Town of Dunn

STORM WATER QUALITY MANAGEMENT PLAN

Date: March 30, 2010

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Engineering for a Rainy Day

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Town of Dunn Stormwater Quality Management Plan
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I.Executive Summary

The Town of Dunn (Town) is located in south central Dane County, 1/2 mile south of the City of Madison including the majority of the lake frontage for Lakes Waubesa and Kegonsa (Lakes). Stormwater runoff pollutants can cause problems in receiving waters including algal blooms, fish kills, fish reproduction issues, loss of benthic habitat, lack of water clarity and loss of recreational use (fishing, swimming, boating). The purpose of this report is to describe existing and proposed practices to control stormwater runoff and mitigate the detrimental impact of stormwater runoff pollution.

Major portions of the plan include:

- An inventory of all of the major and minor outfalls (point of concentrated discharge) into the Lakes,
- Public education efforts to inform the public about stormwater pollution and modification of their day-to-day activities that may cause stormwater pollution,
- Screening for illicit discharge connections into the storm water conveyance system,
- Updating and adopting ordinances to control stormwater pollution.

The existing Town Best Management Practices (BMP) controlling stormwater runoff pollution include:

- Annual maintenance of grassed swales along all roadways,
- Purchase of Development Rights (PDR) program,
- Detention basins at Colladay Point, County Highway B, Dunn Heritage Park,
- Rain gardens at Barber Drive Condominiums, Willow Court, Camp Leonard Road and
- Agricultural Enterprise Area.

The proposed Town practices to increase control of stormwater runoff pollution include:

- County Highway B/AB Swale Prairie Restoration,
- Assist in updating Agricultural Fields Inventory (Total Phosphorus, Working Land Initiative checklist and Snap-Plus modeling),
- Erosion control protection for materials storage piles at Town Transfer Site and Town Garage,
- Placing rock check dams in selected steep grassed swales, and
- Remove sediment from Dunn Heritage Park Ponds.

A stormwater pollution model generated for the 642.6 acre Urbanized Area of the Town documented a 51.9% reduction in Total Suspended Solids and 34.7 % reduction in Total Phosphorus average annual loading from the grassed swales alone when compared to no controls.

II. Introduction and Background

The Town of Dunn (Town) is located in south central Dane County, 1/2 mile south of the City of Madison, directly south of the village of McFarland and directly east of the City of Fitchburg and the Village of Oregon as shown in Figure 1. The Town area is 34.1 square miles including the majority of the lake frontage for Lakes Waubesa and Kegonsa (Lakes).

The Town land use has over 70% of the total land area classified as crop and pasture (1990) with small pockets of residential and commercial land use. Preserving agricultural lands, farm operations and open spaces in the Town is a major objective of the future land use zoning plan. The residential land use is primarily rural residential subdivisions along or close to the Lakes. The 2000 Census population for the Town is 5,270 people and the population is projected to remain stable at approximately 5,300 people for the next twenty years.

Stormwater runoff refers to precipitation that does not infiltrate into the ground or evaporate but instead flows overland through stormwater conveyance systems into adjoining lakes, rivers and streams. In the Town, these stormwater conveyance systems are all grassed swales- which refer to the grass-lined ditches on one or both sides of most roadways.

Stormwater runoff contains a number of surface water pollutants including suspended solids, nutrients (Nitrogen and Phosphorus), oil and grease, heavy metals (zinc, lead and copper), Chemical Oxygen Demand (COD) and others. Stormwater runoff pollutants can cause problems in receiving waters including algal blooms, fish kills, fish reproduction issues, loss of benthic habitat, lack of water clarity and loss of recreational use (fishing, swimming, boating).

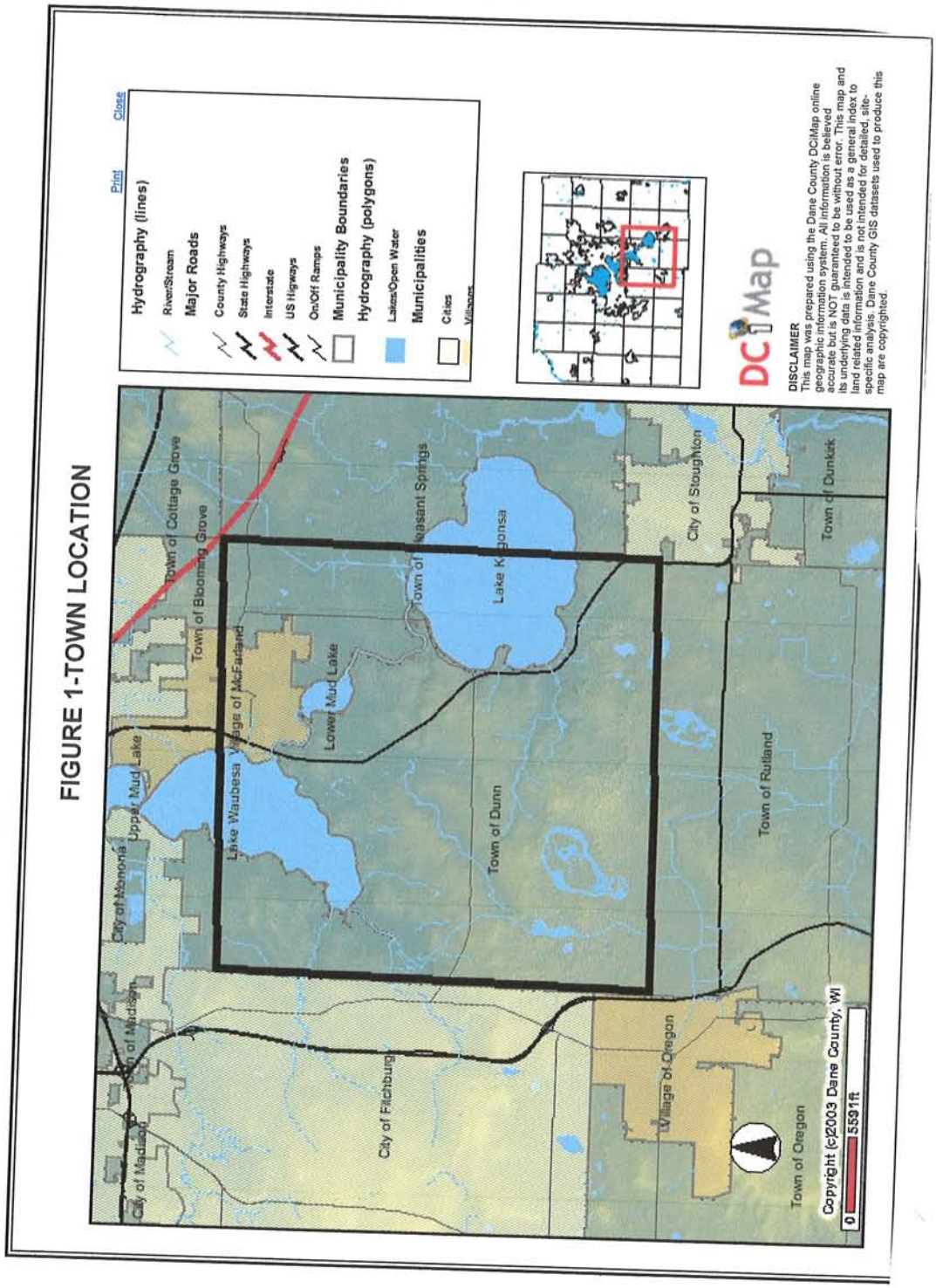
The Town is located in the Badfish Creek, Yahara River and Lake Kegonsa watersheds and the majority of the stormwater runoff drains directly to the Lakes.

- Badfish Creek- 5.39 square miles
- Lake Waubesa- 9.03 square miles
- Lake Kegonsa- 19.68 square miles

Polluted stormwater runoff comes from several major sources within the Town including:

- residential,
- agricultural,
- industrial and commercial (Business Parks, Strip Malls etc) and
- construction sites.

FIGURE 1-TOWN LOCATION



Of these four sources, the residential stormwater runoff pollution source within the Town is minor because:

- Single family residential neighborhoods all have large lot sizes (the Town restricts single family development in new plats to 1 acre in size or greater). These larger lot sizes translate to minimal runoff during most storm events due to the extensive vegetated areas surrounding the paved areas (houses and driveways).
- once undeveloped areas are annexed to the neighboring villages and cities, more dense development is allowed with a corresponding higher pollutant load.
- The small amount of runoff from individual residential sites, during heavy intense storms, drains through a grassed swale stormwater conveyance system. These grassed swales, if configured properly, can remove from 40%-60% of the Total Suspended Solids (Reference #1).

PURPOSE OF PLAN

The purpose of this stormwater management plan is to address the existing and proposed practices affecting the stormwater pollution load from urban areas of the Town including single family residential rural subdivisions, industrial and commercial areas. Other agencies are addressing stormwater runoff pollution from the other three sources (listed above):

- Stormwater runoff pollution from agricultural sites within the Town is addressed by the Land Conservation Division of the Dane County Land and Water Resources Department (LCD) through voluntary implementation of soil conservation and agricultural pollution control measures working with local farmers.
- The LCD is also responsible for review, inspection and maintenance of construction and post-construction erosion control and stormwater facilities for new residential and commercial developments. The WDNR also provides construction and post-construction permit review and approval for sites with over one acre of land disturbance for residential developments and all commercial developments with no land disturbance minimum.

GOAL AND OBJECTIVES OF PLAN

The goal of this stormwater plan (Plan) is to address the broader stormwater pollution problem within the context of the Towns minimal contribution to the overall urban stormwater pollutant load. The following recommendations are listed in the Dane County Water Quality Plan (2004, Page 47) under "URBAN NONPOINT SOURCE CONTROL RECOMMENDATIONS":

> **U-1: All urbanizing units of government should develop comprehensive stormwater management plans that account for water quality and quantity, that encourage infiltration of stormwater, and that are integrated into the long-term land use and open space plans of the area. Stormwater management plans should attempt to mitigate the adverse impacts of development on water resources to the maximum extent practicable.**

U–2: Management agencies should promote land use patterns and practices which preserve the integrity of the natural hydrologic system, including the balance between groundwater and surface water. Require future development to implement infiltration measures, wherever practicable, as a means of controlling stormwater impacts and ensuring groundwater recharge.
U–3: Designated municipalities should implement the state NR 216, NR 151, and federal Phase II stormwater regulations along with the existing Erosion Control and Stormwater Management Ordinance (Chap. 14). Other municipalities should consider developing consistent programs, ordinances, and requirements.

U–5: Prepare specific watershed plans incorporating flow and water quality management practices for all existing and developing urban drainage basins. Where possible, such plans should be prepared in the context of comprehensive watershed water quality plans.

U–6 A coordinated stormwater management plan should be developed for all communities in the municipal NR 216 stormwater permit area.

U–7 Eligible units of government should apply for funding through the DNR Targeted Runoff Management or Urban Nonpoint Pollution grant programs to develop stormwater management plans and install practices that control urban stormwater impacts.

U–8: Management agencies should promote open drainage systems incorporating detention and infiltration areas and natural greenways in developing areas.

U–9: Urban management agencies should work cooperatively with state and local agencies to incorporate stormwater infiltration practices into local erosion control/stormwater management ordinances. Infiltration practices should be designed to protect the groundwater.

U–10: Evaluate and promote potential approaches for enhancing or improving sediment and phosphorus removal in the design, operation, and maintenance of urban drainage systems.

U–12: Design urban drainage systems and associated land use practices to minimize the potential for toxic or hazardous materials being washed or discharged into surface waters, with emphasis on source control.

U–14: Urban management agencies should enact and enforce leaf, yard, and garden debris storage and disposal ordinances in urban areas, including leaf pick-up in the fall, with emphasis on keeping leaves and yard waste off of streets and paved surfaces.

U–15: Urban management agencies should include provisions in building codes and ordinances to require that, wherever feasible, drainage from roofs, driveways, and parking lots be directed toward grassed or vegetated areas, rather than paved areas or storm sewers.

U–16: Conduct aggressive public education and information programs regarding source control, on an annual basis.

U–17: Improve the water quality protection and effectiveness of street sweeping by providing frequent (weekly to biweekly) sweeping of streets in commercial and industrial areas, and regular (biweekly to monthly) sweeping of residential streets, with extra efforts at thoroughly cleaning all streets in early spring and late autumn. Vacuum sweepers should be used where feasible because of greater removal effectiveness.

U–18: Continue to expand efforts to reduce ground and surface water impacts associated with road salt storage and use, and snow removal, including alternative materials and approaches.

The purpose of this plan is to discuss these recommendations as they relate to the Town residents, activities and operations. Specifically items U-1, U-3, U-4, U-5,U-9, U-10, U-12, U-14, U-15 and U-16 described above will be addressed in this plan.

The Town has also developed a Comprehensive Plan with numerous goals and actions. This plan will focus on meeting Goal #2 of the Comprehensive Plan. *(Town of Dunn Comprehensive Plan Goals, Policies, Objectives, Actions, Section 3 Agricultural, Cultural,& Natural Resources Plan, page 3-2 and 3-3*)

Goal 2: Protect the Town's natural resources.

2-2:Respect the capacity and quality of Dunn's wetland, surface and groundwater resources and strive to improve these resources.

Action 2-2a: Work with other organizations and government agencies to identify disturbed or degraded lakeshore and wetland areas that are important to water quality and support efforts to restore and improve such areas.
Action 2-2b: Require strategies to address the potential impacts of development on water quality and quantity in Dunn's streams, rivers, lakes, wetlands and groundwater aquifers. Such strategies could include buffers, setbacks and/or best management practices for erosion control and stormwater management.
Action 2-2c: When possible, promote pervious pavements, bioswales and other techniques to reduce impervious surfaces and stormwater runoff.
Action 2-2d: Work to maintain groundwater levels and quality within the Town by supporting efforts to identify and protect groundwater recharge areas in the Town.
Action 2-2e: Work with the Department of Natural Resources and Dane County to manage lake levels in the Town.

2-3: Prohibit development in areas that possess valuable natural resource characteristics, such as floodplains, wetlands, viewsheds and wildlife habitats.

Action 2-3a: Request rezoning of important wetlands and lands unsuitable for development and appropriate buffer areas for conservation and protection. These include the following areas:
·
Alsmo's Addition Yahara Park Plat
· Fishcamp/DNR area

Action 2-3b: Discourage filling or developing of floodplains and/or wetlands and areas within 100 feet of them for new development.
Action 2-3c: Follow Dane County mineral extraction ordinances and reclamation plans.
Action 2-3d: Require that agencies responsible for the location of public improvements such as highways, pipelines or power lines, recognize and not violate the intent of the Town's goals and policies for protecting natural resources.

On January 19, 2006, a Wisconsin Pollutant Discharge Elimination System (WPDES) stormwater discharge permit was issued from the WDNR regulating stormwater discharge from selected Town urbanized areas (UA) into adjoining rivers, streams and lakes. (Permit #WI-S050075-1-herein after referred to "Permit"). This Permit affects only Town UA as delineated in the 2000 census and shown in Figure 2a-c (See section VI). The permit contains the following major conditions that are also met as objectives of this plan.

- Public Education and Outreach (Section 2.1 of Permit Conditions),
- Public Input and Involvement (Section 2.2 of Permit Conditions),
- Illicit Discharge Detection and Elimination (Section 2.3 of Permit Conditions),
- Pollution Prevention (Section 2.6 of Permit Conditions),
- Stormwater Quantity Management (Section 2.7 of Permit Conditions).

In the following sections of this report, permitted terms and conditions are clearly noted in a separate subsection ("PERMIT") in *italics* listing the permit requirements and **bold** for the response.

Please note that the following Permit Conditions are met by others or by the Town in separate submittals:

- Construction Site Pollution Control (Section 2.4 of Permit Conditions)-Condition being met by LCD (see above).
- Post-Construction Stormwater Management (Section 2.5 of Permit Conditions)-Condition being met by LCD (see above).
- Stormwater System Map (Section 2.8 of the Permit Conditions)- Previously submitted September, 2008.
- Annual Report (Section 2.9 of the Permit Conditions) –previously submitted March 31 of 2007, 2008 and 2009.

III. Public Education and Input

Stormwater pollution comes from everywhere on the Town landscape including the day-to-day practices and activities of Town residents. Educating the public about the detrimental impact of stormwater runoff pollution and establishing the linkage between low quality stormwater runoff and algal blooms in the Lakes is a critical first step. This education is particularly critical for the residents living directly on the lakeshore due to the direct site stormwater discharge. As described above, many Town residents are Lake frontage landowners.

The public education and public input effort for the Town can be broken down into three major categories- existing, permitted and proposed practices as described below: Please note that public input and public education are closely related and described jointly below since each public education effort is also a public input opportunity. In other words, increased public awareness of stormwater pollution results in increased public input.

EXISTING

The Town has developed and implemented an extensive multi-media approach to public education including:

- **Annual meetings**- The Town holds an annual meeting for all Town residents during the second Tuesday in April. Since 2007, each annual meeting included a presentation on stormwater runoff pollution. The DVD titled "Dane Waters- A Reflection of Us All" was shown during the 2007 meeting. Typically, between 50-100 residents attend the meeting.
- **Articles in Town Newsletter**-A newsletter is published in the Spring (April) and in the Fall (November) and distributed to all Town residents. Within the last three years, each newsletter contained one stormwater article focusing on:
    - Fall 2006, "Stormwater Management" (General) And "Stormwater Management Tips",
    - Spring 2007- "Stormwater Management with Rain Gardens",
    - Spring 2008- Springtime brings more than Flowers with those Showers",
    - Fall 2008- Top Five Ways to Help Dane Counties Lakes and Streams,
    - Fall 2008- "Pet Waste Pickup",
    - Spring 2009- "Plant Dane! Cost-Share Program", and
    - Fall 2009- Help Keep the Lakes Clean: Prevent Illicit Discharge.

These newsletter articles are listed in Appendix A.

- **Web-site**- The Town has developed a separate tab titled "Storm Water" on the main page of the Town website (www.town.dunn.wi.us) to educate residents about stormwater pollution. Upon selecting this Tab, the following submenu appears with links to the following articles/information:

- Properly Disposing of Pet Waste
- Link to Current Lake Level Data from Dane County

- Storm water management info - Click below for Five Great ways to protect our waterways -Ways to Help Dane County Lakes and Streams
- Information on Erosion Control/Shoreland Erosion Control and Stormwater Management Permits
- Advice on Preventing Pollution During the Springtime Melt
- Information on My Fair Lakes' DVD "Dane Waters: A Reflection of Us All":- http://myfairlakes.com/dvdRelease.asp
- Storm Water MS4 Information
- Storm Water MS4 Permit Summary
- Storm Water MS4 Permit
- Storm Water MS4 Annual Report

- **"Dane Waters- A Reflection of Us All" DVD-** A copy of this DVD is kept at the Town Hall and available for private citizen use. As described above, information about the DVD is on the Town website and also was shown at an annual Town Meeting. The "Dane Water DVD" link on the Town website also allows the on-line viewing of the DVD and a DVD downloading option.
- **Stormwater Pollution Brochures-** Various stormwater education brochures are displayed at the Town Hall for residents use. (See permitted activities below)
- **Recycling-** The Town has mandatory recycling ordinances and continually educates the public about recycling. (See permitted activities below)

PERMITTED

Two major requirements of the Permit are "Public Education" and "Public Input". The Town previously has prepared and submitted the program below which specifically addresses the Permit requirements and the Town response. This program was reviewed by Laura Bub of the WDNR on October 14, 2008 and the additional comments based on her review are also noted below.

PROPOSED PUBLIC EDUCATION AND OUTREACH AND PUBLIC INPUT AND INVOLVEMENT PROGRAM

1. Section *V(a): A formal Public Education and Outreach program is presented below as required in section 2.1 of the permit, including measurable goals including elements detailed in sections 2.1.1 through 2.1.8 (with responses noted in* ***bold and bold italics based on WDNR input 10/14/08)*** *.*

   2.1.1 Promote detection and elimination of illicit discharges and water quality impacts associated with such discharges from municipal separate storm sewer

systems. **- The Urbanized Area (UA) of the Town of Dunn (Town) is almost all residential and the MS4s are all above ground ditches. The only type of illicit discharge connections possible in this area are private swimming pool drainage, carpet cleaning or car wash discharge. Therefore, *in future years*, we will place articles on our newsletter/website targeting the reduction of these types of illicit discharge and alerting residents to watch for any of this activity.**

We intend to publish articles in our newsletter/website every year covering a stormwater pollution issue that directly relates to the Town residents as follows:

- 2009- Illicit discharge connections,

- 2010- Automobile maintenance (car washing, oil leaks, changing oil),

- 2011- Proper disposal of household waste.

2.1.2 Inform and educate the public about the proper management of materials that may cause storm water pollution from sources including automobiles, pet waste, household hazardous waste and household practices. **An article covering the proper disposal of these items has already been included in our 2007 newsletter and posted on our website titled "Top Five Ways to Help Dane County Lakes and Streams" Item #5 of this article covers the proper disposal of motor oil, antifreeze etc. Our goal for 2008 is to include an article on pet waste in our newsletter/website. *The proposed newsletter topics for the remaining years of the permit are listed above in 2.1.1.***

We have also placed a three panel poster "Keep Stormwater Clean" depicting stormwater runoff issues/concerns prominently in our meeting room of Town Hall. This room is the town board meeting/public voting place and is highly visible due to a large amount of pedestrian traffic.

2.1.*3 Promote beneficial onsite reuse of leaves and grass clippings and proper use of lawn and garden fertilizers and pesticides.* **Composting is encouraged to all residents and is covered as item #3 in the stormwater article in our 2007 newsletter/website. No curbside pickup of leaves/grass clippings is provided by the Town so there is no reason for the residents to put the yard waste there. As noted in section V.f of our 2007 Annual Report, a compost pile is provided at our town transfer site and articles on composting in every bi-annual newsletter. We have an entire section of our web-site dedicated to recycling. We require recycling of yard waste as part of our Recycling Ordinance. *The proposed newsletter topics for the remaining years of the permit are listed above in 2.1.1***

2.1.4 *Promote the management of streambanks and shorelines by riparian landowners to minimize erosion and restore and enhance the ecological value of waterways.*

Since the use of buffers is critical to the health of the Yahara chain of lakes, we will proactively educate all riparian homeowners of the need to install stream buffers and repair actively eroding creek banks through the use of fliers in the Town Hall and information posted on our web-site. The town staff repairs any noted erosion in roadside ditches or riparian areas owned by the Town (Town Parks). Since much of the UA is still agricultural, the Dane County Land Conservation Department (LCD) actively works with farmers to repair stream banks on private lands.

