application Form			
B. Predevelopment Site Conditions Mapping			
1. Location Map			
2. Soils Survey Map			
3. Existing Land Use Mapping			
4. Predeveloped Site Conditions			
a. Existing Contours			
b. Property lines			
c. Existing flow paths and direction			
d. Outlet locations			
e. Drainage basin divides and subdivides			
f. Existing drainage structures on and adjacent to the site.			
g. Nearby Watercourses			
h. Lakes, streams, wetlands, channels, ditches, etc.			
i. Limits of the 100-year floodplain;			
C. Proposed Site Grading and Erosion Control Plan			
1. Boundaries of the construction site.			
2. Drainage Patterns/slopes after grading activities			
3. Areas of land disturbance			
4. Locations of structural and nonstructural controls			
5. Drainage basin delineations and outfall locations			
D. Drawings/Details			
1. Practice Location/Layout/Cross Sections			
2. Construction Details			
E. Calculations, as required to demonstrate ordinance compliance			
F. Narrative			
1. Name of receiving waters			
2. Site Description/Nature of construction activity			
3. Sequence of Construction			
4. Estimate of site area and disturbance area			
5. Pre- and postdeveloped runoff coefficients			
6. Description of proposed controls, including			
a. Interim and permanent stabilization practices			
b. Practices to divert flow from exposed soils			
c. Practices to store flows or trap sediment			
d. Any other practices proposed to meet ordinance			

Village of Hartland

CONSTRUCTION SITE EROSION CONTROL PERMIT NO. _____

Date of Application _____
Site Address_____
Plat Name_____
Certified Survey Map_____
Lots No. (s) _____

Permit Conditions:

(a) Permittee shall notify the Director of Public Works 48 hours prior to commencing any land disturbing construction activity.

(b) Permittee shall notify the Director of Public Works of practice installation within 5 days of installation.

(c) Permittee shall obtain permission in writing from the Director of Public Works prior to any modification pursuant to S.08(2) of the erosion and sediment control ordinance.

(d) Permittee shall install all practices as identified in the approved erosion and sediment control plan.

(e) Permittee shall maintain all road drainage systems, stormwater drainage systems, BMPs and other facilities identified in the erosion and sediment control plan.

(f) Permittee shall repair any siltation or erosion damage to adjoining surfaces and drainage ways resulting from land disturbing construction activities and document repairs in a site erosion control log. Remove accumulated sediment from downstream culverts, storm sewers, and other drainage facilities.

(g) Permittee shall inspect the practices within 24 hours after each rain of 0.5 inches or more which results in runoff during active construction periods, and at least once each week, make needed repairs and document the findings of the inspections in a site erosion control log with the date of inspection, the name of the person conducting the inspection, and a description of the present phase of the construction at the site.

(h) Permittee shall allow the Director of Public Works to enter the site for the purpose of inspecting compliance with the erosion and sediment control plan or for performing any work necessary to bring the site into compliance with the control plan. Permittee shall keep a copy of the erosion and sediment control plan at the construction site.

APPLICANT MUST FILL IN BOXED AREA

Owner _____
(please print or type full name)
Address_____
_____
_____
Signature or Owner or Authorized Representative

Area of Land Disturbance (Square Feet) _____

SPECIAL CONDITIONS: _____
_____
_____
_____

CONDITIONAL APPROVAL: _____
Administrative Authority Title Date

Permits issued under this section shall be valid for a period of 180 days, or the length of the building permit or other construction authorizations, whichever is longer, from the date of issuance. The Director of Public Works may extend the period one or more times for up to an additional 180 days. The Director of Public Works may require additional BMPs as a condition of the extension if they are necessary to meet the requirements of this ordinance.

Village of Hartland
Application Checklist
Summary Tables

Peak Discharge Summary

Outfall No._____

Storm Frequency	Peak Discharge (cfs)		
	Predev.	Postdev.	Postdev. w/Detention
2-Year			
5-Year			
10-Year			
25-Year			
50-Year			
100-Year			

Note: Provide 1 table for each oufall location.