Most of the population of Dunn's Urbanized Area (UA) consists of Lake Waubesa and Kegonsa lake frontage lots. These landowners are already taking steps to minimize erosion on their frontage because the valuable lake frontage would be lost if erosion did occur. During the storm water outfall identification period, we will identify any actively eroding areas by boat from the Lake and target these landowners (if any) with educational pieces on shoreline protection.

2.1.5 *Promote infiltration of residential storm water runoff from rooftop downspouts, driveways and sidewalks.* **Due to the large lot size (1/2 acres is minimum lot size) and lack of curb and gutter, almost all downspouts are disconnected already.** ***We have already posted articles in our web-site/newsletter on rain gardens and will continue to promote water conservation practices and re-use such as rain barrels. Rain barrels were covered in our 2010 Annual Town Meeting.***

2.1.6 Inform and where appropriate educate those responsible for the design, installation, and maintenance of construction site erosion control practices and storm water management facilities on how to design, install and maintain the practices.- **This education is handled by the Dane County Land Conservation Department for the Town. However, in our "Stormwater" section of our website, we provide a link to "Information on Erosion Control/Shoreland Erosion Control and Stormwater Management Permits" which contains Dane County permitting information.**

2.1.7 *Identify businesses and activities that may pose a storm water contamination concern, and where appropriate, educate specific audiences on methods of storm water pollution prevention.-* **The only businesses within the urbanized area are Halverson's Restaurant, Barbers Bay Inn, Quick-Stop**

Gas Station and Quam's Marine. These businesses will be targeted with stormwater pollution information specific to the commercial land use.

2.1.8 *Promote environmentally sensitive land development designs by developers and designers.*

Dunn is a leader in the state for preserving farmland and open space through the Purchase of Development Rights (PDR). Since the PDR program started in 1997, the town has protected 23 farms totaling 2,823 acres of land. We also promote environmentally sensitive design by providing an entire section on "stormwater" on our website including links to Dane County Erosion Control and Stormwater Permits (See 2.1.6 above), our storm water permit annual report, Myfairlakes and various stormwater articles.

A measurable goal for this public education will be one article in one of our bi-annual newsletters every year of the permit and posted on our website.

We will also promote the DVD titled "Dane Waters: A reflection of us all" for town resident's use. ***The distribution of this DVD will be actively targeted to the following active local organizations:***

- ***2008 contact- Waubesa Beach Neighborhood Association, Jeff Hodgson (President), 2985 Waubesa Ave, Madison, WI 53711 Phone: 608-224-0203***
- ***2008 contact- Oregon Sportsmens Club, Bryan Jensen (President), 5414 CTH CC, Oregon, WI 53575 Phone: 608-835-5419***
- ***2009 contact- Madison Retrievers Club, Carol Hynes, 747 Center Rd., Stoughton, WI 53589-3919, Phone: 608-235-9158***
- ***2009 contact- Friends of Lake Kegonsa (F.O.L.K.S.) Bob Arndt (President), PO Box 173, Stoughton, WI 53589 Phone: 608-877-8540***
- ***2009 contact - Boy Scout Troop 620, Susan Richards, 2020 Hawkinson Rd, Oregon, WI 53575 Phone: 608-873-8205***
- **2010 contact -Lake Waubesa Conservation Association-** ***(please note the Lake Waubesa Conservation Association (LWCA) is no longer active. Therefore, we will re- contact the Boy Scout Troop #620 in 2010 to replace the LWCA.)***

We will contact these groups and offer to make a presentation combined with a DVD showing at an upcoming meeting. We also plan to link information about the DVD on our webpage.

3. *Section V(b): A formal Public Involvement and Participation program is presented below and actively involves various target groups in the community and includes measurable goals.*

Response (in bold) The Town of Dunn (Town) Public Involvement and Participation program will consist of the following:

- Posting of the annual report and summary of activities on our web-site by March 1,

- Agenda item for discussion at our Annual Town Residents Meeting held the second Tuesday in April,

- Progress reports at monthly Town Board meeting several times each year (unscheduled),

-Targeting and presenting the Dane Waters DVD to one volunteer/local group *(start with the Waubesa Beach Neighborhood Association and continue with other local groups as noted above in public education and outreach requirements.*

- Continue administering the "Adopt a Highway" program- We have set up an Adopt-a Highway program that encourages volunteer efforts to pick up Town roads including the MS4 ditches. To date we have the following groups participating on an annual basis:

- ***Waubesa Beach Neighborhood Association, contact: Jeff Hodgson, Phone: 608-224-0203***
- ***Waubesa Snowbirds Snowmobile Club, contact: Rod Holden, Phone 608-838-9013***
- ***Covenant Lutheran Youth Group, contact: Dan Oakland Phone: 608-873-4987***
- ***Ackerland LLC, contact: Paul Acker Phone: 608-877-4311***
- ***Christ the King Church, McFarland, contact: Frank Meyers Phone 608-838-8118***

A measurable goal will be the achievement of these five items during every year of the permit.

PROPOSED

- **Place educational signs near stormwater BMPs-** As described below, the Town has installed a number of stormwater BMPs including grassed swales, sediment basins and rain gardens. Signs are proposed to be placed at these locations educating the public

about the benefits of the stormwater BMP in terms of reducing stormwater pollution. A "Rain Garden" sign, for example is available from Dane County at no cost. Additional specialized signs can be fabricated at a small cost to the Town.

- **Promote Adopt a Highway pickup-** As described above (in permitted section), the Town has five voluntary groups involved in "Adopt-a-Highway" pickup of local roads which includes the roadside ditches. These grassed swales are extremely important component of the treatment of stormwater prior to discharge in the Lakes. The expansion of this program is proposed to educate the public about the importance of clearing debris from this area and repairing vegetated areas.
- **Targeted voluntary groups to disseminate information-** Although a copy of the "Dane Waters" DVD is kept at City Hall, various voluntary groups have been targeted to present this DVD to at a future meeting. (See permitted activities below).
- **Promote Erosion Control watch group-** Since stormwater pollution comes from primarily erosion control sites in the residential, urban setting, forming citizens group to watch and report on failing erosion control measures on construction sites is proposed to educate the public. For example, a voluntary group such as a local boy scout troop could be trained to actively monitor construction sites.
- **Educate Farmers on Agricultural Practices-** Many of the areas outside of the UA are agricultural. Recent studies have indicated that that major source of phosphorus is from agricultural fields. The current law specifies that cost-share dollars must be provided in order for Farmers to construct and implement agricultural BMPs. Although agricultural BMP are addressed by working directly with the County LCD, The Town can assist in getting the word out to Farmers concerning new several new cost-share programs such as the USDA Mississippi River Basin.
- **Educate Children-** Integrating aspects of stormwater pollution in the educational curriculum of grades-schoolers and middle-schoolers will also be investigated.
- **Stormwater Fliers inserted in Tax Bill-** Placing a small one-page flier in the annual tax bill that is sent out to each resident is proposed. This flier will list stormwater activities "does and don't" for every –day residential activities such as car-washing, pet waste pickup and car oil leaks.

IV. Stormwater Inventory and Subwatersheds

The Town owns and operates the storm water conveyance system which collects and routes stormwater from the individual parcels to the receiving body of water. This stormwater conveyance system is also called the Municipally Owned Separate Storm Sewer System or MS4. The Town MS4 is comprised of grassed swales which refer to the open channel along the roadways in the Town.

The Town UA MS4 was inventoried and divided into the following categories:

- 10 Major outfalls- defined as a grassed swale discharging to the Lakes with a cross-sectional area greater than 7.55 square feet and a drainage area of over 50 acres.
- 15 Minor outfalls- defined as outfalls that are not major.

Table 1
Major Outfalls in Town UA

Outfall Location	Outfall Type	Outfall Receiving Water
Woodland Rd-N.of Orvoid Park Drive	Drainage way	Yahara River
County Highway AB-N. of Fish Camp Road	36-inch Pipe Culvert	Yahara River
Hwy 51/CTH AB	36" X 72" Box Culvert	Lake Kegonsa
Colladay Point	32" X 48" Box Culvert	Lake Kegonsa
Barber-North	36" X 72" Box Culvert	Lake Kegonsa
Barber-Middle	Drainage way	Lake Kegonsa
Barber-South	Drainage way	Lake Kegonsa
Mallard	Drainage way	Lake Kegonsa
Aalseth	Drainage way	Lake Kegonsa
Petta Lane	29" by 45" elliptical pipe	Lake Waubesa

Table 2
Minor Outfalls in Town UA

Outfall Location	Outfall Type	Outfall Receiving Water
CTH AB S. of Stoney Point	Drainage way	Lake Kegonsa
Quam Point-West	24" pipe culvert	Lake Kegonsa
Quam Point- East	16" pipe Culvert	Lake Kegonsa
Quam Point-South	Drainage way	Lake Kegonsa
Aalseth-West	Drainage way	Lake Kegonsa
Aalseth-East	18" pipe culvert	Lake Kegonsa
Willow- East	18" pipe Culvert	Lake Waubesa

Outfall Location	Outfall Type	Outfall Receiving Water
Willow- West	Drainage way	Lake Waubesa
Morris Park- North	24" pipe Culvert	Lake Waubesa
Morris Park-South	Drainage way	Lake Waubesa
Jordan- East	18" pipe Culvert	Lake Waubesa
Jordan- West	Drainage way	Lake Waubesa
CTH B/Mahoney	22" X 34" Horizontal elliptical	Lake Waubesa
Tower	24" Culvert Pipe	Lake Waubesa
Hillpoint	30" pipe Culvert	Lake Waubesa

In addition, the Town has constructed and maintains the following BMPs to treat stormwater runoff:

Table 3
Town Existing BMPs

Location	Type	Receiving Water Outfall
Dunn-Heritage Park	Sediment/Silt Basins	Lake Kegonsa
Colladay Point	Sediment/Silt Basins	Lake Kegonsa
4+6 (Barber Drive) Condiminiums	Rain Gardens (privately maintained)	Lake Kegonsa
Willow Court	Rain Gardens (privately maintained)	Lake Waubesa
UW Experimental Site (South of "B")	Infiltration Basin	Lake Kegonsa
Camp Leonard Road	Rain Gardens (privately maintained)	Lake Waubesa

The location of the major and minor outfalls and the existing BMPs are shown in Figure 2a-c.

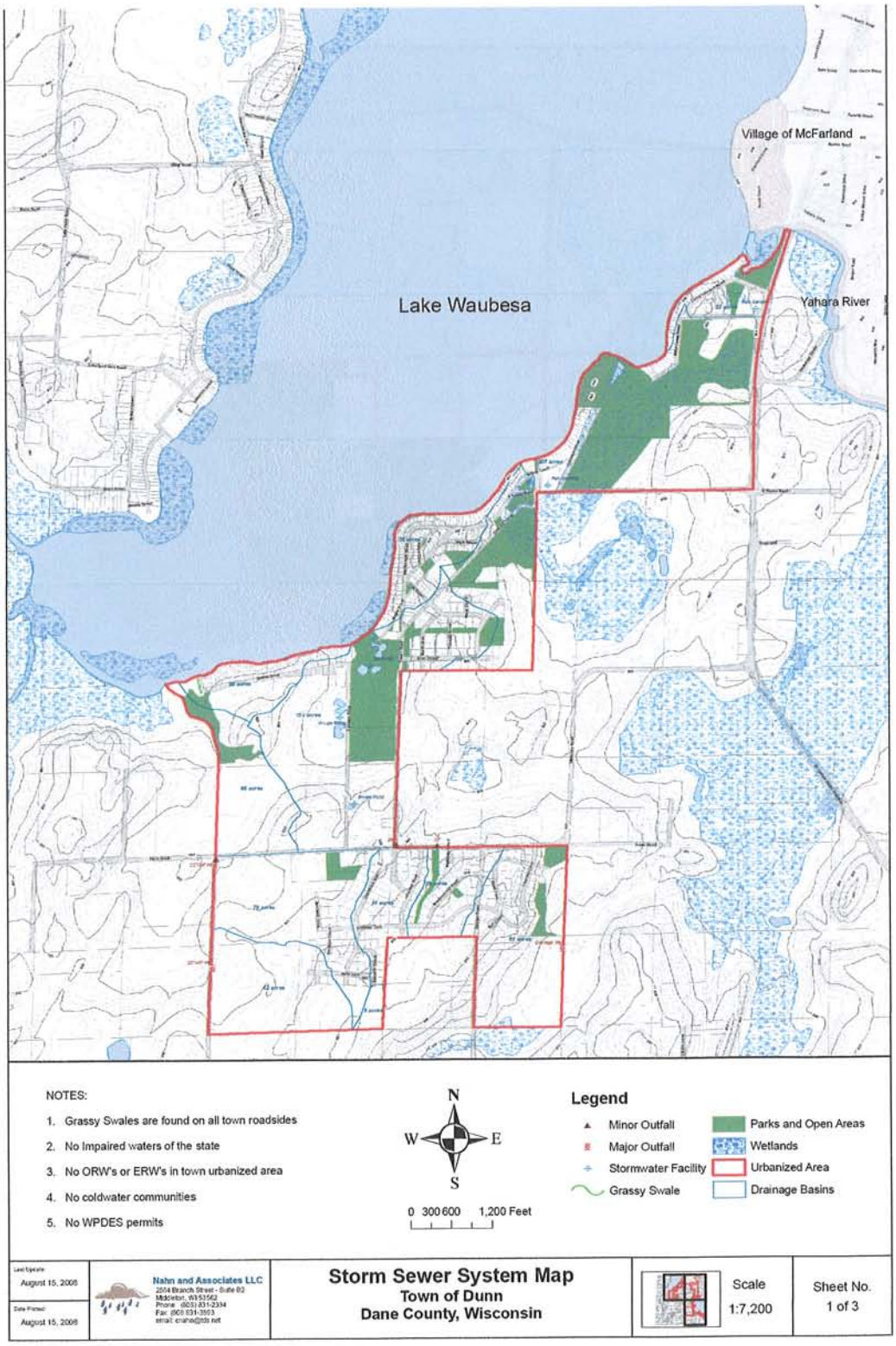


Figure 2a- Major and Minor outfalls and existing BMPS with Town UA

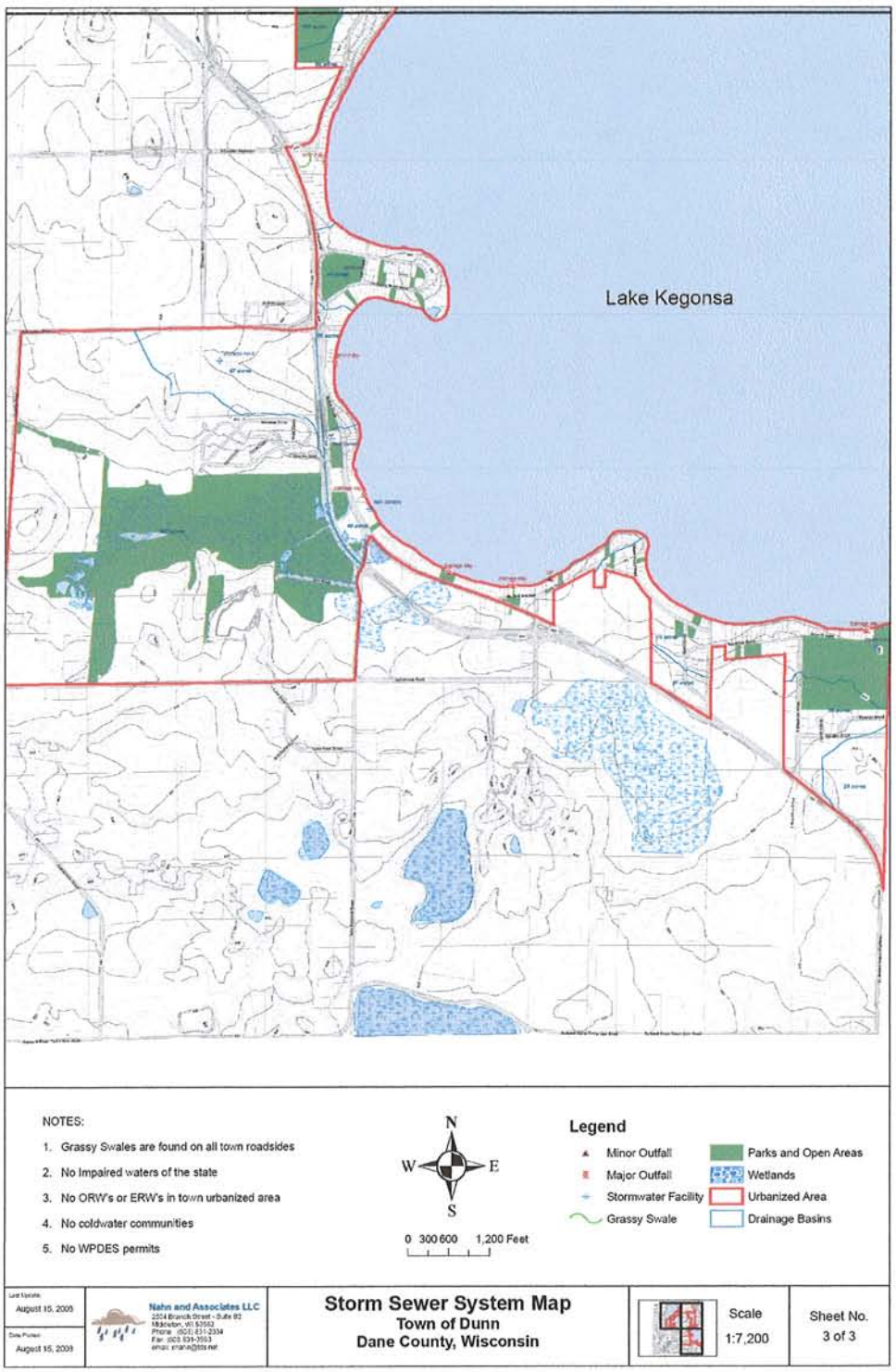


Figure 2c- Major and Minor outfalls and existing BMPS with Town UA

V. Illicit Discharge Detection and Elimination

PERMITTED

2.3 Illicit Discharge Detection and Elimination
The permittee shall develop, implement and enforce a program to detect and remove illicit connections and discharges to the MS4. The program shall include measurable goals and include all of the following:

The Town Illicit Discharge Detection and Elimination program includes screening for illicit discharges and adopting an illicit discharge ordinance. The measurable goals are no illicit discharges into the Town MS4 and immediate cleanup of spills by the responsible party.

2.3.1 *An ordinance or other regulatory mechanism to prevent and eliminate illicit discharges and connections to the MS4. At a minimum, the ordinance or other regulatory mechanism shall:*

The WDNR model illicit discharge ordinance was adopted by the Town Board on September 17, 2007 and enacted as local ordinance Chapter 14 -6, Illicit Discharge Control (Chapter 14-6-1 to 14-6-10). A copy of this code is shown in Appendix B. Section 14-7-6 (2) expressly prohibits illicit discharge connections.

2.3.1.1 *Prohibit the discharge, spilling or dumping of non-storm water substances or materials into waters of the state or the MS4.*

The WDNR model illicit discharge ordinance was adopted by the Town Board on September 17, 2007 and enacted as local ordinance Chapter 14 -6, Illicit Discharge Control (Chapter 14-6-1 to 14-6-10). A copy of this code is shown in Appendix B. Section 14-6-7 (1)prohibits discharging "pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water" into the Town MS4.

2.3.1.2 *Identify non-storm water discharges or flows that are not considered illicit discharges. Non-storm water discharges that are not considered illicit discharges include water line flushing, landscape irrigation, diverted stream flows, uncontaminated groundwater infiltration, uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, fire fighting and discharges authorized under a WPDES permit unless identified by the permittee as significant source of pollutants to waters of the state.*

2.3.1.3 *Establish inspection and enforcement authority.*
Note*: Chapter NR 815, Wis. Adm. Code, regulates injection wells including storm water injection wells. Construction or use of a well to dispose of storm water directly into groundwater is prohibited under s. NR 815.11(5), Wis. Adm. Code.*

The WDNR model illicit discharge ordinance was adopted by the Town Board on September 17, 2007 and enacted as local ordinance Chapter 14 -6, Illicit Discharge Control (Chapter 14-6-1 to 14-6-10). A copy of this code is shown in Appendix B.

2.3.2 *Initial field screening at all major outfalls during dry weather periods. At a minimum, field screening shall be documented and include:*

As described above (in Section II), due to the almost entirely residential area within the UA and above-ground MS4 discharge system, discovering illicit discharge connections is unlikely due to the small number of possible connections and random nature in which they occur. For example, observing swimming pool or car wash discharge will be unlikely because these activities occur rarely.

The Town MS4 was divided into major and minor outfalls as shown in Figure 3. A major outfall was defined as swale with a cross-sectional area greater than 7.55 square feet (cross sectional area of 1,018 inch 2) which is associated with a drainage area of more than 50 acres. Nine major outfalls were identified for illicit discharge testing located at :

- **Aalseth Lane**
- **Mallard Avenue**
- **Barber Drive (South)**
- **Barber Drive (Middle)**
- **Barber Drive (North)**
- **Colladay Point**
- **Hwy 51/CTH AB**
- **Petta Lane**
- **Woodland Road (North)**
- **CTH AB (North of Fish Camp Road)**

These major outfalls were screened for illicit discharge in August of 2008. Three outfalls were screened for illicit discharge on August 6, 2009 (Petta Lane, Barber Drive (North) and CTH AB (North of Fish Camp). Outfall screening was conducted using the dry weather discharge method. No discharge was observed at any of the outfalls during both screening periods. Copies of the dry weather discharge observation forms are shown in Appendix C for both observation periods.

2.3.2.1 *Visual Observation - A narrative description of visual observations including color, odor, turbidity, oil sheen or surface scum, flow rate and any other relevant observations regarding the potential presence of non-storm water discharges or illicit dumping.*

As described above, no discharge was observed at any of the major outfalls during two dry weather outfall screening periods.

2.3.2.2 *Field Analysis - If flow is observed, a field analysis shall be conducted to determine the presence of illicit non-storm water discharges or illicit dumping. The field analysis shall*

include sampling for pH, total chlorine, total copper, total phenol and detergents, unless the permittee elects instead to use detergent, ammonia, potassium and fluoride as the indicator parameters. Other alternative indicator parameters may be authorized by the Department in writing.

Note: Detergent, ammonia, potassium and fluoride indicator parameters provide a better screening tool to identify whether the flow is contaminated with sanitary or wastewater, and also whether the source is a tap water or a natural source of water. The Center for Watershed Protection (CWP) has illicit discharge identification and elimination guidance available at http://www.cwp.org/idde_verify.htm. The CWP guidance includes illicit discharge field sampling guidance developed by Robert Pitt from the University of Alabama on how best to detect illicit discharges including recommended indicator parameters and associated levels of detection.

As described above, no discharge was observed at any of the major outfalls during two dry weather outfall screening periods.

2.3.2.2.*1* *Field screening points shall, where possible, be located downstream of any source of suspected illicit activity.*

No illicit activity is suspected due to primarily residential land use and above-ground MS4. The screening points were located downstream of the entire UA at the outfall into the Lake or UA boundary.

2.3.2.2.*2* *Field screening points shall be located where practicable at the farthest manhole or other accessible location downstream in the system. Safety of personnel and accessibility of the location shall be considered in making this determination.*

The Town does not have manholes since the entire MS4 is above ground. All outfalls were accessible ditches.

2.3.3 *On-going dry weather field screening of outfalls during the term of the permit. Outfalls that will be evaluated on an on-going basis and the field screening frequency shall be identified. Consideration shall be given to hydrological conditions, total drainage area of the site, population density of the site, traffic density, age of the structures or buildings in the area, history of the area and land use types. A description of this on-going field screening program shall be submitted to the Department in accordance with section 3.3.4.*

The Town has not observed any discharge at any of the major outfalls for two years. No further dry weather outfall screening is planned until the permit expires in 2011. Another dry weather screening is proposed with the expanded UA in 2012.

2.3.*4* *Procedures for responding to known or suspected illicit discharges. At a minimum, procedures shall be established for:*

See specific procedures listed below.

2.3.4.1 *As soon as possible, investigating portions of the MS4 that, based on the results of field screening or other information, indicate a reasonable potential for containing illicit discharges or other sources of non-storm water discharges.*

Results of the field screening indicated no reasonable potential for containing illicit discharges or other sources of non-storm water discharges. A major non-stormwater discharge in residential areas is groundwater discharge from basement waterproofing drain tiles. This discharge is allowable and not considered an illicit discharge source.

2.3.4.2 *Responding to spills that discharge into and/or from the MS4 including tracking and locating the source of the spill if unknown.*

No spills have ever been reported to discharge in the MS4 within the UA with the exception of minor vehicle spill cleanup (oil and antifreeze leaks).

2.3.4.3 *Preventing and containing spills that may discharge into or are already within the MS4.*

If a spill would occur, depending on the location either the Stoughton, Oregon or McFarland Fire Department would be the first responder to contain the spill if the party causing the spill cannot do so. The boundary between the three departments is

- **north of County Highway (CTH) "B" and approximately east of Mahoney Road is McFarland,**
- **south of CTH B and approximately east of Hawkinson Road is Stoughton and**
- **Approximately west of Hawkinson (south of CTH B) and approximately west of Mahoney (north of CTH B) is Oregon.**

The Village of McFarland Fire Department has two trailers filled with spill containment devices- a Decon trailer and Boom trailer. Equipment stored in these trailers includes absorbent pads, snakes and booms. McFarland also has 1000 feet of 6- inch floating water boom to contain spills in the lake in the Boom trailer.

The City of Stoughton Fire Department has a small "New Pig" trailer containing numerous small spill control devices including two styles of spill absorbent pads (regular and super-absorbent), small containment booms, salvage barrels, plastic cover. Each truck carries absorbent material (kitty litter) and tarps and shovels for minor spill cleanup and containment. Larger spills would be routed to the City of Madison HazMat team or Dane County for response and cleanup.

The Village of Oregon Fire Department has a spill containment kit containing several absorbent pads and blocking agents for emergency cleanup of minor spills. Larger spills

would be routed to the City of Madison HazMat team or Dane County for response and cleanup. Five gallon buckets of sawdust are also carried on the truck for cleanup of minor vehicle spills (Such as oil, gas etc)

Depending on the first responder assessment, the City of Madison Level A or Level B Emergency Response Unit may be notified to provide additional spill-specific actions. Level A and Level B response requires full encapsulated suits. The Fire Department will continue to work with the Level A or B response units to prevent further damage and contain the spill.

Section 14-6-9 of the local Town Ordinance (See Appendix B) and State law (State Statute 292.11 and NR 706) requires that the responsible party contain and cleanup all spills. Due to the emergency nature of the spill, the Fire Department/City of Madison Level A/B emergency response unit may contain the spill and leave it to the responsible party to clean-up.

2.3.4.*4* *Notifying the Department immediately in accordance with ch. NR 706, Wis. Adm. Code, in the event that the permittee identifies a spill or release of a hazardous substance, which has resulted or may result in the discharge of pollutants into waters of the state. The Department shall be notified via the 24-hour toll free spill hotline at 1-800-943-0003. The permittee shall cooperate with the Department in efforts to investigate and prevent such discharges from polluting waters of the state.*

The WDNR regional Spill Response Coordinator is Mike Schmoller (608-275-3303) . Mr. Schmoller and the spill hotline will be contacted in the event of a reportable spill in the future.

2.3.4.5 *To the maximum extent practicable, eliminating leakage from sanitary conveyance systems into the MS4.*

All residences with the UA have a sanitary conveyance system operated by either Sanitary District #1,#3 and #4 or Sanitary District #2 (Kegonsa Sanitary District). District #2 stated the following in the December 2009 newsletter:

"During the past year we found five basins that were leaking groundwater into the system. We replaced all five basins. We also found four manholes that were leaking clearwater into the system. All four manholes were re-sealed… We are making progress but have a long way to go.. Our service operators have been using the District's sewer camera and have been locating areas where large amounts of water are entering the system."

2.3.4.6 *Providing the Department with advance notice of the time and location of dye testing within a MS4. (Because the dye may get reported to the Department as an illicit discharge or spill, the Department requires prior notification of dye testing.)*

No dye testing is needed because no illicit discharge sources were identified in the initial dry weather screening.

2.3.5 *The permittee shall take appropriate action to remove illicit discharges from its MS4 system as soon as possible. If it will take more than 30 days to remove an illicit connection, the Department shall be contacted to discuss an appropriate action and/or timeframe for removal.*

Town Ordinance Section 14-6-7 prohibits illicit discharges and Section 14-6-8 allows the Town (or other authorized agency) to access the facility as "often as may be necessary to determine compliance". Therefore, if an illicit discharge was ever discovered, the Town would have the authority to require the termination of the discharge and to monitor the facility to confirm that the discharge is terminated.

2.3.6 *In the case of an illicit discharge that originates from the permittee's permitted area and that discharges directly to a municipal separate storm sewer or property under the jurisdiction of*
another municipality, the permittee shall notify the affected municipality within one working day.

The Town UA MS4 only drains directly to the Lake so this section does not apply.

2.3.7 *The name, title and phone number of the individual(s) responsible for responding to reports of illicit discharges and spills shall be included in the illicit discharge response procedure and submitted to the Department in accordance with section 3.3.2.*

Scott Miller is the Deputy Fire Chief of the McFarland Fire District (Telephone number 608- (608) 838-3278) and is the individual responsible for responding to reports of illicit discharges and spills for the Town within the McFarland Fire Department boundaries (North of CTH B and east of Mahoney).

Tony Antoniewicz is a Captain at he Village of Oregon Fire District (Telephone number (608) 835-5587) and is the individual responsible for responding to reports of illicit discharges and spills for the Town within the McFarland Fire Department boundaries (west of Mahoney/Hawkinson).

Scott Wegner is the Assistant Fire Chief at the City of Stoughton Fire District (Telephone Number (608) 209-7753-cell phone and (608) 873-7218-land phone) and is the individual responsible for responding to reports of illicit discharges and spills for the Town within the Stoughton Fire Department boundaries (south of CTH B and east of Hawkinson).

VI. Town Stormwater Ordinance Review and Update

In addition to the Illicit Discharge ordinance (adopted by the Town as part of the Illicit Monitoring requirements of the Permit as described in section V), Town ordinances were reviewed for additional stormwater control language. The existing ordinances listed below provide the Town with legal authority to regulate stormwater runoff pollution primarily by controlling the material that may come in contact with stormwater. The ordinance language is listed in Appendix D.

- Recycling (Chapter 14-5)
- Littering (Chapter 11-15(6)(2)
- Junk Accumulation (Chapter 11-15(6)
- Trash Can Pickup (Chapter 14-3 Section 3)
- Pet Waste Pickup (Chapter 11.6-1-6(e))

The following changes were recommended to the ordinances to increase the Town's legal authority to regulate stormwater runoff pollution.

- Suggest deleting Chapter 11-10 Earth Moving Permit because County has more stringent standards and it is out-of-date.
- Suggest increasing fees on Chapter 11-2
- Pool discharge- Pool Discharge- Suggest adding- "No person shall discharge chemically treated swimming pool discharge onto public property or adjoining private properties.
- Oil leak- Oil leak- "No person shall operate' park or store a motor vehicle so as to cause mud, dirt, stones, or vehicle fluids or lubricants (hereafter referred to as "Debris") to become deposited upon Public Property or upon any private property not owned by said person or upon the surface of any body of water within the Town.

As of the date of this report, these changes to the ordinances are proposed and not formally adopted. These changes will be incorporated in the next Town ordinance update.

VII. Existing and Proposed Best Management Practices (BMPs)

The Town has already implemented many Best Management Practices to control stormwater runoff pollution both within the Town boundary and within the Town UA boundary. BMPs are broadly defined by the Environmental Protection Agency as:

> **"A BMP is a technique, process, activity, or structure used to reduce the pollutant content of a storm water discharge. BMPs include simple nonstructural methods, such as good housekeeping and preventive maintenance. BMPs may also include structural modifications, such as the installation of bioretention measures. BMPs are most effective when used in combination with each other, and customized to meet the specific needs (drainage, materials, activities, etc.) of a given operation. The focus of EPA's general permits is on preventive BMPs, which limit the release of pollutants into storm water discharges. BMPs can also function as treatment controls."**

The purpose of this section of the plan is to describe the existing and proposed BMPs for the Town divided into the two main types-non-structural and structural. Non-structural BMPs refer to a technique, process or activity to control storm water pollution that does not involve a structure while structural BMPs involve structures to control stormwater. Please also note that many of the existing and proposed public education activities (described in section II) and Town ordinance changes (described in Section V and VI) are also non-structural BMPs.

a. EXISTING NON-STRUCTURAL

1. **Grassed Swale Cleaning-** As described below, an existing structural BMP is the extensive system of grassed swales along most roads. The Town has an Adopt-a-Highway program in which local volunteers clean up sections of roadway annually including roadside ditches. The following voluntary groups participate in this program:
    - Waubesa Beach Neighborhood Associations,
    - Waubesa Snowbirds Snowmobile Group,
    - Covenant Lutheran Youth Group,
    - Ackerland LLC and
    - Christ the King Church.

    In addition, the Town staff inspects all grassed swales annually as part of the annual road review in the spring. During this inspection, swales are inspected for erosion, shoulder wash and accumulated debris. Repairs to the ditches are made immediately after the inspection. The grassed swales that are not located alongside roadways (east of Hillpoint Road, south of Oak Street, near Mallard Avenue) are also inspected annually as part of the greenway inspections.

2. **Roadway De-icing**- The Town maintains approximately 64 miles of roadway (128 lane – miles) with de-icing activities during and after winter snow and ice storms. A sand/salt mix is used applied only to intersections, curbs and hills. Some Town roads are never de-iced depending on the severity of the storm. The Town staff engaged in de-icing activities attend annual all-day training sessions in which avoiding the overapplication of salt is covered.

   In the last several years, salt was used as follows:

   - 2004-5 winter- 402.21 tons
   - 2005-6 winter- 399.74 tons
   - 2006-7 winter- 484.59 tons
   - 2007-2008 winter – 510.92 tons

   A four year average is 449.37 tons of salt used per winter season. During an average year 20-25 roadway de-icing trips will occur from late November through early April. Based on these averages, the Town uses approximately 256-321 lbs/lane-mile/snow event. As shown in Appendix E, the Town reports an average usage of 5.5 cubic yards of sand/road-salt mixture per truck per snow event. Since each truck covers 40 to 50 lane-miles and using a density for salt of 2600 lbs/cubic yard yields an average salt application rate of between 114 lbs/lane mile to 143 lbs/lane mile. The WDOT manual specifies a salting rate between 100-300 lbs/lane mile of pre-wetted salt applied to a two-lane road as listed in Appendix E. Therefore, the Town applies road-salt within the recommended rates or slightly over the recommended rates depending on the severity of the storm.

   A comparison of salt usage per municipality is shown in Appendix E. As seen in Appendix E, although the Town average salt application rate may be over the WDOT recommended rates, it is still much less than other Dane County municipalities.

3. **Street Sweeping**- The Town only conducts street sweeping during road reconstruction. As part of the sealcoat process, the contractor is required to sweep up the excess pea gravel as a part of the contract. Typically, sealcoat is used for 5-8 miles of roadway reconstruction every year. The contractor disposes of the street sweeping material properly.

4. **Purchase of Development Rights Program**- The Town PDR is a voluntary farmland protection method that compensates landowners for inhibiting future development on their property. This BMP directly limits the development and corresponding increased stormwater pollutant loading associated with increased paved surfaces. Through this program, the Town has purchased from 2850 to 2900 acres of development rights since 1997. Two major goals of the program are to:

   - Permanently preserve scenic vistas and environmentally significant areas (wetlands, lakes, streams, woodlots etc) and
   - Preserve "buffer zones" around significant environmental and/or agricultural areas.

   Currently, the Town is working on 160 acres of land through the PDR program (two 80-acres parcels). The Town has a prioritized waiting list of over 1000 acres in which land-

owners desire to participate in the PDR program. As the conservation easements developed, a maximum impervious surface amount is determined and recorded in the easement (typically 2% pavement or less).

5. **Good Housekeeping for Town Operations-** Good housekeeping refers to Town practices for reducing stormwater contact with potential contamination materials.

    - Town Garage- The Town garage is not located within the UA but has all liquid materials stored inside consisting of two 100 gallon plastic tanks of hydraulic motor fuel and diesel motor oil. Two tanks of water are stored outside in old oil storage tanks. The Town garage does not have an outdoor storage area- all activities and materials are inside with the exception of the two concrete bins used to store blacktop patch and sand.
    - Salt Storage Shed- The salt is stored under cover at the Town Garage. Any spill piles of salt in loading/unloading exposed to the atmosphere is picked up immediately. The salt storage shed is inspected every other year to meet the requirements of Trans 477.
    - Pesticides/Fertilizer use on Town property (Cemetery, Parks)-The Town operates right parks and one cemetery. Fertilizers, pesticides or any other weed control chemicals are not used on any Town property
    - Town Transfer Site- The Town operates a transfer site ¼ mile east of the Town Hall allowing residents to properly dispose and recycle many materials. Detailed information on the hours, acceptable materials and site operation is listed on the Town website. This BMP provides residents to dispose of the following materials with minimal exposure to stormwater:

        i. Scrap metal,
        ii. Motor Oil,
        iii. Leaves and grass clippings,
        iv. Brush and wood and
        v. Tires.

        This transfer site is locked to prevent unauthorized access during non-operational hours. All transfer activities are supervised by Town Staff. The waste oil tank is stored under cover.

6. **Recycling/Composting-** As described above, the Town has passed an ordinance (Chapter 14-5) which requires citizens to recycle yard waste and recycle various materials. Residents may either compost on–site or take the yard waste to a community compost site.

7. **Assistance to County on Erosion Control and Post-Construction Stormwater Management practices-** As described above, Dane County Land and Water Department –Land Conservation Division (LCD) provides enforcement of both the construction erosion control and post-construction stormwater ordinance (County Chapter 14) for all new development within the Town. The Town inspector provides assistance to Dane

County by checking for the County permit on-site and keeping a copy of the County checklist for erosion control activities. If the Town building inspector notes erosion control violations, Dane County LCD will be notified.

8. **Agricultural BMP Assistance**- Design and implementing BMPs for agricultural sites is the responsibility of the Dane County Land Conservation Division working directly with local farmers. However, the Town has assisted local farmers by filing a petition with the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) to from an "Agricultural Enterprise Area (AEA)" for 11,000 acres of the Town (17.2 square miles). This AEA will allow farmers to obtain tax credits for farming practices contingent on the farm meeting local and state soil and erosion control requirements. Participating in this program is entirely voluntary. Currently, six farms have signed up to participate in this AEA program.

b. <u>PROPOSED NON-STRUCTURAL</u>

1. **Agricultural**- As described above, the agricultural BMPs are partially funded, designed and implemented by working directly with the farmer and the County LCD. However, since 75% of the stormwater pollutant load in the Yahara Lakes watershed is from agricultural sources, agricultural BMPs are also urgently needed. Dane County has recently completed a county wide stormwater quality study (called Yahara Clean) in which agricultural fields and practices were analyzed to determine individual parcels with high pollutant loads. Several of these agricultural parcels were located within the Town. If the Town becomes aware of any issue related to stormwater runoff from an individual field, the County Conservationist at the Dane County LCD will be contacted immediately. The Town can also encourage local Farmers to:

    a. complete the "Working Land Initiative" compliance checklist provided in Appendix F. This checklist is the first step towards participating in the AEA.

    b. Update the inventory of current Soil Phosphorus.

    c. Encourage Farmers to hire a consultant to prepare a Snap-Plus model to determine the source of sediment and phosphorus loading.

2. **Town Transfer Site**- Several large piles of sand and slag sweepings are exposed to stormwater runoff as shown in Figures 3 and 4. These piles should be protected with sediment control devices such as a "sediment sock". Alternatively, the storage areas could be covered with a tarp or have a roof constructed over them.

3. **Town Garage Material Storage**- The Town garage has several outdoor storage areas in which sand and blacktop patch are stored as shown in Figures 5 and 6. These open storage areas should be surrounded with sediment control devices such as a "sediment sock". Alternatively, the storage areas could be covered with a tarp or have a roof constructed over them.

4. **Modification to Winter Roadway De-icing-** As described above, the salting rate usage for winter roadway de-icing may be slightly over the WDOT recommendations depending on the snow event although less than the amount used by neighboring municipalities. The following modifications to the winter de-icing program are based on the "Minnesota Snow and Ice Control Field Handbook for Snowplow Operators"

Figure 3- Exposed Material Piles at Town Transfer Site

Figure 4- Exposed Material Piles at Town Transfer Site

Figure 5- Exposed Material Storage Bins at Town Garage

Figure 6 - Exposed Material Storage Bins at Town Garage

(www.pca.state.mn.us/programs/roadsalt.html) and Chapter 35 of the Wisconsin Department of Transportation Highway Maintenance Manual (see Appendix):

a. **Develop Written Snow Removal Policy-** A written snow removal policy is recommended describing the level of service for snow removal for various roads. The level of service may be based on average daily traffic, environmental concerns, safety, mobility, economics, and other factors.

b. **Calibration-** Calibration is an essential procedure to measure the pounds of salt and sand applied to the roadway at various auger settings in relation to truck speed. Calibrate each truck individually each year following the manufacturer's recommendation. The auger plate must be in place during calibration.

c. **Pavement Temperature-** The temperature of the pavement can differ substantially from the air temperature. The pavement temperature will determine the appropriate application rate and is a critical variable to avoid over application and de-icing materials waste. A hand-held pavement temperature sensor can be purchased at a local hardware store.

d. **Anti icing-** Anti-icing is often the most cost-effective and environmentally safe practice in certain winter road maintenance situations. Applying chemical freezing-point-depressant materials before a storm, prevents snow and ice from bonding to the pavement. Anti-icing requires about ¼ the material of deicing at 1/10 the overall cost, making it the least expensive option for improving traffic safety. Anti-icing is effective and cost-efficient when used correctly and approached with realistic expectations.

e. **Prewetting and Prewetting Salt/Sand-** Dry material blows or bounces off the roadway surface. Adding a liquid can increase the amount of material remaining on the surface. Liquids also increase salt's effectiveness by jump-starting the melting process. Depending on the liquid used, the melting point can also be decreased. Because pre-treating and pre-wetting cause material to stick to the road, 20 to 30 percent less material is used—saving money and reducing environmental impacts. Pre-treating involves adding liquid to the salt stockpile and does not involve equipment changes and requires no new capital upgrade expenses. Prewetting is adding a liquid to the salt as it is being applied—either at the spinner or through a soaker pipe in the auger box—to help it stick to the road better. Although prewetting requires some equipment changes, it provides flexibility to switch the chemical makeup depending on conditions.

f. **Limit Use of Sand-** Using a sand/salt mix is generally not recommended because sand does not melt anything. Sand also reduces salts effectiveness and salt reduces sand effectiveness. Sand can be used when the pavement temperature is less than 10 degrees F to provide traction when other de-icing agents are ineffective. However, sand should be pre-wetted and only used in low speed trouble spots and intersections. Sand should not be used on roadways where speed exceed 45 MPH because the sand will immediately fall off the side of the roadway

g. **Following WDOT application rates** – The WDOT recommends both anti-icing and de-icing rates as show in Tables 4 and 5 based on pavement temperature.

Table 4

Anti-icing Salt Application Rates

Guidelines Anti-Icing				
		Rate Application		
PREDICTED PRECIPITATION EVENT	Recommended Locations	Liquid (gal/lane-mi.)	Pre-wetted Salt (lb/lane-mi)	COMMENTS
Frost or Black Ice	Bridge Decks and Trouble Spots	20-30 (frost) 30-40 (Black Ice)	50-150	1) Consider treating approaches as well as bridge decks 2) Treat ice patches, if needed, with pre-wetted salt at 100 lb/lane-mi.
Sleet	Bridge Decks and Trouble Spots and Intersections	20 Recommended 30 Maximum	200-400(1) 100-300(2)	1) Consider treating approaches as well as bridge decks.2) Treat ice patches, if needed, with pre wetted salt at 100 lb/lane-mi
Freezing Rain	Any area of concern	Not Recommended	200-400(1) 100-300(2)	It is not recommended to apply liquid de-icing agents in an anti-icing mode prior to freezing rain events
Light Snow (< 1/2" in./hr.)	Trouble Spots and Intersections	30 Recommended 40 Maximum	100-200	If anti-icing is performed prior to a snow event, re-application may be necessary to prevent re-freeze. It also may be necessary to switch to a de-icing mode.
Moderate or Heavy Snow (> 1/2 in./hr)	Trouble Spots and Intersections	40 Recommended 50 Maximum	100-300	1) Do not apply liquid anti-icing agents onto heavy snow accumulation or packed snow. 2) Applications will need to be more frequent at lower temperatures and higher snowfall rates. 3) If anti-icing is performed prior to a snow event, re-application may be necessary to prevent re-freeze. It also may be necessary to switch to a de-icing mode.