Detention Basin Summary

Detention Basin _____

Storm Frequency	Storage Volume (ac-ft)	Peak Discharge (cfs)		
		Inflow	Discharge	Pond Elevation
2-Year				
5-Year				
10-Year				
25-Year				
50-Year				
100-Year				

Note: Provide 1 table for each detention basin.

VILLAGE OF HARTLAND
GENERAL INFORMATION
STORMWATER MANAGEMENT PERMIT APPLICATION

Send Application to:

Village of Hartland
210 Cottonwood Avenue
Hartland, WI 53209

Official Use Only

Date Received _____
Number _____
Fee Received _____
Reviewer _____

Instructions: Please type or print. Read all instructions before completing application.

Name of Project:
_____

Applicant/Entity Receiving Permit

Name of Applicant: _____
First Name of Contact: _____Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: ___
Telephone Number: (____) _____
Fax Number: (____)_____
E-mail Address_____

Property Owner

First Name: _____ Last Name: _____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: _____
Telephone Number: (_____) _____
Parcel Identification Number(s): _____
E-mail Address_____

Engineer

Name of Firm: _____
First Name of Contact: _____Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: ____
Telephone Number: (_____) _____
Fax Number: (_____)_____
E-mail Address_____

Village of Hartland
Stormwater Management Plan
Application Checklist

Permit #: _____

Project Name: _____ **Date:** _____

Please check the appropriate box: I = Included; NA = Non-Applicable *(If "NA" is checked, an explanation must be entered.)*

Plan Requirement	I	NA	Explanation/Location in Plan
A. Submittal Requirements			
1. Permit Application Form			
2. Maintenance Agreement			
3. Financial Guarantee			
4. Certification/Stamp by Wisconsin Prof. Engineer			
B. Predevelopment Site Conditions Mapping			
1. Location Map			
2. Soils Survey Map			
3. Existing Land Use Mapping			
4. Predeveloped Site Conditions			
a. Existing Contours			
b. Property lines			
c. Existing flow paths and direction			
d. Outlet locations			
e. Drainage basin divides and subdivides			
f. Existing drainage structures on and adjacent to the site.			
g. Nearby Watercourses			
h. Lakes, streams, wetlands, channels, ditches, etc.			
i. Limits of the 100-year floodplain;			
j. Wells/Wellhead Protection Areas			
C. Post-Development Site Conditions Mapping			
1. Pervious Surfaces			
2. Impervious Surfaces			
3. One Foot Topographic Contours			
4. Proposed Drainage System (including applicable off-site)			
5. Proposed Easement Locations			
6. Proposed Flow Paths, Overland Flow Routes			
7. Proposed Outlets/Drainage Divides			
D. Drawings/Details			
1. Practice Location/Layout/Cross Sections			
2. Outlet Structure Details			
3. Ditch/Storm Sewer Plan/Profile			
4. Other			
E. Calculations, including computer modeling input and output files.			
1. Hydrograph Parameter Calculations			
2. Computer Modeling Input/Output (Pre- and Postdeveloped)			
3. Detention Pond Routing			
4. Conveyance System Design			
5. Other			

Village of Hartland
Stormwater Management Plan
Application Checklist

Permit #: _____

Project Name: _____ **Date:** _____

Please check the appropriate box: I = Included; NA = Non-Applicable *(If "NA" is checked, an explanation must be entered.)*

Plan Requirement	I	NA	Explanation/Location in Plan
F. Narrative			
1. Methodologies and Assumptions			
2. Results/Conclusions			
a. Pre-, and Post-developed parameter summary			
b. Pre-, and Post-developed peak discharge Summary			
3. Provisions to preserve natural topography/cover features			
4. Limitations from wellhead protection plans and ordinances.			
5. Results of investigations of soils and groundwater			
6. Practice Installation Schedule			
7. Maintenance Plan			
8. Cost Estimates			
9. Other Information			

Village of Hartland
Application Checklist
Summary Tables

Hydrologic Parameters

Basin Name	Drainage Area (Ac)		Runoff Curve Number		Time of Concentration (min.)	
	Existing	Proposed	Existing	Future	Existing	Future

Village of Hartland

STORMWATER MANAGEMENT PERMIT NO. _____

Date of Application _____
Site Address_____
Plat Name_____
Certified Survey Map_____
Lots No. (s) _____

General Conditions:

(a) All storm water management measures shall be installed in accordance with the approved storm water management plan and this permit.