Notes:

Table 5

De-icing Application Rates for Pre-Wetted Salt (2 lanes)

WEATHER CONDITIONS		SALT APPLICATION RATE (Pounds of Material Per Lane Mile of Pavement)	REMARKS
PAVEMENT TEMPERATURE	PRECIPITATION		
28°F AND ABOVE	Snow	Initial at 200 of Salt Repeat a. 100-200 of Salt	• If sufficient moisture is present, dry salt without pre-wetting can be applied.
	Sleet/Freezing Rain		• If sufficient moisture is present, dry salt without pre-wetting can be applied.
23-28°F	Snow/Sleet	Initial at 100-300 of Salt Repeat a: 100-200 of Salt	• If sufficient moisture is present, dry salt without pre-wetting can be applied.
	Freezing Rain	Initial at 100-300 of Salt Repeat a: 100-200 of Salt	• Use small amounts of pre-wetted abrasives at intersections and low speed trouble spots only if warranted.
18-23°F	Dry Snow	Plow Only	• If necessary, use alternate de-icing agents like calcium chloride and magnesium chloride in combination with a lower application rate of salt • Intersections and low speed hazardous areas may be treated with pre-wetted abrasives when warranted.
	Wet Snow/Sleet	Initial at 100-300 of Salt Repeat a: 100-200 of Salt	• If necessary, use alternate de-icing agents like calcium chloride and magnesium chloride in combination with a lower application rate of salt
Below 18°F	Dry Snow	Plow Only	• If necessary, use alternate de-icing agents like calcium chloride and magnesium chloride in combination with a lower application rate of salt • Intersections and low speed hazardous areas may be treated with pre-wetted abrasives when warranted.
	Ice/Snow Pack	100-300 lbs salt or salt mixed dry calcium chloride or other de-icing agents	• Scrape off everything possible then apply a lower application rate of salt pre-wetted with calcium chloride, magnesium chloride, or other strong freezing point depressant.

Notes

5. **Remove Sediment from Dunn Heritage Park-** The sediment ponds at Dunn Heritage Park are ¾ full of sediment and should be restored to the original depths. These ponds have never been dredged in the past.

c. EXISTING STRUCTURAL

1. **Grassed Swales-** The entire Town MS4 is comprised of grassed swales on one or both sides of every roadway. Grassed swales are defined as grass-lined ditches along the side of the roadway surface to convey stormwater. These grassed swales typically remove from 40% to 80% of the stormwater pollutants from the average annual pollutant load based on numerous stormwater treatment removal studies (Ref #2). As described below in the BMP modeling section (Secton VIII), the grassed swales within the Town UA were modeled to achieve over 50% of the annual total suspended sediment load as required under the Permit.

   A grassed swale technical standard (SOC Tech Standard #1005) and several guidance memorandums provide details of grassed swale dimensions to provide good pollutant removal as shown in Appendix G. A critical design component (Tech Standard #1005 G. Swale Geometry) is the following:

   - 3:1 side slope or less,
   - longitudinal swale slope from 1% to 4% and
   - bottom width less than 6 feet.

   The geometry is recommended to achieve optimum stormwater treatment. As part of this plan, grassed swales were analyzed to determine existing grassed swales with recommended swale geometry within the residential and commercial urbanized areas of the Town. The majority of the grassed swales slopes along roadways within the Town were within the slope recommendation. In addition, the Town typical roadway cross-section shows a 4:1 side slope and typically less than a 4 foot bottom width.
2. **Dunn Heritage Park Silt Basins-** These two silt basins are approximately .3 acres in size and located in Dunn Heritage Park. The basins trap sediment from a residential area before it can enter into Lake Waubesa
3. **Colladay Point Silt Basins-** These silt basins are approximately 7 acres in size and located west of Colladay point. Sediment is removed annually with 5 cubic yards of sediment removed typically.
4. **Private Rain Gardens-** Many newer developments have rain gardens installed including 4+6 Condominiums (off of Barber), Willow Court, Camp Leonard Road. These rain gardens drain residential rooftops and are privately maintained. Based on a field inspection, all rain gardens appear to be in good working condition with no observed clogging.

5. **3rd Street Wetland Restoration-** A 3-acre wetland was restored in 2002 providing stormwater treatment benefits.
6. **County Highway B Infiltration Basin-** This basin provides stormwater infiltration for the U.W. Experimental site south of County Highway B.

d. <u>PROPOSED STRUCTURAL</u>

1. **McConnell Street Wetland Restoration-** The Town has purchased this lot and plans to remove the existing structure (Sutter House) and restore the area to a wetland.
2. **County Highway B and AB Swale Prairie Restoration-** The roadway grassed swale has degraded so that sediment is entering Lake Kegonsa at the intersection of County Highway "B" and "AB". The LCD has designed a prairie restoration of this area including erosion control and stormwater treatment improvements to the roadway grassed swale
3. **Grassed Swale Modification-** Several grassed swales slope are too steep compared to the recommended longitudinal slope range of 1%-4%. A ditch check is recommended at these grassed swale locations:
    a. Hillpoint Road neighborhood
        i. Thatcher, East of Burl- 600 feet at 6% slope
        ii. Hillpoint, North of Tower- 360 feet at 5.5% slope
        iii. Keenan, North of Waubesa Hill Road- 390 feet at .5% slope
        iv. Kennan, South of Lookout- 660 feet at 6.1% slope
    b. Tower Road neighborhood
        i. Brian Street, between Scott Lane and Thomas Road- 375 feet at 5.3% slope
        ii. Tower Road and Ridge Court- 911 feet at 5.3% slope
        iii. Morris Park Road- 150 feet at 13.25% slope
        iv. Bible Camp Road, South of Camp Leonard- 290 feet at 6.9%
    c. Orvoid Park neighborhood
        i. Woodland Road, north of Orvoid Park Drive- 214 feet at 8.9% slope
        ii. Tura Road- 180 feet at 11% slope
        iii. Edgewood Drive- 840 feet at 7.2% slope
    d. Colladay Point neighborhood
        i. Colladay Point Drive-195 feet at 6.6% slope

Figure 9-11 shows examples of steep grassed swales within the Town UA.

Figure 7 - Examples of Steep Grassed Swales within Town UA

Figure 8 - Steep Grassed Swales within Town UA ;Intersection of CTH AB and Woodland

Figure 9 - - Steep Grassed Swales within Town UA ; Looking South along County Highway AB

e. PROPOSED BMP OPINION OF PROBABLE COST

Table 6

Proposed BMP Opinion of Probable Cost

Proposed BMP	Cost Estimate
County Highway B/AB Swale	$25,000
Agricultural Fields Inventory	$500
Erosion Control Practices for Material storage Piles(400 L.F. @$1.20/LF	$480
Steep Channel-Rock Check Dams (29 @$960/each))	$27,840
Winter Deicing Modification	$12,500
Remove Sediment for Dunn Heritage Park ponds (3264 cubic yards @ $30/ c. y.)	$71,000

PERMITTED

grassed swales and several sediment basins at Dunn Heritage Park and Colladay Point. These facilities are inspected on an annual basis with the exception of Dunn Heritage Park sediment basins. The proposed BMP is to remove sediment from the Dunn Heritage Park basin.

2.6.2 *Routine street sweeping and cleaning of catch basins as appropriate-* **As described above, the Town does conduct street sweeping on road that are being resurfaced to remove the gravel. The Town doesn't own any catch basins.**

2.6.3 *Proper disposal of street sweeping and catch basin cleaning waste.* **Since the street sweeping is conducted by a licensed road contractor, the street sweeping waste is disposed properly. The Town has no catch basin waste.**

2.6.4 *If road salt or other de-icers are applied by the permitee, no more shall be applied than necessary to maintain public safety*

Note: The DOT "Highway Maintenance Manual", chapter 35, contains guidance on application of road salt and other deicers that can be used to determine whether not application is necessary and what application rate is appropriate for deicing and ice prevention. This information is held on a secured server and users must first register with the state of Wisconsin to obtain an ID and password. You can learn more about getting connected to this secured server at: http://www.dot.wisconsin.gov/business/extranet/. The Wisconsin Department of Transportation(DOT) highway salt storage requirements are contained in ch. Trans 277, Wis. Adm. Code.

The use of road salt on Town roadways as part of winter de-icing measures is described above. The Town salt application rates may be slightly over the range of WDOT recommended application rates. Proposed BMPs, described above, will further reduce the amount of road salt used.

2.6.5 *Proper management of leaves and grass clippings, which may include on-site beneficial reuse as opposed to collection.* **As described above, the Town has stringent ordinances mandating composting of leaves and grass clippings. The Town also provides a community composting site at the Town Transfer site.**

2.6.6 *Storm water pollution prevention planning for municipal garages, storage areas and other sources of storm water pollution from municipal facilities.* **As described above, the two municipal facilities are the Town Garage and Town Transfer sites. Good housekeeping measures are employed at both sites with minimal stormwater exposure to materials. Proposed BMPs will enhance the existing BMPs by protecting material storage piles.**

2.6.7 *Application of lawn and garden fertilizers on municipally controlled properties, with pervious surfaces over 5 acres each, in accordance with a site-specific nutrient application schedule based on appropriate soil tests.* **As described above, the Town does not apply any lawn or garden fertilizers to municipally controlled properties including parks and cemeteries.**

2.6.8 Education of appropriate municipal and other personnel involved in implementing this program. **The Town staff are educated in proper road salt usage during winter de-icing activities. The Town Director of Public Works also is educated on minimizing stormwater exposure to materials at the Town Transfer site.**

2.6.9 *Measures to reduce municipal sources of storm water contamination within source water protection areas. Wisconsin's source water assessment program information is available at:*

http://www.dnr.state.wi.us/org/water/dwg/swap/index.htm. **The UA of the Town is not within a source water protection area. All drinking water is withdrawn from groundwater aquifers.**

VIII. Existing and Proposed Condition WinSLAMM Modeling

The Town in under a stormwater permit requirement to implement stormwater management practices necessary to achieve a 20% reduction in the average annual mass of Total Suspended Solids (TSS) discharging from the MS4 to surface waters of the state as compared to implementing no controls by March 10, 2008. The requirement shifts to 40% TSS reduction by March 10, 2013. The Town UA was modeled using the WIN SLAMM (Version 9.3.3) model to determine the % TSS removal attributable to the grassed swales that exist within the Town Urbanized area.

60 different WinSLAMM models were created for the differing land use and soils within the Town UA. The WDNR guidance memorandum for Win SLAMM Modeling and grassed swales were utilized in this modeling efforts as listed in Appendix H. The grassed swales within the Town UA remove on average 52.7% TSS meeting both the 2008 and 2013 requirement.

The WinSLAMM input parameters are listed in Table 7. The summary removal table for all of the Town Outfalls shown in Table 8. The WinSLAMM modeling results were approved by the WDNR as shown in Appendix I.

Table 7

Win SLAMM Input Parameters

SLAMM INPUTS - Dunn	
Fraction of Land Use Area (0-1)	1.0
Swale Density (ft/ac)	313.0
Typical Bottom Width (ft)	0.5
Typical Swale Side Slope (__ ft H : 1 ft V)	4.0
Typical Longitudinal Slope (ft/ft)	0.021
Swale Retardance Factor	C
Typical Grass Height (in)	6.0
Swale Dyn. Infiltration Rate (in/hr)	0.237
Avg. Swale Length to Outlet (ft)	Variable

Table 8

WinSLAMM Summary TSS removal

Summary of MS4 Modeling Results- Dunn

			Total Suspended Solids			Total Phosphorus			Stormwat
rainage Area (label)	Area (acres)	Primary Land Use (R, C, etc.)	Discharge no controls (pounds)	Discharge with controls (pounds)	TSS Control (%)	Discharge no controls (pounds)	Discharge with controls (pounds)	P Control (%)	Primar (WP, SW,
1	15.86	R,O	12392.7709	5865.4526	52.7%	57.470154	38.574428	32.9%	GS
2	65.16	R,O	27080.088	9668.5353	64.3%	115.85775	71.129331	38.6%	GS
3	26.89	R,O	16331.3837	7242.0467	55.7%	70.935412	46.578209	34.3%	GS
4	29.74	R,O	25994.035	11492.6392	55.8%	117.563297	74.825891	36.4%	GS
5	8.07	R	7335.939	3667.6	50.0%	32.90475	22.09339	32.9%	GS
6	73.24	R,O	45866.345	18153.229	60.4%	224.98813	147.49494	34.4%	GS
7	7.07	R	6426.93	3254.586	49.4%	28.82733	19.47871	32.4%	GS
8	3.14	R,O	2308.558	1306.8136	43.4%	10.861557	7.990982	26.4%	GS
9	49.48	R,O	42849.3553	17864.1147	58.3%	194.182904	120.506593	37.9%	GS
10	5.33	R	4844.729	2530.839	47.8%	21.73273	14.91381	31.4%	GS
11	13.06	R	11870.66	5674.256	52.2%	53.24871	34.96059	34.3%	GS
12	33.74	R,O	29453.1429	12834.7798	56.4%	133.244514	84.255265	36.8%	GS
13	25.29	R,O	21640.7888	9749.7604	54.9%	98.325339	63.397054	35.5%	GS
14	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-
16	11.13	R,O	3342.3687	1282.4995	61.6%	21.289834	16.594398	22.1%	GS
17	1.19	R	1082.362	664.8338	38.6%	4.85388	3.621022	25.4%	GS
18	76.97	R,O	52411.6509	21008.9789	59.9%	248.2354453	159.2822466	35.8%	GS
19	35.93	R	31111.87733	13640.43316	56.2%	136.1872054	85.2774256	37.4%	GS
20	9.15	R,I	10900.835	6300.814	42.2%	40.2685	28.021322	30.4%	GS
21	0.04	R	37.18883	26.75724	28.1%	0.165092	0.1344484	18.6%	GS
22	20.69	R	18807.85	8592.557	54.3%	84.36319	54.16782	35.8%	GS
23	11.99	R	10899.61	5250.808	51.8%	48.89007	32.22362	34.1%	GS
24	211.53	R,O,D	157867.4744	78222.74586	50.5%	606.5435807	428.3007409	29.4%	GS
25	-	-	-	-	-	-	-	-	-
26	22.45	R,C	24080.854	13547.342	43.7%	87.496336	59.240979	32.3%	GS
27	3.27	R	2972.711	1642.235	44.8%	13.33312	9.41046	29.4%	GS
28	17.27	R,O,D	17479.4454	8994.43464	48.5%	70.7269557	47.0632582	33.5%	GS

29	72.5	R,O,C	52394.2064	22894.1316	56.3%	243.799176	160.59407	34.1%	GS
30	7.33	R	6782.081	3663.988	46.0%	30.750568	21.497189	30.1%	GS
31	28.03	R,O	19094.565	8484.9505	55.6%	91.58581	61.54514	32.8%	GS
32	2.73	R	2481.315	1399.439	43.6%	11.13142	7.940388	28.7%	GS
Totals	**888.27**		**666141.1206**	**304921.6005**	**54.2%**	**2899.76276**	**1921.113721**	**33.7%**	

ınd Use Areas:
residential
institutional
commercial
industrial
open urban
freeways

Stormwater Practices:
WD: wet detention
SW: street sweeping
VS: vacuum streets
B: biofiltration
I: infiltration
C: catch basin
DC: drainage control
O: other control
GS: Grass Swales

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2.7 STORM WATER QUALITY MANAGEMENT

The permittee shall develop and implement a municipal storm water management program. This program shall achieve compliance with the developed urban area performance standards of s. NR 151.13(2), Wis. Adm. Code, for those areas of the municipality that were not subject to the post-construction performance standards of s. NR 151.12 or 151.24. The program shall include:

2.7.1 *To the maximum extent practicable, implementation of storm water management practices necessary to achieve a 20% reduction in the annual average mass of total suspended solids in runoff that enters surface waters of the state as compared to implementing no storm water management controls, by March 10, 2008.* **As documented above, the BMP of grassed swales achieves a 54.2% TSS removal rate for the Town outfalls.**

2.7.2 *Evaluation of all municipal owned or operated structural flood control facilities to determine the feasibility of retrofitting to increase total suspended solids removal from runoff.* **The Town does not own or operate any structural flood control facilities.**

2.7.3 *Assessment of compliance with s. NR 151.13(2), Wis. Adm. Code, by conducting a pollutant-loading analysis using a model such as SLAMM, P8 or equivalent methodology approved by the Department. At a minimum, the average annual total suspended solids and phosphorus loads to surface waters shall be determined at all outfalls for the controls and no controls conditions. As a baseline, the modeling shall calculate the theoretical annual average*

mass of TSS generated for the entire area served by a MS4 within the permittees jurisdiction with no controls or BMPs applied. Modeling to reflect the current state of controls and BMPs shall be judged against the baseline to determine the percent of reduction. A storm water infiltration system is considered to be a control and/or BMP. Controls and BMPs that exist at the time of permit issuance may be used to achieve this reduction. This pollutant level reduction applies to total suspended solids only. Areas that are or were subject to the requirements of subch. III of NR 151 shall not be included in the calculation to meet this reduction.

Note: It is recommended that the pollutant-loading analysis be conducted as soon as possible. This analysis is needed to provide the permittee with information on what BMPs are needed to meet the implementation date of March 10, 2008. **As documented above, the Town BMP of grasses swales removes 52.4% of the TSS using the pollutant loading model of WIN SLAMM as compared to the "no control" condition. These grassed swales exist at the time of permit issuance and are implemented as standard practice when new roadways are constructed within the Town UA.**

References

1. Shaw L. Yu,1 Jan-Tai Kuo,2 Members, ASCE, Elizabeth A. Fassman,3 and Henry Pan4, "FIELD TEST OF GRASSED-SWALE PERFORMANCE IN REMOVING RUNOFF POLLUTION", ASCE JOURNAL OF WATER RESOURCES PLANNING AND MANAGEMENT / MAY/JUNE 2001, Pg 168-171

2. Michael Barrett,Patrick Walsh, "PERFORMANCE OF VEGETATIVE CONTROLS FOR TREATING HIGHWAY RUNOFF" J. Envir. Engrg. Volume 124, Issue 11, pp. 1121-1128 (November 1998)

3. James H. Stagge, Allen P. Davis, "WATER QUALITY BENEFITS OF GRASS SWALES IN MANAGING HIGHWAY RUNOFF", WEFTEC.06 (2006)

APPENDIX A- PAST TOWN NEWSLETTER ARTICLES

Storm Water Management

Storm water discharges are generated by runoff from land and impervious areas such as paved streets, parking lots, and building rooftops during rainfall and snow events that often contain pollutants in quantities that could adversely affect water quality. Most storm water discharges are considered point sources and require a DNR permit. The primary method to control storm water discharges is through the use of best management practices.

The quality of water directly affects the quality of our lives. Polluted water endangers health . of family, pets and livestock. All of Dunn residents rely on well water, and part of the rain that falls on our land recharges groundwater supplies. Clean surface water . streams, rivers, ponds and lakes . can also increase the value of our property.

Water that doesn.t soak into the ground . whether from rain, snowmelt, farming operations, car washing, or leaking pipes . is called runoff. The runoff carries whatever it picks up along the way, including animal wastes, herbicides, pesticides, and septic system overflows. What *washes* away does not *go* away.

It just flows downstream. By changing some of our personal habits, we can help maintain the quality of life in our watershed and lessen impacts downstream.

Fertilizers and pesticides that may have been applied wash away, too, causing water quality problems for people living downstream. Suspended silt keeps sunlight from penetrating waterbodies, robbing aquatic plants, animals, and fish of the light and oxygen they need to live. When silt eventually settles to the bottom, it can smother fish eggs and other aquatic life. Sediments can also reduce stream channel capacity, causing localized flooding.

Plants are a natural, inexpensive and highly effective means of controlling runoff. Runoff slows down and loses much of its erosional force when it reaches a strip of vegetation. Vegetation also works as a filter, straining out sediment, debris and other pollutants. You can do certain things to reduce erosion from your property.

Minimize hard surfaces and maximize the absorption capacity of your land.

- Keep trees, shrubs, perennial grasses or legumes along steep slopes, drainage channels or ditches, and around bodies of water. Native plants generally survive best. The proper width of .buffer strips. of vegetation between land that is being used and water courses will depend on type of soil, degree of slope, and type of vegetative cover. Forested areas are more effective than grasslands for reducing erosion on steep slopes.
- Use terraces or water bars to reduce runoff velocity on long or steep slopes.
- Keep heavy equipment off exposed soil during the rainy season. Use gravel for parking areas.
- Check with the county for their erosion control regulations before breaking ground.
- Avoid disturbing soil in the autumn. Plan activities such as plowing, logging and construction for good weather, so vegetation covers the soil and protects it during rainy and freezing seasons.
- When selecting a building site, avoid naturally wet areas or areas that may be unstable. Protect such areas before the rains start. Fabric fencing is a good erosion control method.
- Think carefully how to divert runoff from erosion-prone areas. Keep sites small, disturbing only the amount of land absolutely necessary.
- Save natural vegetation wherever possible, as a buffer zone and soil stabilizer.
- Plant temporary vegetative cover (annual grasses or clovers) on sites that must remain exposed during the winter.
- Use commercial hydromulch, straw or hay to help stabilize exposed or steep areas until vegetation is established.
- If you have a wetland on your property, cherish and protect it.

What is a rain garden?

Rain gardens are shallow depressions (3-4 inches to two feet) planted with native wildflowers and other plants that soak up rainwater or melted snow from your rooftop, driveway and lawn. The gardens allow water to infiltrate into the soil rather than becoming runoff.

A rain garden can soak up to 30% more water than a traditional lawn. This helps to protect the quality of water downstream by preventing runoff from getting to the ditches and helps reduce the chances for local flooding.

Why is that important? Because the water from rain or snow fall that runs off our roofs and off our yards, into our streets and eventually through the ditches to our lakes is untreated, and carries with it all sorts of pollutants like fertilizers, oil from the street and pet waste. Holding back the runoff by allowing it soak into the ground in rain gardens, helps improve the water quality in our lakes, can reduce the chances for local flooding and also helps reduce bank and shoreline damage.

Such a complex and important mix of environmental benefits is accomplished by devoting a small amount of space, time and money to the creation of a rain garden. There are only a couple of key decisions you'll need to make: the size of the garden, its location, the mix of native plants and vegetation you'll put in and whether you build it yourself or hire a professional landscaping company to help you.

Rain gardens should be positioned to receive water from downspouts or at a low-point in the lawn where drainage naturally occurs. While the plants grow, you'll need to weed a bit, but a mature rain garden is delightfully easy to maintain. The simpler you keep your design the more involved you can be in both planning and building the garden. But increasingly, driven by consumer demand and interest, there are many professional landscapers and horticulturists who are in the business of designing and building rain gardens.

Visiting well-designed gardens can give you ideas and talking to folks who have them can provide helpful tips on how to do it right.

Rain gardens are aesthetically pleasing to look at and provide habitat for birds, butterflies and beneficial insects-including dragonflies that eat mosquitoes. Once the plants mature, maintenance is relatively low, and beats mowing! Just think-no noise, no gas, and all that free time!

Rain Garden Listserv

The Office of Lakes and Watersheds currently maintains a discussion group for those interested in rain gardens in Dane County. To subscribe, send a blank email to daneraingardens-subscribe@yahoogroups.com. To email the listserv, send email to daneraingardens@yahooogroups.com

Volunteer Opportunities

McFarland Senior Center
Volunteer Drivers
McFarland Senior Outreach Services Deptartment is looking for responsible volunteer drivers for the driver escort program. The drivers take older adults to vital medical appointments in McFarland, Stoughton and Madison. Schedules for driving are flexible, so volunteers can designate which days and times they are willing to drive. Mileage is reimbursed for this program. Interested drivers should contact the Outreach office at 838-7117.

McFarland Senior Center Home Delivered Meals Driver Substitutes
Substitute drivers are needed for the home delivered meal program of McFarland. Meal deliveries are typically between 11:15 am - 12 noon, depending on the route. Substitutes can indicate which days they are most available. Mileage is reimbursed. Call 838-7117 for more information.

Oregon Senior Center
Home Delivered Meals Substitute Drivers
Substitute drivers are needed for the home delivered meal programs in Oregon. Monday - Friday as needed to fill in for about an hour to an hour and a half depending on the route and the weather. Oregon Senior Center 608-835-5801

McFarland Senior Center
Nutrition Site Kitchen Volunteer
Substitute kitchen volunteers on Mondays or Thursdays are wanted for the McFarland senior citizens' meal site. No cooking is required, since meals are provided by a caterer. Volunteers assist staff in packaging home delivered meals, setting up and taking down of the meal site, and serving meals. Normal working hours are 10:30 am - 12:45 pm. Interested persons should contact 838-7117.

Free Tax Help !

Qualified Volunteers will work with you to fill out and file your 2007 State and Federal Tax Returns

When: Thursday April 3 and 10th ,12:00 noon -5:30 p.m.
Walk-in Service Only. No appointments necessary.
Where: Volunteer Income Tax Assistance (VITA) Site

Springtime brings more than flowers with those showers

March brings our first taste of spring after the snowiest winter on record. It is a good time to ask ourselves "What happens to all that melting snow and rainwater?" Most of it ends up in our lakes and streams. As it washes across our roof tops, roads, lawns and farmland it is up to us to prevent pollution from salt, fertilizer, manure, leaves, grass clippings, pesticides, oil and other trash. Here are some ways you can help stop the pollution:

- Keep leaves and grass clippings out of the street and drainage ways.
- Direct rainwater away from paved areas on laws or gardens where it can soak in.
- Get a soil test before applying fertilizer to your lawn. If you do fertilize, apply according to directions and clean up any spills.
- Clean up pet waste. Bury it or flush it down the toilet.
- Compost your leaves and yard debris.
- Keep your vehicles tuned up and repair leaks.
- Walk or ride a bike whenever you can.
- Wash your car on the law or at a car wash.
- Prevent soil erosion.
- Install a rain barrel in your down spout. Order them through Sustain Dane web site at www.sustaindane.org
- Get involved. Join local water conservation groups like:

  Friends of Lake Kegonsa Society at www.kegonsa.org

  or Lake Waubesa Conservation Association at www.lakewaubesa.org

Dane County Book Mobile

The Book mobile is in Waubesa Heights at the corner of Lookout Trail and Charmany Rd on Fridays from 3:30 to 4:30 PM.
Check out a book, browse, and enjoy reading!

On the Road Again

Pet Waste Pickup

Pet waste left in our parks, yards or other open areas can be washed away and carried by rainwater into roadside ditches to nearby rivers, lakes and streams which causes many problems, among them:

1. Pet waste decays, using up dissolved oxygen and releasing compounds that are harmful to fish and other animals that rely on water to live.

2.Pet waste contains nutrients that can cause excessive algae growth in Lakes Kegonsa and Waubesa upsetting the natural balance.

3. Pet waste contributes to bacterial contamination of our rivers, lakes and streams. Pet waste contains harmful bacteria such as E. Coli and fecal coliform. Waters that contain a high amount of bacteria such as E. Coli are unfit for human contact. A single gram of pet waste contains an average of 23 million fecal coliform bacteria, some of which can cause disease in humans.

Whether in your yard or walking your dog, you can easily do the right thing. Purchase a device made especially for the task or simply use a plastic bag. Then, just place the waste in a garbage can, flush down the toilet or bury it in your yard. Everyone will be happier when you pick up after your pet! Also, who wants to step in it let alone swim in it!

The Town of Dunn has a pet waste pickup ordinance requiring pet waste cleanup (Ordinance 11.6-1-6(e)**. Please do the right and considerate thing and pick up after your pet**.

FALL 2000

Top Five Ways to Help Dane County Lakes and Streams
(Reprinted and modified from Dane County Webpage)

1. **Learn more about local waters and join a local watershed or conservation group.** Go to our **Dane County Waters** page (www.countyofdane.com/commissions/lakes/waters.shtml) and use the **Watershed Locator** to find out what watershed you live in. Then go to **Watershed Associations, Friends Groups and Other Natural Resource Groups** to locate an active group in your area. There are many groups in Dane County all working to preserve and enhance the natural resources here. Check out their web sites or get in touch with their contact person to find out how you can get involved. If you don't find one where you live, consider starting over!

2. **Test your soil before applying fertilizers containing phosphorus.** Apply phosphorus-containing lawn fertilizer *only* if a soil test shows it's needed. If it's not needed, be sure to purchase phosphorus-free fertilizers if you fertilize. Look for 0 as the middle number-all fertilizers shower three numbers on the label (10-0-5, for example.) The middle number represents the amount of phosphorus. So, buy zero. Learn more about phosphorus on our **Phosphorus Control in Dane County** page (www.countyofdane.com/commission/lakes/phosphorus.shtml)

3. **Keep leaves and grass clippings out of the street and ditches, compost, and practice other water-friendly lawn care.** Instead of raking your leaves to the ditch, start a compost pile. Leaves make great fertilizer for vegetable and flower gardens. They can also be tilled right into your garden. Or you could use a mulching mower to chop the leaves into little bits for your turf. If you do rake, make sure that the leaves stay out of the roadside ditch. Learn where the nearest storm drain is in relation to your house. Then learn which lake or stream receives the stormwater that drain sends. Read about it in our **You're the Solution to Water pollution** series of brochures. (www.countyofdane.com/commissions/lakes/waterpollution.shtml)

4. **Keep water on site and soil in place (so it's out of our waters).** Try building rain gardens, installing rain barrels and directing roof gutters and downspouts to grassy areas (pervious areas) rather than hard surfaces (such as driveways and sidewalks that will deliver stormwater to storm drains and eventually our water resources). Be sure to mulch or plant any bare soil so that rain and snow don't erode it away. Check out our **Rain Garden Information** page. (www.countyofdane.com/commissions/lakes/raingarden.shtml)

5. **Reduce motorized vehicle use; maintain vehicles in an environmentally friendly way (don't pump oil in storm drains or on the street, for example).** Get your oil changed at a service station. If you change your car's oil yourself, take the used oil to a collection site for recycling. Never let any oil make its way to the storm drain. Make sure your car doesn't leak antifreeze, brake fluid, or windshield wiper fluid. These leaks and drips could be washed into the storm drain from the street or your driveway with the

Plant Dane! Cost-Share Program for Rain Garden Projects in Dane County

Thinking about installing a rain garden? Consider taking advantage of the Plant Dane! Cost-Share Program, open to schools, non-profit organizations (homeowner, lake or neighborhood associations, faith centers, garden clubs, etc.), municipalities and individual residents in Dane County, Wisconsin.

The Plant Dane! Cost-Share Program provides native plants at the greatly reduced price of $1.80 each—about half the normal retail price. For choice of plants, order forms with payment are due at the February workshop. Orders/payments received after the workshop will be filled on a first-come, first-served, as available basis. Orders received after the last working day in May cannot be filled. Plants are delivered in June. Preference will be given to orders/payments received at the workshop in February.

Not sure if you can do a rain garden? Come to the workshop and make your decision then and there! Click here to apply.

2009 Plant Dane! Schedule

February 28	Rain Garden Workshop. Applicants that submit their applications prior to February 27 will be sent confirmation and an order form that is due at the February workshop. Order form with payment due to GMF at or before the workshop for choice of plants.
May 31	Last day applications and orders with payment will be accepted. Orders received after the February workshop are subject to availability. Applications/orders received after May 31 will be considered for the following year.
June 27	Plants are delivered to Dane County Land & Water Resources Department, One Fen Oak Court, for pick-up between 8a–10a.

Learn about rain gardens and other ways you can help protect and improve our lakes and streams at www.myfairlakes.com. For more information, contact Marcia Hartwig, Madison Area Municipal Storm Water Partnership Education Coordinator at (608) 224-3746 or email hartwig@co.dane.wi.us.

The Plant Dane! Cost-Share Program is possible through a gift from the Graham-Martin Foundation, Inc., a registered 501(c)(3) organization, dedicated to the preservation and restoration of natural ecosystems and the promotion of environmental education.

ILLICIT DISCHARGE CONNECTIONS

We have recently enacted an ordinance addressing illicit discharge connections into our drainage ditches as part of our WDNR stormwater permit. The following definition is taken from the Environmental Protection Agency concerning illicit discharge connections (modified to fit our Town) .

An illicit discharge is defined as any discharge to the Town roadside ditches (ditches) that is not composed entirely of storm water, except for discharges allowed under an NPDES permit or waters used for firefighting operations. These non-stormwater discharges occur due to illegal connections to the ditches from commercial establishments.

As a result of these illicit connections, contaminated wastewater enters ditches which flow directly into our lakes without receiving treatment from a wastewater treatment plant.

Illicit connections may be intentional or unknown to the business owner. These connections are often due to the floor drains connected to the storm drainage system. Additional sources of illicit discharges are failing septic systems, illegal dumping practices, and the improper disposal of sewage from recreational practices such as boating or camping.

Illicit discharges also can be generated by persons using antiquated methods for tasks such as cleaning pool filters, cleaning paint brushes, cars, washing and other common activities.

Town residents can help to eliminate illicit discharges and clean up our lakes through the following activities:

1. Private Swimming Pool Filter Cleaning and Discharge- Let the pool water sit untreated for 5 days before discharge into the ditch at the end of the season. Do not discharge pool filter backwash directly into the ditch. Backwash from pool filters must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or an unpaved vegetated area of your lawn away from the ditch.

2. Proper disposal of household cleaners, solvents, oils and paints- Do not dump in the ditch!!!Take all scrap metal, motor oil, yard waste, brush and wood, batteries and tires to our Transfer site at 4030 County Road B, (¼ mile east of the Dunn Town Hall) from 8 AM to 4 PM on the 1st and 3rd Saturdays of every month. Other household chemicals (paints, pesticides , poisions) take to the Dane County "Clean Sweep" disposal site at Dane County Highway Garage2302 Fish Hatchery Rd.(north end), corner of Fish Hatchery and Badger Roads from 7:30am - 2:00pm Tuesday, Wednesday,

APPENDIX B- TOWN OF DUNN ILLICIT DISCHARGE ORDINANCE

Chapter 14.6
Illicit Discharge Control

14-6-1 Purpose
14-6-2 Definitions
14-6-3 Applicability
14-6-4 Responsibility for Administration
14-6-5 Severability
14-6-6 Ultimate Responsibility
14-6-7 Discharge Prohibitions
14-6-8 Monitoring of Discharges
14-6-9 Notification of Spills
14-6-10 Enforcement, Penalties, and Remedies
14-6-11 Effective Date

Sec. 14-6-1 Purpose.

The purpose of this Chapter is to provide for the health, safety, and general welfare of the citizens of the **Town of Dunn** and protect waters of the state through the regulation of illicit discharges to the municipal separate storm sewer system as required by federal and state law. This Chapter establishes methods for controlling the discharge of pollutants into the municipal separate storm sewer system owned or operated by **Town of Dunn** in order to comply with the requirements of the Clean Water Act, Chapter 283.33, Wis. Stats., and Wisconsin Pollutant Discharge Elimination System municipal storm water discharge permit program under Chapter NR 216, Wis. Adm. Code.

The objectives of this Chapter are:
(1) To regulate the contribution of pollutants to the municipal separate storm sewer system associated with discharges from any user of the municipal separate storm sewer system.
(2) To prohibit illicit connections and discharges to the municipal separate storm sewer system.
(3) To establish legal authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this Chapter.

Sec. 14-6-2 Definitions

For the purposes of this Chapter, the following definitions are applicable:
(1) **"Authorized agency"** means employees or designees of the director or directors of the municipal agency or agencies of the **Town of Dunn** designated to administer or enforce this Chapter.
(2) **"Illicit connection"** means any drain or conveyance, whether on the surface or subsurface, which allows the discharge of sanitary waste to the municipal separate storm sewer system and any connections to the municipal separate storm sewer system from indoor drains and sinks.
(3) **"Illicit discharge"** means any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges authorized by a WPDES permit or other discharges not requiring a WPDES permit.

(4) **"Municipal separate storm sewer" or "MS4"** means a conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets the following criteria:

a. Owned or operated by the **Town of Dunn**.

b. Designed or used for collecting or conveying storm water.

c. Which is not a combined sewer conveying both sanitary wastewater and storm water.

d. Which is not part of a publicly owned wastewater treatment works that provides secondary or more stringent treatment.

(5) **"Non-storm water discharge"** means any discharge to the municipal separate storm sewer system that is not composed entirely of storm water.

(6) **"Storm water"** means surface runoff and drainage of rainfall and snow or ice melt.

(7) **"Waters of the state"** means those portions of Lake Michigan and Lake Superior within the boundaries of Wisconsin, all lakes, bays, rivers, streams, springs, ponds, well, impounding reservoirs, marshes, water courses, drainage systems and other surface water or groundwater, natural or artificial, public or private within the state or under its jurisdiction, except those waters which are entirely confined and retained completely upon the property of a person.

Sec. 14-6-3 Applicability

This Chapter shall apply to all discharges to the MS4 and to all activities that can reasonably be expected to result in a discharge to the MS4.

Section 14-6-4 Responsibility for Administration

The **Town of Dunn** shall administer, implement, and enforce the provisions of this Chapter. Any powers granted or duties imposed by this Chapter upon the authorized agency may be delegated by the Town Board Chair to persons or entities acting in the beneficial interest of or in the employ of the Town.

Sec. 14-6-5 Severability

The provisions of this Chapter are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Chapter or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this Chapter.

Sec. 14-6-6 Ultimate Responsibility

The standards set forth herein and promulgated pursuant to this Chapter are minimum standards; Therefore, this Chapter does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharges.

Sec. 14-6-7 Discharge Prohibitions

(1) **Prohibition of Illicit Discharges.**

No person shall discharge or cause to be discharged into the MS4 or waters of the state of any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water. The

commencement, conduct or continuance of any illicit discharge to the MS4 is prohibited. The following non-storm water discharges or flows are generally not considered illicit discharges if done so in a non-polluting manner: water line flushing, landscape irrigation, diverted stream flows, uncontaminated groundwater infiltration, uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, de-chlorinated swimming pool water, street wash water and fire fighting.

(2) **Prohibition of Illicit Connections.**

(a) The construction, use maintenance or continued existence of illicit connections to the MS4 is prohibited.

(b) This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

(c) A person is considered to be in violation of this Chapter if the person connects a line conveying sanitary waste to the MS4, or allows such a connection to continue.

Sec. 14-6-8 Monitoring of Discharges

Access to Facilities.

The authorized agency shall be permitted to enter and inspect facilities subject to regulation under this Chapter as often as may be necessary to determine compliance with this Chapter. If a discharger has security measures in force which require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to representatives of the authorized agency.

Sec. 14-6-9 Notification of Spills

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illicit discharges or pollutants discharging into storm water, the MS4, or water of the state, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the authorized agency in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the authorized agency within three business days of the phone notice.

Sec. 14-6-10 Enforcement, Penalties, and Remedies

(a) *Violations.* It shall be unlawful for any person to violate any provision of this Chapter. Each and every day during which the violation continues shall constitute a separate offense. The Town may institute appropriate action of proceedings to enjoin violations of this Chapter.

(b) *Penalties.* Any person who fails to comply with the provisions of this Chapter shall, upon conviction thereof, forfeit no less than one hundred dollars ($100.00) nor more than five hundred dollars ($500.00) and also pay the costs of prosecution for each violation, including the Town's

reasonable and actual attorneys fees and disbursements incurred in the prosecution of such violations.

Sec. 14-6-11 Effective date

This ordinance shall take effect the day after passage and posting or publication pursuant to law.

The above and foregoing ordinance was adopted by the Town Board of the Town of Dunn at its meeting held on September 17, 2007.

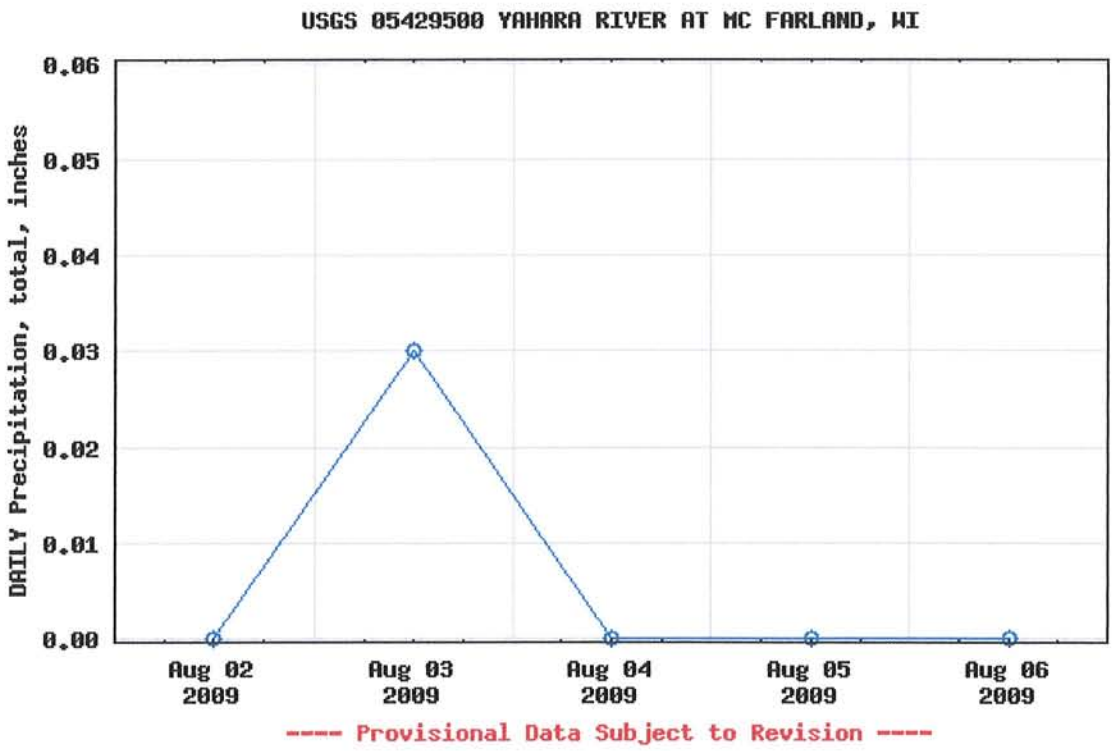
TOWN OF DUNN

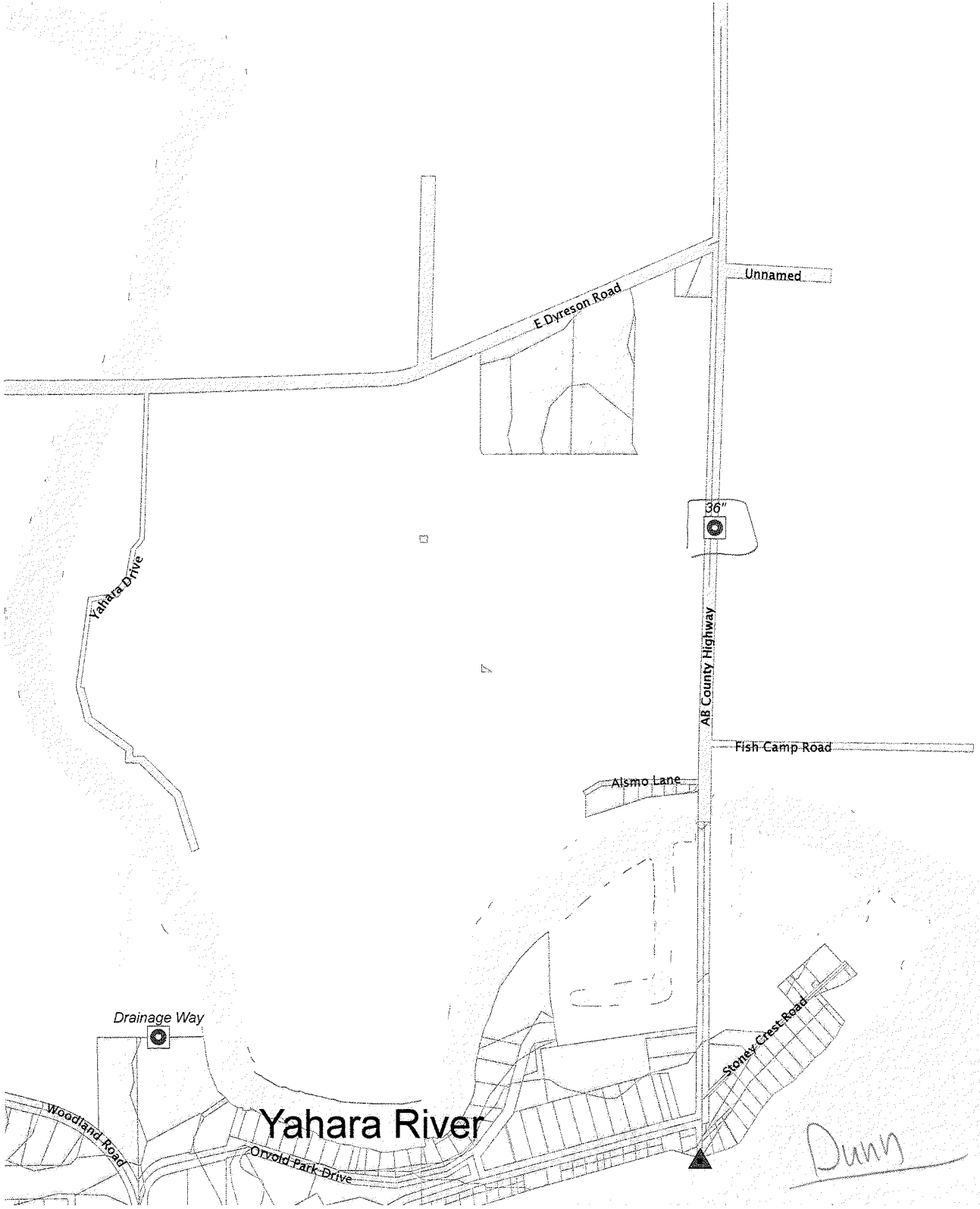
By _____
Edmond P. Minihan, Chairman

ATTTESTED: _____
Rosalind Gausman, Clerk Treasurer

Approved: 9/17/2007
Posted: 9/19/2007
Published: _____

APPENDIX C- TOWN OF DUNN DRY WEATHER OUTFALL SCREENING FORMS-2008 AND 2009 INSPECTIONS


USGS 05429500 YAHARA RIVER AT MC FARLAND, WI
DAILY Precipitation, total, inches
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Aug 02 2009
Aug 03 2009
Aug 04 2009
Aug 05 2009
Aug 06 2009
---- Provisional Data Subject to Revision ----