(b) The Director of Public Works shall be notified at least 3 business days before commencing any work in conjunction with the storm water management plan, and within 3 business days upon completion of the storm water management practices.

(c) Practice installations shall be certified "as built" by a licensed professional engineer. Completed storm water management practices must pass a final inspection by the Director of Public Works or its designee to determine if they are in accordance with the approved storm water management plan and ordinance.

(d) The Director of Public Works shall be notified of any significant proposed modifications to an approved storm water management plan.

(e) All storm water management practices shall be maintained in accordance with the storm water management plan until the practices either become the responsibility of the Village of Hartland, or are transferred to subsequent private owners as specified in the approved maintenance agreement.

(f) The Village of Hartland is authorized to perform any work or operations necessary to bring storm water management measures into conformance with the approved storm water management plan, and consent to a special assessment or charge against the property as authorized under subch. VII of ch. 66, Wis. Stats., or to charging such costs against the financial guarantee posted under S.10.

(g) If so directed by the Director of Public Works, all damage to adjoining facilities and drainage ways caused by runoff, where such damage is caused by activities that are not in compliance with the approved storm water management plan shall be repaired at the permitee's expense.

(h) Access is permitted to the Director of Public Works or its designee for the purpose of inspecting the property for compliance with the approved storm water management plan and this permit.

APPLICANT MUST FILL IN BOXED AREA

Owner _____
(please print or type full name)
Address_____
_____
_____
Signature or Owner or Authorized Representative

Gross Aggregate Area (Square Feet) _____

SPECIAL CONDITIONS: _____
_____
_____
_____

CONDITIONAL APPROVAL: _____

Administrative Authority Title Date

Permit VALID for a period of twelve (12) months from date of issuance by Director of Public Works and all work must be completed prior to the expiration unless authorized in writing from the Director of Public Works.

Village of Hartland
Stormwater Management Plan

Financial Guarantee

To: [permit holders name]
Date:
Subject: **Financial Guarantee** in the Amount of $_____
Check # _____ Received by (staff initials): _____

Project Name: _____

Location: Section [no.], Town of [public land survey township name]

This memo shall serve as a receipt for the above noted Financial Guarantee and as an agreement of the purpose and conditions for release by the Village of Hartland (herein referred to as the "Village").

Authority.
The authority of the Village to collect and hold this Financial Guarantee is stated in Chapter___, Section ___ of the Village of Hartland Code of Ordinances – Stormwater Management Zoning Ordinance (herein referred to as the "Ordinance").

Purpose.
The purpose of this Financial Guarantee is to ensure compliance with the Ordinance and the terms and conditions of a Stormwater Management Permit issued for the above noted project and location.

Conditions For Release.
Terms for release of the Financial Guarantee shall include all of the following:

1. Construction Certification. A professional engineer licensed in Wisconsin shall certify that construction of all stormwater management practices comply with the approved plans and the technical standards of the Village. "As-built" plans shall be submitted for stormwater management practices showing actual location, elevations, materials, construction methods and other items as deemed necessary by the Village to determine compliance.

2. Maintenance Agreement. A copy of an approved maintenance agreement for all stormwater management practices associated with this project must be provided to the Village. The agreement shall be stamped by the Register of Deeds, showing that it has been recorded for all applicable properties.

3. Final Inspection. The Village shall complete a final inspection of the property and certify compliance with the permit and the Ordinance.

If the Village should use any portion of the Financial Guarantee to complete permit activities, due to default or improper action by the permit holder, the Village shall withhold any amounts owed for this work, in accordance with the Ordinance.