Door Creek

Lake Kegonsa

2

Lake Kegonsa
Audrey Lane
Dyreson Road
Schneider Drive
32" x 48"
~500'
36"x72" Box
Infiltration Pond
51 United States Highway
Norman Drive
Perch Court
Charles Lane
Trout Trail
Bass Circle
Rain Garden
Drainage Way
Rain Gardens
Lake Kegonsa Road
Cox Road
Drainage Way
Barber Drive
Drainage Way
Mallard Avenue
24"
Quam Drive
Dunn
3

Goodland Park Road
Lake Farm Road
Berkan Street
Unnamed
Lalor Road
Lake Waubesa
Bible Camp Road
Exchange Street
Lani Lane
North Pass
Country Walk
Elvehjem Road
Elvehjem Road
Yahara River
E Tower Road
Lower Mud Lake
Door Creek
Orchard Street
Tower Road
Jordan Drive
S Jordan Drive
Mahoney Rd
Unnamed
E Dyreson Road
Fish Camp Rd
Stace Road
Evans Road
Lookout Trail
51 United States Highway
Woodland Road
Yahara River
Dunn
Mahoney Road
Keenan Road
Liatris Lane
AB County Highway
B County Highway
Lake Kegonsa
Schneider Drive
Charles Lane
Sand Hill Road
Greene Road
Barber Drive
Cox Road
Quam Drive
Hawkinson Road
Halvorson Road
S Brooklyn Drive
Dunnwood Way
Lake Kegonsa Road
Hook Island Road
Labrador Road
Unnamed
Rutland-Dunn Town Line Road

DRY WEATHER DISCHARGE OBSERVATION FORM

Town of Dunn

Name: Nick Derent	
Date: 8/6/09	**Time:** 1:51
Outfall Location: Mahoney Dr. (S of Stace Dr)	
Weather: Partly Cloudy	
Last Rain Over .01 Inch:	**Discharge Observed:** Y (N)

If Observed			
Flow Rate:			
	YES	**NO**	**NOTES**
Smell	☐	☐	
Turbidity	☐	☐	
Sheen	☐	☐	
Surface Scum	☐	☐	
Discoloration	☐	☐	
NOTES:			

OUTFALL PICTURES: #1
#2
~#3

DRY WEATHER DISCHARGE OBSERVATION FORM

Town of Dunn

Name: Nick Deerna	
Date: 8/6/09	**Time:** 2:10
Outfall Location: Cty. Hwy AB	
Weather: Partly Cloudy	
Last Rain Over .01 Inch:	**Discharge Observed:** Y (N)

If Observed			
Flow Rate:			
	YES	**NO**	**NOTES**
Smell	☐	☐	
Turbidity	☐	☐	
Sheen	☐	☐	
Surface Scum	☐	☐	
Discoloration	☐	☐	
NOTES:			

OUTFALL PICTURES: #5 (SB Lane)
#6 (SB Lane)
#7 (NB Lane)

DRY WEATHER DISCHARGE OBSERVATION FORM

Town of Dunn

Name: Nick Decent	
Date: 8/6/09	**Time:** 2:25
Outfall Location: Hwy 51, S. of Schneider Dr	
Weather: Partly Cloudy	
Last Rain Over .01 Inch:	**Discharge Observed:** Y (N)

If Observed			
Flow Rate:			
	YES	**NO**	**NOTES**
Smell	☐	☐	
Turbidity	☐	☐	
Sheen	☐	☐	
Surface Scum	☐	☐	
Discoloration	☐	☐	
NOTES: Dry			

OUTFALL PICTURES: #8
#9
#10

APPENDIX D- TOWN OF DUNN EXISTING STORM WATER CONTROL ORDINANCE

1. Section 11-15 Section (6) "Waste Disposal"

(1) **Dumping of Rubbish Regulated.**

A) PROPERTY OWNERS NOT TO PERMIT DUMPING WITHOUT PERMIT. No person, firm or corporation owning, controlling or occupying real estate within the Town shall permit or allow the dumping of garbage, ashes, rubbish, miscellaneous wastes, manure, or other substances upon said real estate without first having been granted a permit therefor by the Town Board.

B) DUMPING PROHIBITED UNLESS AUTHORIZED. No person, firm or corporation shall dump or deposit anywhere within the Town of Dunn any garbage, ashes, rubbish, miscellaneous wastes, manure or other substances except in such places as may be authorized by the Town Board by permit.

C) DUMPING: OWNER'S CONSENT REQUIRED. No person shall dump or deposit any garbage, ashes, rubbish, miscellaneous wastes, manure or other substances upon private property unless the written consent of the owner or his/her authorized agent shall first be obtained and filed with the Town Board.

2) **Littering Prohibited.** No person shall throw or deposit any glass, can plastic or metal container, paper, refuse, waste, filth or other litter upon the streets, alleys, highways, public parks, or other public or private property within the town other than in proper receptacles intended therefor.

3) **Placing Trash for Pickup Regulated.** No person, firm or corporation shall place garbage cans, garbage bags, or other trash or recycling receptacles along any street, alley, highway, or other roadway within the Town; provided that this subsection shall not apply to the placement of such receptacles within 24 hours of a regularly scheduled time for garbage removal.

4) **Storage of Junk, Etc... Prohibited.** No person, firm or corporation shall store junk or discarded property including trucks, tractors, refrigerators, furnaces, washing machines, appliances, stoves, machinery or machinery parts, wood, bricks, cement blocks, other unsightly debris, or other items no longer used for their original purpose, except in an enclosure which houses such property from public view or upon permit issued by

2. Section 14-02 Debris on public or Private Property

Section 1: Debris on Public or Private Property

No person shall throw or deposit any type of debris or waste material on or along any highway or on any other public or private property.

Section 2: Penalty

Any person violating Section 1 of this ordinance shall be required to forfeit no more than $50.00 for each offense.

Section 4: Failure to Control Waste

Any person who fails to control or store any debris, waste material, trash or garbage so that it becomes deposited on or along any highway or on any other public or private property shall be deemed in violation of Section 1 of this ordinance and shall be subject to the penalty set forth in Section 2 of this ordinance.

Section 5: Liability for Another's Failure to Control Waste

Any person who employs, contracts, engages or utilizes with or without financial recompense another person to transport, store, or discard any debris, waste material, trash or garbage, who then fails to control this material so that it becomes deposited on or along any highway or on any other public or public property, shall be deemed in violation of Section 1 of this ordinance and subject to the penalty set forth in Section 2 of this ordinance.

Section 1: Dumping of Rubbish Regulated

(a) DEFINITION - The word "rubbish as used in this section shall mean any garbage, ashes, or miscellaneous wastes or other substances other than agriculture or landscape related.

(b) PROPERTY OWNERS NOT TO PERMIT DUMPING WITHOUT A PERMIT. No person, firm or corporation owning, controlling or occupying real estate within the Town of Dunn shall permit or allow the dumping of rubbish as defined in (a) above, upon said real estate without first having been granted a permit to do so by the Town Board.

(c) DUMPING PROHIBITED UNLESS AUTHORIZED. No person, firm or corporation shall dump or deposit anywhere in the Town any rubbish as defined in (a) above, except in such places as may be authorized.

(d) OWNER'S CONSENT REQUIRED. No person shall dump or deposit any rubbish as defined in (a) above, upon private property unless the written consent of the owner or his/her authorized agent shall first be filed with the Town Board.

Section 2: Littering Prohibited

No person shall throw or deposit any litter or other refuse on the streets, alleys, highways, public parks, or other public or private property within the town other than in proper receptacles.

Section 3: Placing Trash for Pickup Regulated

No person, firm or corporation shall place garbage cans, garbage bags, or other trash receptacles along any street, alley, highway, or other roadway within the town; provided that this subsection shall not apply to the placement of such receptacles within 24 hours of a regularly scheduled time for garbage removal. Every day during which such receptacles are permitted to remain shall constitute a separate offense.

Section 4: Use of Town Landfill Regulated

The town owned and operated landfill is for the use of residents only for disposal of refuse generated on real estate within the Town of Dunn.

(a) Use of the town landfill requires a sticker with a

number issued by the town clerk.

(b) Garbage enroute to the town landfill must be bagged or covered and tied down.
(c) Disposal of tires at the town landfill will require a $2.00 fee per tire.

Section 5: Disposal of Newsprint

(a) Newsprint includes newspapers, advertising circulares printed on newsprint, and normally accompanying newspapers, but shall not include books, magazines and periodicals.
(b) All newsprint shall be securely tied in both directions with heavy string or cord in bundles of 30 pounds or less, and shall not be placed in containers with other refuse or garbage. Such bundles shall, at the option of the householder, be placed at the roadside with other refuse on the regular refuse collection day to be collected by private refuse collector, or may be taken to the town landfill or other location for recycling and placed in the designated location for recyclable newsprint.

Section 6: Penalty

Any person violating the provisions of subsections 1 through 5 shall forfeit not less than $10.00 nor more than $50.00 for each offense.

(d) PERMIT - PUBLIC PROPERTY. No person, firm, corporation or other entity shall dump or deposit on public property in the Town any rubbish, as defined in (b) above, except in such places as may be authorized by the Town, or, if not authorized, without first having been granted a permit to do so by the Town Board under Section 6 of this Ordinance.

2. Section 6 of Ordinance No. 14-3 shall be repealed and recreated to provide as follows:

Section 6: Dumping/Depositing Application and Permit

(a) APPLICATION. An application for a permit required under this Ordinance shall be filed with the Town Clerk. The application shall include a sworn statement that the application is true and factual. The application shall include the following information:

(1) The name, address and telephone number of the applicant;

(2) The location, current owners and legal description of the site of the proposed dumping or depositing;

(3) The names and addresses of the owners of all property located within one-half mile of the site of the proposed dumping or depositing;

(4) Names, addresses and telephone numbers of any persons who will represent the applicant;

(5) Copies of available site reports, feasibility reports, engineering plans, or other documents filed or to be filed with the Department of Natural Resources, or the U.S. EPA, that are related to the proposed dumping or depositing;

(6) A plan for construction, operation, maintenance, closure and long-term care of the site proposed to receive the dumping or depositing. The plan must describe the size, capacity and other features of the site and its proposed future;

ORDINANCE NO. 14-3a
TOWN OF DUNN

AN ORDINANCE TO REPEAL AND RECREATE SECTIONS 1 AND 6 OF ORDINANCE NO. 14-3 AND TO CREATE SECTIONS 7, 8, 9 AND 10 OF ORDINANCE NO. 14-3 OF THE TOWN CODE OF ORDINANCES, RELATING TO OFFENSES AGAINST PUBLIC PROPERTY/WASTE DISPOSAL

The Town Board of Supervisors of the Town of Dunn, Dane County, Wisconsin, do ordain as follows:

1. Section 1 of Ordinance No. 14-3, shall be repealed and recreated to provide as follows:

Section 1: Dumping of Rubbish Regulated

(a) PURPOSE. The purpose of this ordinance is to regulate the dumping or deposit of rubbish, as defined in (b) of this section, and other waste products by persons, firms, corporations and other entities within the Town of Dunn. Because of the possible danger to the health, safety and welfare of the public, and because of the Town's long-time commitment to agriculture, such dumping or deposit within the Town shall be permitted only under the terms and conditions of this Ordinance.

(b) DEFINITION. The word "rubbish" shall mean any garbage, ashes, or miscellaneous wastes or other substances other than agriculture or landscape related, but including petroleum - or other - contaminated soil.

(c) PERMIT AND OWNER'S CONSENT - PRIVATE PROPERTY. No person, firm, corporation or other entity shall dump or deposit any rubbish, as defined in (b) above, upon private property or real estate in the Town of Dunn without first having filed the written consent of the owner or his/her authorized agent with the Town Board and without first having been granted a permit to do so by the Town Board under Section 6 of this Ordinance.

3. Animal feces pickup Section 11.61-6 (e)

(e) **Animal Feces**. The owner or person in charge of any dog or other animal shall not permitsolid fecal matter of such animal to deposit on any street, alley or other public or private property, unless such matter is immediately removed there from by said owner or person in charge. This Section shall not apply to a person who is visually or physically handicapped.

4. Section 14-5 Recycling Ordinance

TOWN OF DUNN

ORDINANCE #14-5A

AN ORDINANCE TO REVOKE CHAPTER 14-5 AND
RECREATING CHAPTER 14-5 OF THE GENERAL CODE OF ORDINANCES

The Town Board of the Town of Dunn, Dane County, Wisconsin does ordain that Chapter 14-5 of the General Code of the Town of Dunn, entitled Public Health and Sanitation, "Recycling Ordinance" be and the same is revoked and hereby re-created to read as follows:

TOWN OF DUNN

ORDINANCE #14-5A

RECYCLING ORDINANCE

The Town Board of the Town of Dunn, Dane County, Wisconsin, hereby ordains as follows:

Section 1: Purpose

(1) The purpose of this ordinance is to promote recycling, composting, and resource recovery through the administration of an effective recycling program, as provided in Chapter 159.11 of Wisconsin Statutes and Chapter NR 544 of the Wisconsin Administrative Code.

(2) The provisions of this ordinance shall be administered by the Town Board or designee of the Town Board in accordance with the purpose of the ordinance.

Section 2: Statutory Authority

(1) This ordinance is adopted as authorized under Chapter 159.09(3)(b), Wisconsin Statutes.

Section 3: Definitions

(1) The following words are defined in this ordinance as follows:

(a) "Collector" means the contractor or entity authorized by the Town Board to collect, transport and dispose of the community's solid waste, recyclable and non-recyclable, or, person or persons contracting with waste generators for these services, and who will enforce preparation standards for recyclable materials as well as ensure community compliance with this source separation recycling program.
(b) "Corrugated cardboard" means heavy duty Kraft paper packaging material with a corrugated medium between two flat paper liners, and does not include paperboard such as for cereal or laundry detergent boxes or holders for 6 packs or 12 packs of beverage cans or bottles.
(c) "Garbage" means discarded materials resulting from the handling, processing, storage and consumption of food.
(d) "Glass" means discarded glass bottles, jars and

containers and does not include window glass, drinking glasses, pyrex, light bulbs or other non-container glass.

(e) "Good faith" means reasonable efforts to adhere to the policies, standards and rules of this mandatory source separation recycling program.

(f) "Hazardous waste" or "hazardous substance" means those wastes or substances defined thusly in NR 181 of the Wisconsin Administrative Code (including all amendments provided thereto) pursuant to authority vested in the Wisconsin Department of Natural Resources to describe and list materials thusly and also includes those solid wastes or substances found in household waste (notwithstanding the household waste exclusion provided in s. NR 181.12(4)(a), Wisconsin Administrative Code.)

(g) "Household Sharp Medical Waste" means any type of product capable of puncturing or lacerating the skin that is designed or used to treat, diagnose, or prevent a disease or medical condition, including, but not limited to, scalpels and hypodermic needles.

(h) "Lead-acid batteries" means automotive and related batteries that are comprised of lead plates with an acid electrolyte, and does not include nickel-cadmium batteries, dry cell (flashlight) batteries or batteries used in calculators, watches, hearing aids or similar devices.

(i) "Major appliance" means a residential or commercial air conditioner, clothes dryer, clothes washer, dishwasher, freezer, microwave oven, oven, refrigerator, stove, water heater or any other item commonly referred to as a white good.

(j) "Metal cans" means tin coated steel cans, bi-metal cans, and aluminum cans used for food and other non-hazardous materials but excluding aerosol cans and cans that held paint, paint related products, pesticides or other toxic or hazardous substances.

(k) "Multi-family dwelling" means a residential dwelling place intended to be the residence of more than four independent family units.

(l) "Newspapers" means matter printed on newsprint including daily or weekly publications and advertising materials but excludes glossy paper, magazines, catalogs or similar materials.

(m) "Non-recyclable material" means all items or waste not recyclable except hazardous waste or hazardous substances.

(n) "Other paper" shall mean all paper excluding newsprint materials or materials specifically excepted in the definition of "newspapers", and "corrugated cardboard" but shall include grades of fiber materials with available markets for recycling.

(o) "Oversize and bulky waste" means large items such as furniture, mattresses, carpeting, construction or demolition materials of substantial dimensions, brush and other large items whose proportions are not easily reduced.
(p) "Person" includes any individual, corporation, organization, association, or other entity, local governmental unit, as defined in section 66.299(1), Wis. Stats., state agency or authority or federal agency.
(q) "Plastic container" means a blow molded plastic bottle made of high density polyethylene (HDPE) or a plastic bottle or jar made of polyethylene terephthalate (PET), but does not include HDPE containers that are not blow molded including but not limited to containers for yogurt, cottage cheese, butter, margarine, ice cream and similar products.
(r) "Preparation standards" shall mean criteria provided establishing acceptable good faith limits for introduction of materials into the source separation recycling program involving either transport to a material recycling center or temporary storage of such materials.
(s) "Recyclable material" means identified materials meeting preparation standards and shall include the following: newspapers; corrugated cardboard; [unbroken] brown, green and clear container glass; aluminum, bi-metal and tin-coated steel cans; blow-molded HDPE and PET plastic containers; tires; used oil, lead-acid batteries; and large appliances. "Recyclable material" further means all materials identified as recyclable material in Wis. Statutes 159.07(3)(4) and NR 544.06 of the Wisconsin Administrative Code, as amended from time to time.
(t) "Rubbish" means combustible and non-combustible materials including, but not limited to: paper products, wood, metal, glass, cloth and products thereof in unrecoverable condition; litter and street rubbish not including yard waste; uncontaminated ashes. "Rubbish" for purposes of this ordinance shall not include "oversize or bulky waste".
(u) "Sharps Container" means a container specifically manufactured for the disposal of sharp medical waste.
(v) "Solid Waste" means garbage, rubbish and all other discarded or salvageable solid materials, including solid waste materials resulting from industrial, commercial and agricultural operations, and from community activities, but does not include solids or dissolved material in waste water effluents or other common water pollutants.

(w) "Solid waste storage" shall mean safe, environmentally sound short-term containment of materials and for recyclable material shall involve preserving materials in a condition meeting preparation standards.
(x) "Tires" for collection purposes shall means rubber tires, from automobile and light truck tires and other tires which are removed from rims.
(y) "Used oil" means any contaminated petroleum-derived or synthetic oil including but not limited to the following: engine and other mechanical lubricants; hydraulic and transmission fluid; metalworking fluid; and, insulating fluid or coolant.
(z) "Yard waste" means leaves, grass clippings, yard and garden debris, including clean woody vegetative material no greater than six (6) inches in diameter and holiday trees, but does not include tree stumps, extensive root systems or shrubs with intact root balls.

Section 4: Applicability

(1) This ordinance shall apply to all persons, and appropriate waste generating activities, within the Town of Dunn.

Section 5: Conflict and Severability

(1) The provisions of this ordinance shall be held to be minimum requirements and shall not be deemed a limitation or repeal of any other power granted by the Wisconsin Statutes or pertinent Dane County Ordinances in their interpretation and application. Because this ordinance creates a comprehensive, mandatory source separation recycling program in our community, where any terms or requirements of this ordinance may be inconsistent or conflicting, the more restrictive requirements or interpretations consistent with state and county law shall control. If any section, provision or portion of this ordinance is found unconstitutional or invalid by a court, the remainder of the ordinance shall remain enforceable and shall not be affected by that ruling.

Section 6: Preparation Standards

(1) Preparation standards for recyclable materials shall be provided by notice to generators of waste and collectors by the Town or the collector under contract with the Town or individual persons. When additional materials become

recyclable, preparation standards for them will be established by the Town or Collector dependent upon available economic markets.

(2) Acceptable recyclable materials shall be prepared in accordance with the following standards for collection purposes pursuant to this ordinance:

a) "Newsprint" shall be dry, free of paper not normally included in the newspaper and not sunburned.
b) "Corrugated Cardboard" shall be flattened, empty and free of food debris and other contaminating material;
c) "Glass Containers" shall be unbroken, empty, clean and free of metal caps and rings, other contaminates such as window glass, drinking glasses, ceramics and similar material;
d) "Metal Cans" shall be empty with ends removed and flattened where possible, and clean with labels removed;
e) "Plastic Containers" shall not be tied together, and shall be empty, clean, flattened, and have caps removed.
f) "Lead-acid Batteries" shall have all caps firmly attached and be free from leaks.
g) "Tires" shall include automobile and light truck tires and other tires, removed from rims.

(3) All garbage placed for collection shall be well drained, wrapped and deposited in water tight containers or water tight bags. No container or bag placed for collection shall exceed 32 gallons in capacity or 50 lbs. in weight.

(4) Household Sharp Medical Waste Disposal. Household sharp medical waste shall not be deposited in any place or manner in the Town of Dunn other than as hereinafter provided:

(a) Acceptable means of disposing of household sharp medical waste include:

1. Disposal in an approval medical waste box, such as a Sharps container; or
2. Disposal in a heavy plastic container, such as a laundry soap bottle, providing that the lid is permanently affixed thereto using tape or another means, and the container is marked "Medical Waste: Do Not Open".

(b) No container for household sharp medical waste or loose household sharp medical waste may be mixed with recyclables.

(5) Any garbage or rubbish not placed for collection in accordance with the provisions of this section may be refused by the collector.

(6) Grass, leaves and brush shall not be collected with the intent of disposal at sanitary landfills. The Town shall not be responsible for handling yard waste. All persons who generate yard waste shall be responsible for appropriate disposal of yard waste from properties owned or occupied by the aforementioned persons. Composting of yard waste on private property is permitted where no nuisance to others occurs. The Town of Dunn provides a collection site for yard waste where residents of the Town of Dunn may dispose of yard waste.

Section 7: Required Separation of Solid Waste

(1) The owner or occupant of each residence, residential unit, place of business, church, industry or commerce or other place providing goods or services of any type shall cooperate in the recycling of recyclable material by performing the following:

(a) Except as provided in (c) and (d) hereafter, all recyclable material shall be separated from other solid waste, grouped together by like materials and placed in containers for collection according to the collection schedule established under Section 8. Recyclables shall not be placed in containers with other solid waste.

(b) Newspaper and Corrugated cardboard. Newspapers shall be placed in a suitable container marked "NEWSPAPER" and placed at the curb line with solid waste on the designated collection date for the Town's collector. No newspapers, except newspapers rendered useless for recycling purposes, shall be disposed of in any manner by any resident or business so as to result in newspapers being disposed of in the Dane County sanitary landfill or any private landfill. Corrugated cardboard shall be flattened and securely tied in bundles or placed in suitable containers facilitating handling and collection. Corrugated cardboard and newspaper shall not be intermixed, bundled together or mixed with other recyclable materials such as paper.

(c) Owners of multi-family dwellings in the Town of Dunn must provide adequate containers for handling and collection of recyclable materials enabling tenants to ensure separation of recyclables and ensuring that recyclables meet preparation standards. The following shall be acceptable means of providing containers: providing a series of containers for the complex or sub-units thereof with unique containers for each type of recyclable to be shared in common by occupants of

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the multi-family dwelling not including provisions for major appliances or used oil with sufficient, separate containers to achieve good faith separation of recyclables based upon size of the multi-family dwelling, and handling, transportation and processing requirements for the collector. Containers shall be clearly designated and marked as to the recyclable contained therein, and containers shall be maintained in a clean, safe and watertight condition.

(d) Owners of commercial, retail, industrial and governmental facilities in the Town of Dunn must provide separate containers for recyclable materials and regular collection of those containers; and, must notify all users of their facilities of county and municipal recycling requirements.

(e) All persons who are generators of the following types of waste shall make appropriate arrangements for collection, transportation and disposal of these materials at their own expense: lead-acid batteries, major appliances, tires, large metal products and used oil.

(f) Grass, leaves and brush are not to be included in solid waste, as they are banned from landfills.

(g) Owners of multiple family dwellings, commercial, retail, government and industrial facilities shall notify users, tenants and occupants of reasons to reduce and recycle, which materials are collected, how to prepare materials in order to meet the processing requirements, collection methods or sites, locations and hours of operation, and a contact person or company, including a name, address and telephone number.

(h) The requirements specified in (c) (d) and (g) above do not apply to the owners or designated agents of non-residential facilities and properties or multiple family dwellings if the post-consumer waste generated within the facility or property is treated at a processing facility licensed by the Department of Natural Resources that recovers for recycling the materials specified in section 7 (1)(a)(b) from solid waste in as pure a form as is technically feasible.

(2) It shall be unlawful to bring into the Town of Dunn for disposal refuse or recyclables from outside the Town of Dunn.

(3) A collector may not dispose in a landfill or burn in a solid

waste facility any recyclable materials generated in the Town of Dunn that have been separated for recycling.

(4) To the greatest extent practicable, the recyclable materials separated in accordance with Section 7(1) shall be clean and kept free of contaminants such as food or product residue, oil or grease, or other non-recyclable materials, including but not limited to household hazardous waste, medical waste, and agricultural chemical containers. Recyclable materials shall be stored in a manner which protects them from wind, rain, and other inclement weather conditions.

(5) Separation requirements of this ordinance do not apply to a recyclable material for which a variance has been granted by the Department of Natural Resources under s. 159.11(2m), Wis. Stats., or s. NR 544.14, Wis. Administrative Code.

Section 8: Collection Schedule

(1) The Town Board and Town's collector shall establish the time of collection of solid waste, including recyclable materials, and the clerk shall distribute the collection schedule according to regulation established under Section 15.

(2) All persons having solid waste, including recyclable materials, shall place the same in containers or water-tight bags or bundles as herein required at the collection point not sooner than 24 hours prior to the regularly scheduled collection time and no person shall permit solid waste containers thereof to accumulate or remain at the curb line longer than 12 hours thereafter.

Section 9: Placing of Solid Waste for Collection

(1) Except as otherwise specifically directed or authorized by the Town Board under (2), solid waste containers from all residential premises shall be placed at the curb line adjacent to the street designated in the published collection schedule.

(2) The Town Board may direct or authorize the placing of solid waste containers in a manner different than that provided herein in order to facilitate a more reasonable mode of collection from particular premises.

Section 10: Garbage or Rubbish not to be Deposited in any Other Place or Manner than herein Provided.

(1) No person shall place any garbage on any street, or other public or private property unless the same shall be placed

in containers or bags for town collection at the times and in the manner as herein provided.

(2) No person shall place for collection any solid waste at the curb line or adjacent to any premises not owned or occupied by such person.

Section 11: Recyclable Material Property of Town

(1) All residential recyclable material collected and deposited as provided in this section shall be the property of the Town.

(2) Recyclables collected privately for businesses and apartments are the property of those entities.

Section 12: Items not to be Placed for Pick Up

(1) No person shall dump, deposit or place at the curb line adjacent to any street for collection by the town or for any other purpose any of the following:

(a) Large amounts of stone, concrete, rubber, earth or sod.
(b) Lead-acid batteries and tires.
(c) Grass, leaves and brush.
(d) Containers over 32 gallons or over 50 lbs.
(e) Garbage or rubbish in such a manner as will permit strewing by animals or vandals prior to collection.

Section 13: Anti-scavenging Provision

(1) Persons shall not pilfer recyclables or disturb recyclable materials placed for collection. All recyclable materials placed for collection pursuant to this ordinance shall thereupon become the property of the municipality, or, the municipality's authorized agent, or, a private collector whom persons in the municipality have contracted to perform functions pursuant to the recycling plan provided in this ordinance. Only persons authorized by the municipality or the generator of waste shall collect or handle recyclable materials once those materials have been placed appropriately for collection. Any and each collection by unauthorized persons in violation of this provision shall constitute a separate and distinct offense punishable as provided hereinafter.

Section 14: Violation and Penalty

(1) For the purpose of ascertaining compliance with the provisions of this ordinance, any authorized officer, employee or representative of the Town of Dunn may inspect recyclable materials separated for recycling, post-consumer waste intended for disposal, recycling collection sites and facilities, collection vehicles, collection areas of multiple-family dwellings and non-residential facilities and properties, and any records relating to recycling activities, which shall be kept confidential when necessary to protect proprietary information. No person may refuse access to any authorized officer, employee or authorized representative of the Town of Dunn who requests access for purposes of inspection, and who presents appropriate credentials. No person may obstruct, hamper, or interfere with such an inspection.

(2) Any person who violates a provision of this ordinance may be issued a citation by a Town of Dunn law enforcement officer to collect forfeitures. The issuance of a citation shall not preclude proceeding under any other ordinance or law relating to the same or any other matter. Proceeding under any other ordinance or law relating to the same or any other matter shall not preclude the issuance of a citation under this paragraph.

(3) Any person who violates any provision of this ordinance or any regulations promulgated pursuant to this ordinance shall forfeit upon conviction thereof not less than Fifty Dollars ($50.00) nor more than Two Hundred Dollars ($200.00) for each separate violation hereunder, provided that the range of forfeiture for the third and any subsequent violation of this ordinance or regulations promulgated pursuant thereto within a twelve month period shall be not less than One Hundred Dollars ($100.00) nor more than Five Hundred Dollars ($500.00) for each separate violation. Each incident of violation shall be a separate offense and each day or part thereof during which a violation occurs or continues shall be deemed a separate offense. In addition to or in lieu of the penalty provided herein, the violator may be required by court order to clean up, remove or pay the cost of clean up or removal of any garbage or rubbish placed in violation of this ordinance and pay for the cost of all medical care necessary should any injury be caused by the improper disposal of household sharp medical waste.

Section 15: Promulgation of Regulations

(1) Town Board of the Town of Dunn shall prepare regulations, standards and schedules as necessary to make effective all

Appendix E- Town Winter Road De-icing Information

TOWN OF DUNN - 4156 COUNTY ROAD B, McFARLAND, WI 53558
Website: www.town.dunn.wi.us
E-mail: townhall@town.dunn.wi.us

Phone: (608) 255-4219
FAX: (608) 835-5700

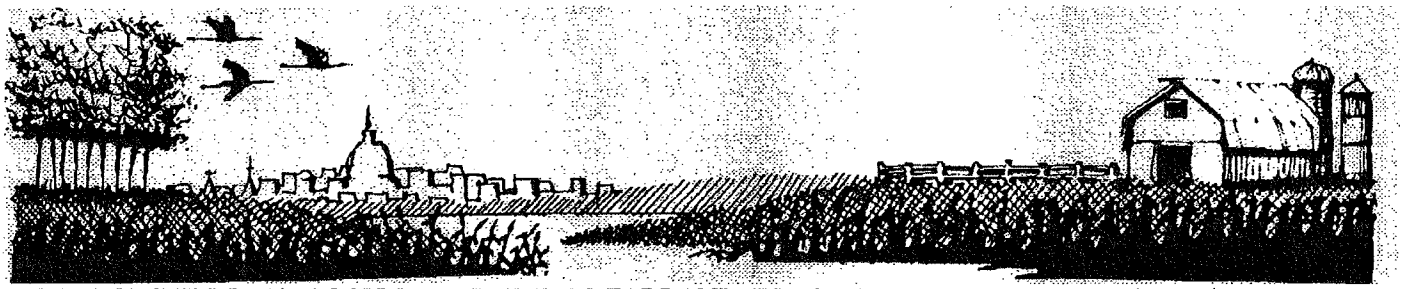
Fax to: CHUCK NAHN

From: JAY HOEL
TOWN OF DUNN - PUBLIC WORKS

Date: JUNE 18TH, 2010

RE: SALT USAGE

OF PAGES INCLUDING THIS PAGE — 3



TOWN OF DUNN - 4156 COUNTY ROAD B, McFARLAND, WI 53558 Phone: (608) 838-1081
Website: http://town.dunn.wi.us
E-mail: townhall@town.dunn.wi.us FAX: (608) 838-1085

June 18, 2010

Mr. Chuck Nahn
Nahn and Associates, L.L.C.
2564 Branch Street – Suite B2
Middleton, WI 53562

Dear Mr. Nahn,

From 2004/2005 to 2009/2010 winters, the Town of Dunn has had on average between 20 to 25 snow/ice events per winter plowing season. Individual events vary from 1" or less to 16" or more.

The Town of Dunn has 3 patrol trucks that go out on each winter snow or ice event. The Town of Dunn has approximately 70 miles of road and each truck covers approximately 20 to 25 miles of road or 40 to 50 lane miles. Prior to 2002 we had dispensed straight road salt. Beginning in 2002 we began a 60/40 sand to road salt mixture. Each snow/ice event will differ in intensity, duration and precipitation type thus increasing or decreasing total amounts of mixture dispensed. On average we dispense 5.5 cubic yards of sand /road salt mixture per truck per snow/ice event

The following page is a salt usage comparison of area municipalities

Sincerely,

Jay Hoel
Town of Dunn
Public Works Superintendent

COMPARISION OF SALT USAGE

MUNICIPALITY	SALT CONTRACT TONS	SALT CONTRACT POUNDS	ESTIMATED LANE MILES	# SALT/ MI/YEAR
TOWN OF ALBION	585	1,170,000	100.34	11,660.35
TOWN OF CHRISTIANA	230	460,000	93.04	4,944.11
TOWN OF COTTAGE GROVE	437	874,000	134.34	6,505.88
TOWN OF DUNKIRK	200	400,000	94.88	4,215.85
TOWN OF DUNN	440	880,000	129.60	6,790.12
TOWN OF MONTROSE	172	344,000	82.86	4,151.58
TOWN OF OREGON	575	1,150,000	120.98	9,505.70
TOWN OF SPRINGFIELD	575	1,150,000	78.12	14,720.94
TOWN OF SUN PRAIRIE	450	900,000	87.92	10,236.58
TOWN OF VERONA	575	1,150,000	72.06	15,958.92
TOWN OF WESTPORT	300	600,000	136.16	4,406.58
TOWN OF WINSOR	725	1,450,000	136.16	10,649.24
TOWN OF YORK	143	286,000	93.84	3,047.74
VILLAGE OF CAMBRIDGE	226	452,000	14.66	30,832.20
VILLAGE OF MARSHALL	140	280,000	27.36	10,233.92
VILLAGE OF MT HOREB	805	1,610,000	74.38	21,645.60
VILLAGE OF OREGON	460	920,000	83.26	11,049.72
CITY OF FITCHBURG	1740	3,480,000	236.14	14,737.02
CITY OF MADISON	8050	16,100,000	1,705.00	9,442.82
CITY OF MIDDLETON	1600	3,200,000	137.76	23,228.80
CITY OF SUN PRAIRIE	1840	3,680,000	252.92	14,550.06
CITY OF VERONA	1355	2,710,000	106.42	25,465.14

Information obtained from:
Road miles - WISL
Salt contracts - WI DOT

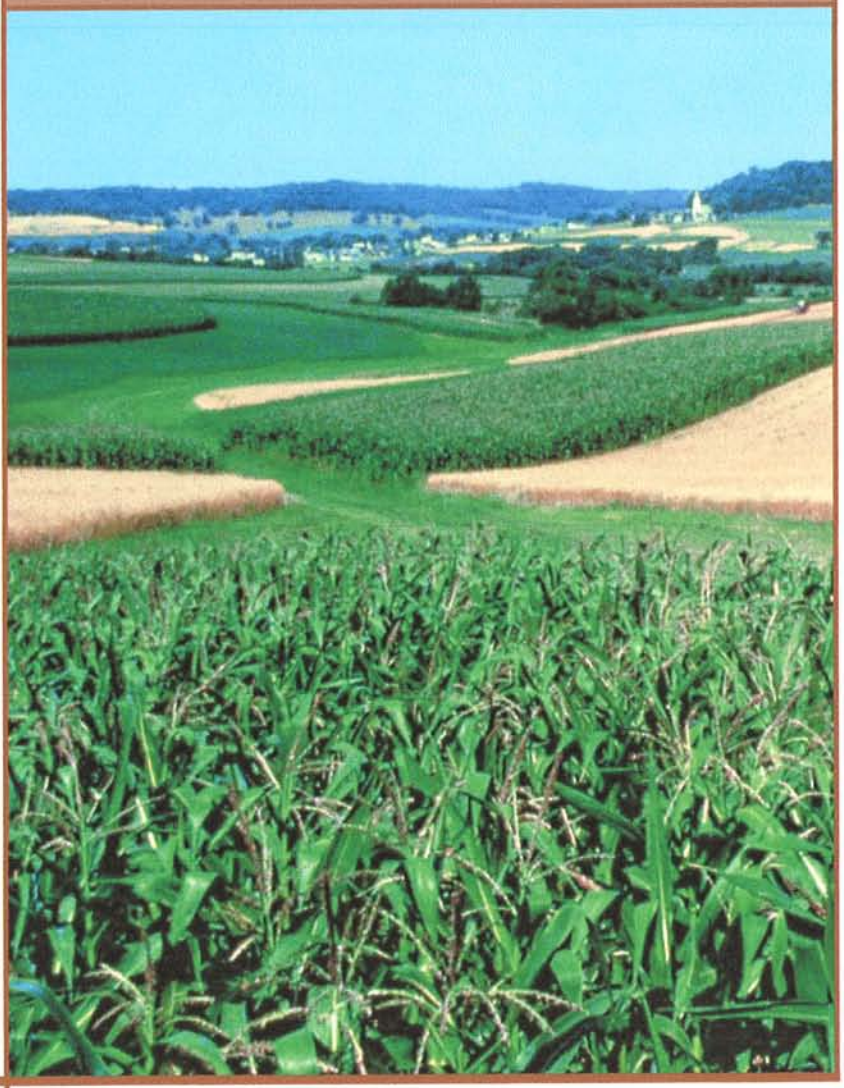
Appendix F- Wisconsin Working Lands Initiative

Compliance Checklist

November 2004

DNR Pub. No. WT 756-2004

Wisconsin's Runoff Rules: What Farmers Need to Know



Wisconsin's rules to control polluted runoff from farms, as well as other sources, went into effect October 1, 2002. The state Legislature passed the rules to help protect Wisconsin's lakes, streams and groundwater.

DNR rule NR 151 sets performance standards and prohibitions for farms. It also sets urban performance standards to control construction site erosion, manage runoff from streets and roads, and manage fertilizer use on large turf areas.

DATCP rule ATCP 50 identifies conservation practices that farmers must follow to meet performance standards. The DATCP rule also sets out the requirements for nutrient management plans. Your County LCD has primary responsibility for implementing the agricultural runoff standards.

What does this mean for you?

See the details inside...

Wisconsin Department of Natural Resources (DNR)

Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP)

In cooperation with:

USDA Natural Resources Conservation Service (NRCS)

University of Wisconsin-Extension (UWEX)

County Land Conservation Departments (LCD)

AGRICULTURAL STANDARDS & PROHIBITIONS

For farmers who grow agricultural crops

- Meet tolerable soil loss ("T") on cropped fields.

- Follow a nutrient management plan designed to limit entry of nutrients into state waters (groundwater and surface water)

Note: Nutrient management plans must be in place by Oct. 1, 2003 for new croplands; Jan. 1, 2005 for high priority waters *(e.g., impaired, exceptional/ outstanding resource waters, source water protection areas)* and Jan. 1, 2008 for all others.

For farmers who raise, feed, or house livestock

- Prevent direct runoff from feedlots or stored manure into state waters.

- Limit livestock access to state waters to avoid high concentrations of animals and maintain adequate or self-sustaining sod cover along waterways.

- Follow a nutrient management plan for manure application.

For farmers who have, or plan to build, a manure storage structure

- Maintain structures to prevent overflow.

- Repair or upgrade any failing or leaking structures that pose an imminent health threat or that violate groundwater standards.

- Close abandoned structures according to accepted standards.

- Meet technical standards for newly constructed or substantially altered structures.

Livestock operations planning to expand might need to apply for a permit from DNR. Contact your DNR Service Center for more information.

For farmers with land in a Water Quality Management Area

(300 feet from a stream, 1,000 feet from a lake, or in areas susceptible to groundwater contamination)

- Do not stack manure in unconfined piles.

- Divert clean water away from feedlots, manure storage areas, and barnyards located within this area.

NUTRIENT MANAGEMENT PLANS

To meet the new nutrient management standards, farmers may hire an agronomist or prepare their own nutrient management plans if they complete a DATCP-approved training course or otherwise demonstrate that they are qualified. These plans must:

- Rely on soil nutrient tests from a DATCP-certified laboratory.

- Comply with current NRCS Nutrient Management Standard 590.

- Follow the recommendations for nutrient applications in the Soil Test Recommendations for Field, Vegetable and Fruit Crops, UWEX publication A-2809, unless there are circumstances that justify more than the recommended application.

- Include additional management practices to reduce runoff of phosphorus or other nutrients if the farms have Wisconsin Pollutant Discharge Elimination System (WPDES) permits, or have fields near high priority waters (see note in left column).

COST SHARING

Many farmers voluntarily install conservation practices on their farms to help improve water quality and wildlife habitat and to help prevent soil erosion. Cost sharing is available for many practices.

Farmers can expect counties to continue to offer voluntary cost sharing. They may negotiate voluntary cost share contracts that:

- Pay for selected conservation practices, or selected costs.
- Pay for installation or maintenance, or both.
- Pay for some practices if a farmer agrees to install others without cost sharing.
- Pay alternative flat rates per acre for annual practices such as nutrient management and contour farming.
- Make payments for a specified number of years in return for a farmer's commitment to continue annual practices (such as nutrient management or contour farming).

Agricultural performance standards and prohibitions went into effect on October 1 2002, except for nutrient management (see note on page 2). Farmers who are in compliance on or after that date do not have a right to cost sharing if they later fall out of compliance. Farmers who establish new facilities (e.g., build new livestock housing or manure storage) may be eligible for cost sharing, but cost sharing is not required for compliance. Those covered by WPDES permits are not eligible for state cost sharing to meet performance standards and prohibitions required under their permits. They may be eligible for federal cost sharing under certain NRCS programs unless they have received a notice of violation or are under an enforcement action.

In most cases, farmers cannot be required to change an existing cropland practice or livestock facility on a farm to meet the new standards, unless they are offered cost sharing. Farmers are eligible for at least 70% cost sharing — more if there is an economic hardship.

Contact your county Land Conservation Department for current funding sources. Rates may change from year to year. Practices available for cost sharing and cost-share rates may also vary by county. Cost-share dollars through the USDA Natural Resources Conservation Service (NRCS) may be combined with other state or local cost-share programs, as long as the total does not exceed 100% of the cost.

COST SHARING COMPARISON

COVERED COSTS	STATE includes (CREP)	NRCS (EQIP)
Standard Rates	70%	50%
Economic Hardship	Up to 90%	Up to 75%
Flat Rates for some practices (nutrient management)	Yes	Yes
Installation	Yes	Yes
Farmer's contribution of labor, equipment, and supplies	Yes	Yes
Livestock facility expansion	Yes (with limits)	Yes
Maintenance	Varies	No
Mowing	Varies	No
Land taken out of production	Varies	No

CREP = Conservation Reserve Enhancement Program
EQIP = Environmental Quality Incentives Program

TWO REMINDERS . . .

FARMLAND PRESERVATION PROGRAM

Even if cost sharing is not available, a farmer must comply with state standards to receive the Farmland Preservation Tax Credit. The requirement applies to farmers whose land is either located in a district zoned as exclusive agricultural use or who signed a contract after county standards were in effect.
If a farmer has had time to come into compliance but problems have not been corrected, the county may seek to suspend a farmer's tax credits.

COUNTY LAND CONSERVATION DEPARTMENTS

Each county LCD will develop an implementation strategy including cost sharing and enforcement. Counties will use their DATCP-approved land and water resource management (LWRM) plans to identify local conservation needs and set priorities in a county. The LWRM plan will also outline the implementation strategy, including enforcement procedures.

FOR MORE INFORMATION ...

For more information on runoff management in Wisconsin and topics found in this brochure please visit:

runoffinfo.uwex.edu

Contact your county Land Conservation Department for more information.

Wisconsin DATCP
Bureau of Land & Water Resource Management

P.O. Box 8911
Madison, WI 53708

Wisconsin DNR
Runoff Management Section

P.O. Box 7921
Madison, WI 53707

IN COOPERATION WITH:

NRCS Natural Resources Conservation Service

UW Extension

County Land Conservation Departments

The cooperating agencies are EEO / Affirmative Action employers and provide equal opportunities in employment and programs including Title IX and ADA requirements.

ARM-LWR-480 (06/10)

Wisconsin Department of Agriculture, Trade & Consumer Protection
Division of Agricultural Resource Management
Bureau of Land and Water Resources
PO Box 8911, Madison WI 53708-8911, Phone: 608-224-4605

Nutrient Management Plan Checklist

Sec. 92.05(3)(k), Wis. Stats.
ATCP 50.04(3) Wis. Admin. Code

Use this form to check nutrient management (NM) plans for compliance with the WI NRCS 590 Standard (Sept. 2005).

County name:_____ Date Plan Submitted:_____ Growing season year NM plan is written for _____
Township (T.__N., S.) – (R.__E., W.) Initial Plan or Updated Plan (circle one) (from harvest to harvest)

Name of qualified nutrient management planner		Planner's business name, address, phone:
Circle the planner's qualification: 1. NAICC-CPCC 2. ASA-CCA 3. ASA-Professional Agronomist 4. SSSA-Soil Scientist 5. DATCP approved training course 6. Other credentials approved by DATCP	Cropland Acres (owned & rented)	Name of farm operator receiving nutrient management plan:
	Rented farm(s) landowner name(s) and acreage:	
Circle relevant program requirement or regulation the plan was developed for: Ordinance, USDA, DATCP, DNR, NR 243 – NOD or WPDES		

		Yes	No	NA
1.	**Are the following field features identified on maps or aerial photos in the plan?**			
a.	Field location, soil survey map unit(s), field boundary, acres and field identification number			
b.	Areas prohibited from receiving nutrient applications: Surface water, established concentrated flow channels with perennial cover, permanent non-harvested vegetative buffer, non-farmed wetlands, sinkholes, lands where established vegetation is not removed, nonmetallic mines, and fields eroding at a rate exceeding tolerable soil loss (T)			
c.	Areas within 50 feet of a potable drinking water well where mechanically-applied manure is prohibited			
d.	Areas prohibited from receiving winter nutrient applications: Slopes > 9% (12% if contour-cropped); Surface Water Quality Management Area (SWQMA) defined as land within 1,000 ft of lakes and ponds or within 300 ft of perennial streams draining to these waters, unless manure is deposited through winter gleaning/pasturing of plant residue and not exceeding the N and P requirements of this standard; Additional areas identified within a conservation plan as contributing runoff to surface or groundwater			
e.	Areas where winter applications are restricted unless effectively incorporated within 72 hours: Land contributing runoff within 200 feet upslope of direct conduits to groundwater such as a well, sinkhole, fractured bedrock at the surface, tile inlet, or nonmetallic mine			
f.	Sites vulnerable to N leaching: Areas within 1,000 feet of a municipal well, and soils listed in Appendix 1 of the Conservation Planning Technical Note WI-1			
2.	**Are erosion controls implemented so the crop rotation will not exceed T on fields that receive nutrients according to the conservation plan or WI P Index model?**			
3.	**Were soil samples collected and analyzed within the last 4 years according to UW Publication A2100 recommendations?**			
4.	**Using the field's predominant soil series and realistic yield goals, are planned nutrient application rates, timing, and methods of all forms of N, P, and K listed in the plan and consistent with UW Publication A 2809,** *Soil Test Recommendations for Field, Vegetable and Fruit Crops,* **and the 590 standard?**			
5.	**Do manure production and collection estimates correspond to the acreage needed in the plan? Are manure application rates realistic for the calibrated equipment used?**			
6.	**Is a single phosphorus (P) assessment of either the P Index or soil test P management strategy uniformly applied to all fields within a tract?**			
7.	**Are areas of concentrated flow, resulting in reoccurring gullies, planned to be protected with perennial vegetative cover?**			
8.	**Will nutrient applications on non-frozen soil within the SWQMA comply with the following?**			
a.	Unincorporated liquid manure on unsaturated soils will be applied according to Table 1 of the 590 standard to minimize runoff			
b.	One or more of the following practices will be used: 1) Install/maintain permanent vegetative buffers, or 2) Maintain greater than 30% crop residue or vegetative coverage on the surface after nutrient application, or 3) Incorporate nutrients leaving adequate residue to meet tolerable soil loss, or 4) Establish fall cover crops promptly following application			

I certify that the nutrient management plan represented by this checklist complies with Wisconsin's NRCS 590 nutrient management standard.
Signature of qualified nutrient management planner

ARM-LWR-479 (08/10)

Wisconsin Department of Agriculture, Trade & Consumer Protection
Division of Agricultural Resource Management
Bureau of Land and Water Resources
PO Box 8911, Madison WI 53708-8911, Phone: 608-224-4605

Nutrient Management Plan Review

Sec. 92.05(3)(k), Wis. Stats. ATCP 50.04(3) Wis. Admin. Code

This form and Snap Plus software are used to review nutrient management (NM) plans for compliance with the NRCS 590 Standard (September 2005). An "x" is placed in the **Yes** column for plan components that meet the standard 590; or in the **No** column if the plan is lacking. The reviewer will underline any item that is lacking in the second column and may provide more information in the last column. To improve future plans, copies of this review may be provided to the farmer, planner, and local conservation staff.

(please type or print)

Review date:_____ Reviewer Name:_____ NM Plan's Crop Year_____ County: _____

Planner Name: _____ Planner Address: _____

Farmer Name: _____ Farmer Address: _____

Does the NM plan have:	How to Check Using Snap Plus v 1.132 Plan Name: (underline plan problem)	Yes	No	Comments
1. a **Snap Plus database**	Open unzipped database in Snap Plus with File then Open. Browse for the file.			
2. consistent **field boundaries, numbering,** and **acres,** adjusted **slope** & **distance to water** not defaults (0-2%) (0-300'), [**dominant critical soil type, and N (nitrogen) soil, winter, non-winter surface water, well/groundwater conduit, concentrated flow**] application restrictions for all fields properly explained & mapped on soil/restriction maps	Compare map features to the Field Screen. Correct any soil type that does not reflect the steepest soil that covers 10% or more of the field. Correct any soil type's slope that is not consistent with the dominant critical series slope range. Make a note of which fields were changed then run ***Field Data & 590 Assessment Report*** see columns: Field Name and Acres, Soil series & map symbol, Below Field Slope To Water (%), Distance To Water (ft), N and Field Restrictions			
3. **concentrated flow** areas protected with perennial vegetation and **realistic yields** with **updates to actual**	Compare ***Narrative and Crops Report*** to maps for protected concentrated flow areas and compare yields over time for consistency in planning and actual updates.			
4. proper **soil testing** on every field at least every 4 years	Review ***Compliance Check Report*** for current soil tests, number of samples needed			
5. **N (nitrogen) soil** restrictions properly planned & explained	Review ***Compliance Check Report*** for excessive summer and fall N applied (R=close to bedrock, W=high water table, P=highly permeable soil)			
6. **winter** restrictions properly planned & explained	Review ***Compliance Check Report*** for Field Slope (%), Field in SWQMA, Local prohibitions for winter applications, Winter P2O5 excess, Winter liquid manure rate > 7000 gallons/acre, Winter slope, Winter applications on fields with local restrictions, Winter SWQMA			
7. **non-winter surface water** restrictions properly planned & explained	Review ***Compliance Check Report*** for Excess rate for single application without incorporation in SWQMA, or SWQMA application without appropriate runoff management			
8. **Well/groundwater conduit** restrictions properly planned & explained	Review ***Compliance Check Report*** for unincorporated applications near drinking water well w/in 50 ft, other wells, tile inlets, surf. bedrock, sinkhole upslope (w/in 200 ft), applications above groundwater conduits			
9. **UW N** recommendations or less on every field every year	Review ***Compliance Check Report*** for N over applied			
10. Tolerable soil loss levels, **T**, on every field	Review ***Compliance Check Report*** for fields exceeding 'T'			
11. **rotational P management** providing for annual crop needs	Review ***Compliance Check Report*** for Rotational P2O5 balance over applied, Rotational P Index greater than 6, Fertilizer P2O5 excess(lb/ac)			
12. **K** applications consistent with needs	Review ***Spreading and NM Sorted By Crop Report*** column Over(+) Under(-) Adj. UW Recs K2O lb/ac.			
13. annually consistent **manure** production, collection, and **calibrated** manure application amounts or explain why	Review ***Manure Tracking Report*** columns Production (lbs), Used (lbs), Calibrated rate. Compare ***Spreading and NM Sorted By Crop Report*** column Application rate and method for consistency with manure calibration.			

Appendix G- Grassed Swale

Technical Standard Guidance

Vegetated Infiltration Swale
(1005)
Interim Technical Standard
Wisconsin Department of Natural Resources
Conservation Practice Standard

I. Definition

Vegetated infiltration swales are stormwater conveyance systems designed to enhance the infiltration runoff. A vegetated infiltration swale can be a natural elongated depression or a constructed channel. A vegetated infiltration swale differs from a conventional drainage channel or ditch in that it is constructed specifically to promote infiltration.

II. Purposes

The primary purpose of this practice is to infiltrate storm water, while limiting groundwater contamination by providing filtering of pollutants. Vegetated swales can also help attenuate peak flows through reducing runoff velocities and volumes.

III. Conditions where Practice Applies

Vegetated infiltration swales are best suited for

- *low- to medium-density residential land uses*[1], and
- Non-residential areas where infiltration of runoff is allowable under Chapter NR 151.

Swales are often placed along roads and in drainage easements in side/back lot lines. Swales are intended to treat relatively flat and small drainage areas with contributory areas less than 5 acres. Swales are not suitable in areas of steep topography or areas with erodible soils without implementation of additional measures to reduce flow velocities and protect against erosion.

This standard does not apply to swales installed to meet the swale treatment option set forth in ss. NR 151.24(10) and Trans 401.106(10).

IV. Federal, State, and Local Laws

Users of this standard shall be aware of applicable Federal, State, and local laws, rules, regulations, or permit requirements governing vegetated infiltration swales. This standard does not contain the text of Federal, State, or local laws.

V. Criteria

Vegetated infiltration swales shall be designed to infiltrate runoff and can be a component of a system intended to meet the runoff infiltration requirements of Chapter NR 151. The swale may also be a component of the stormwater conveyance/storage system.

A. **Site Assessment** - A site assessment shall be conducted and documented meeting the requirements of the WDNR Conservation Practice Standard "Site Evaluation for Stormwater Infiltration" (1002). In addition, the site assessment shall evaluate the alignment of the infiltration swale in relation to ground slopes; drainage patterns; and proximity to buildings.

B. **Determination of *Effective Infiltration Area*** – In order to take credit towards the infiltration requirements in NR 151.12(5)(c), the swale must meet the criteria outlined in this standard.

The effective infiltration area is the area that can be counted toward the requirements in NR 151.12(5)(c) and is calculated based on wetted perimeter of the vegetated infiltration swale at a flow depth of 1-inch multiplied by the length of vegetated infiltration swale.

*Effective Infiltration Area (ft^2) = ½ * Wetted Perimeter (ft) at 1-inch depth of flow * Length of Vegetated Infiltration Swale (ft)*

Details on the calculation methodology can be found in Attachment 1.

Vegetated infiltration swales receiving runoff from source areas outlined under NR 151.12 (5)(c)(4) cannot be counted toward the effective infiltration area unless the water is effectively pre-treated prior to entering the swale. The area of the

[1] Words in the standard that are shown in italics are described in IX. Definitions. The words are italicized the first time they are used in the text.

pre-treatment device shall not be counted toward the effective infiltration area.

C. **Pre-treatment** - As with other infiltration devices, vegetated infiltration swales require pretreatment of stormwater to remove sediment from source areas listed in NR 151.12 (5)(c)(4). Pretreatment can be accomplished through the use of practices such as grassed swales, detention basins, and vegetated filter strips.

If a pre-treatment swale is used, the length of pre-treatment shall be calculated based on the following equation with a minimum length of 200 feet:

$$\mathbf{L} = \mathbf{v} * \mathbf{HRT} * 60\text{s/m}$$

Where:
L = Swale length in feet
v = Peak flow velocity in fps for 2-year, 24-hour design storm
HRT = Hydraulic residence time in minutes shall be either:

- 5-minutes for infiltration rate greater than or equal to 0.5 inches per hour (sandy loam).
- 8-minutes for infiltration rate less than 0.5 inches per hour (sandy loam).

Infiltration rates shall be determined in accordance with WDNR Conservation Practice Standard Code 1002, "Site Evaluation for Stormwater Infiltration."

If a pre-treatment swale is used, the area of the pre-treatment swale shall not be counted toward the effective infiltration area

D. **Design Infiltration Rate** - The *design infiltration rate* for swale ($\mathbf{K}_{swale}$) shall be ½ the infiltration rate ($\mathbf{K}_{static}$) determined in accordance with WDNR Conservation Practice Standard Code 1002, "Site Evaluation for Stormwater Infiltration." This is to account for the dynamic nature of a swale in which water is moving through the system rather than the static nature of the infiltration tests where the water is allowed to pond.

$$\mathbf{K}_{swale}\ (\text{inches/hr.}) = \tfrac{1}{2}\ \mathbf{K}_{static}$$

E. **Infiltration Volume Credit** - The volume of water infiltrated and the resulting pollutant reduction must be quantified through the use of an *approved model.*

F. **Velocity and Depth Criteria** – A maximum velocity is based on providing adequate residence time for infiltration, allowing for a stable swale design, and preventing re-suspension and scour of sediment.

1. Peak flow velocity for the 2-year, 24-hour design storm shall not exceed 1.5 feet per second and have a maximum flow depth of 12-inches. For larger design storms greater than the 2-year, 24-hour, velocities shall be non-erosive.

2. Manning's roughness coefficients, "*n*", shall be selected consistent with the type of vegetation, mowing height, and depth of flow. Attachment 2 provides guidance on selection of Manning's *n* values for shallow depth of flows.

   When calculating the infiltration volume, if the approved model does not vary Manning's n with the depth of flow, a default value of 0.30 can be used for the Manning's n provided the flow depth does not submerge the vegetation.

3. Ditch checks, if allowed by the regulatory authority, shall be installed as necessary to reduce velocities, extend detention time, or retain a design volume. Refer to Technical Standard 1062 Ditch Checks for design requirements.

   If utilizing ditch checks, ensure that the design allows for no standing water within 24 hours after a rainfall / runoff event.

G. **Swale Geometry Criteria**[a] -

1. Swales shall have side slopes no steeper than three horizontal to one vertical (3:1) for trapezoidal channels and 4:1 for triangular shaped swales. Flatter side slopes are recommended to reduce erosion potential and increase infiltration area.

2. The bottom width of the swale is shape dependent but shall be a maximum of 6-feet. If widths greater than 6-feet are needed then length-wise dividers shall be

[a] *This standard does not set forth criteria for the analysis of site hydrology, system hydraulic analysis for large flows, or channel stability See Reference Section X.*

employed such that the maximum width of any given cell is 6-feet.

3. The longitudinal slope of the swale shall between 1% and 4%.

H. **Vegetation** - Swales shall be planted with native vegetation or seeded with turf grass. A specific planting guide shall be prepared for each project. A companion (cover) crop may be necessary for establishing native vegetation. Depending on location of the swale, vegetation shall be selected that is tolerant of road salt and wetness. A planting medium that can support the selected vegetation shall be installed.

To maintain vegetation, infiltration swales shall be designed to have no standing water within 24 hours after a rainfall / runoff event.

Sod shall not be used. Sod does not establish roots as well as seed and often has muck soils not conducive to infiltration.

I. **Site Layout** - The site layout shall consider features such as location of infiltration swales relative to buildings, water supply wells, lot boundaries, and existing or proposed public rights-of-way.

1. Where a swale accepts runoff from more than one property, it shall be located in a legally established drainage easement granting access for maintenance, or in a public right-of-way.

2. Swales shall not be *hydraulically connected* to foundations or cause negative impacts to structures.

3. Swales shall not be located such that overflow from the swale could cause flooding of existing or proposed buildings during storms with recurrence intervals commensurate with the degree of hazard.

J. **Construction Criteria** - Following excavation, exclude vehicles and heavy equipment from entering the infiltration swale area to prevent compaction. To minimize or mitigate the effects of compaction during construction and to control soil erosion associated with construction:

1. Compaction Mitigation – The effects of compaction shall be mitigated using the following methods:

a. Incorporate soil additives consisting of two inches of *compost* and two inches of topsoil.

b. The compost shall be incorporated into the existing soil using a chisel plow or rotary device with the capability of reaching to 12 inches below the existing surface.

c. The compost component shall meet Wisconsin Department of Natural Resources Specifications S100 Compost.

2. A construction erosion control plan shall be prepared. Prior to compaction mitigation and final grading of the infiltration swale, the drainage area to the swale shall have proper erosion controls in place to prevent sediment from entering the swale, and the lot(s) adjacent to the swale shall be stabilized. Any sediment entering the swale during construction shall be removed after the tributary area is stabilized. The infiltration swale itself shall also be stabilized following compaction mitigation and final grading. Stabilize swale prior to receiving runoff. For stabilization design criteria for tributary areas and the swale itself, refer to WDNR Conservation Practice Standards Channel Erosion Mat (1053), Mulching for Construction Sites (1054) and Seeding for Construction Site Erosion Control (1059).

VI. Considerations

These additional factors are set forth to enhance the use of this practice, or to address special cases that may arise in the implementation of the practice.

A. Swales should be designed to have hydraulic capacities that meet applicable local government or state agency requirements for conveying runoff from large storms, and they should also be designed as part of a *major stormwater management system* as defined in this standard.

B. The number and length of swales is dictated by the topography and amounts of runoff from the contributing area. For a given depth of flow, the width of a swale depends on the rate and velocity of flow through the swale. Minimum length and width requirements to achieve infiltration and water quality improvements may limit the use of a swale at some sites.

C. The establishment of deep-rooted vegetation will enhance infiltration.

D. Swale geometry should attempt to maximize the infiltrative surface but avoid convergence of flows that may result in erosion or gullies.

E. Excavation hoes, light equipment with turf-type tires, marsh equipment, or wide-track loaders should be used to construct swales.

F. Public education is recommended to inform local residents of the swale's purpose and to discourage dumping of leaves or parking on the edge of the swale.

G. This infiltration device is not suitable for treating chlorides. Chloride use on source areas tributary to a swale can be reduced or eliminated by minimizing the amount of compound used, using alternative de-icers or using clean sand.

VII. Plans and Specifications

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use. Plans shall specify the materials, construction processes, locations, size and elevations of all components of the practice to allow for certification of construction upon completion.

VIII. Operation and Maintenance

A. An operation and maintenance plan for the specific swales shall be prepared. The responsible party shall be identified.

B. Consider prevention of off-street parking or other activities that may cause rutting or soil compaction in the swale.

C. Pesticides and fertilizer shall be used in moderation, and only if needed to establish or maintain dense vegetation.

D. Vegetation shall be mowed or cut such that the proper design height is maintained. To take credit for potential phosphorus removal by the swale, mowed/cut vegetation must be removed as part of routine maintenance.

E. Sediment shall be removed when infiltration rates are impeded or sediment reaches a height of 2-inches. Minimize serious disturbance of the vegetation and avoid compaction of the soil in the swale during the sediment removal process. After sediment removal, repair any damaged or eroded areas. Fill any eroded areas with topsoil and reseed.

F. If during construction or maintenance erosion becomes severe enough to prevent establishment of vegetation, additional erosion control measures shall be taken. Refer to WDNR Conservation Practice Standards 1053, 1054, and 1059 for further guidance.

G. When maintenance is required the infiltration capacity of the swale shall be restored. Vegetation shall be reestablished following compaction mitigation.

H. Annual inspections shall be made to detect and remedy nuisance conditions such as mosquitoes, weeds, woody growth and trash dumping.

IX. Definitions

Approved Model (V.E.): A computer model with an infiltration component that adequately accounts for the hydraulic nature of swales and that has been approved by the applicable regulatory authority. Examples include SLAMM, P-8, and RECARGA.

Compost (J.1.): A mixture that consists largely of aerobically decayed organic waste.

Design Infiltration Rate (V.D.): A velocity, based on soil structure and texture, at which precipitation or runoff enters and moves into or through soil. The design rate is used to size an infiltration device or system. Rates are selected to be minimal rates for the different types of soils. Selection of minimal rates will provide a robust design and maximize the longevity of the device.

Effective Infiltration Area (V.B.): The area of the infiltration system that is used to infiltrate runoff. Does not include the area used for pretreatment.

Hydraulically Connected (I.): Two entities are considered to be hydraulically connected if a surface or subsurface link exists between the two exist such that water is transmitted from one entity to the other.

Low -density Residential Land Use (III): Single-family houses on lots with areas of 19,000 square feet or greater.

Major Stormwater Management System (VI.A): The stormwater management facilities that are intended to convey and/or store runoff in excess of the capacity of the minor system. The minor system is designed to

function frequently to prevent nuisance flooding and is sized for a smaller storm than the major system, generally a 10-year storm. The major system is primarily designed to function infrequently to prevent flooding of buildings and ponding of runoff in locations where it could promote harmful infiltration and inflow to sanitary sewers. The major system is generally designed for a 100-year storm. It consists of the components of the minor system, such as overland flow, swales, curbs and gutters, storm sewers, and detention/retention basins, and also includes the entire roadway cross section and associated swales or overland flow paths ultimately discharging to receiving streams.

Medium-density Residential Land Use (III): Single-family houses on lots with areas ranging from 10,900 to 18,999 square feet.

X. References[b]

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USDA-SCS, National Engineering Handbook, Section 4 – Hydrology, March 1985.

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Washington State Department of Ecology, *Stormwater Management Manual for the Puget Sound Basin (The Technical Manual)*, Washington State Department of Ecology, February 1992

[b] Methods for hydraulic analysis and channel stability are well documented and are; therefore; not included in this standard.. For more background, see open channel hydraulics texts such as Open Channel Hydraulics, Chow, 1988; Open Channel Flow, Henderson, 1966; and Open-Channel Hydraulics, French, 1985.

Attachment 1:
Calculation of Effective Infiltration Area
Vegetated Infiltration Swales (1005)

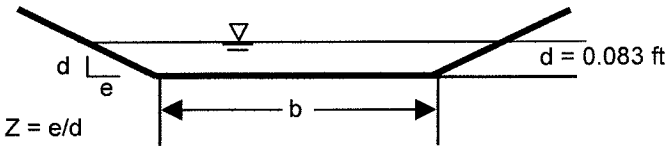
The effective infiltration area as outlined in NR 151 is defined as the area of the infiltration system that is used to infiltrate runoff and does not include the area used for site access, berms, or pretreatment. The area of infiltration is calculated for a swale based on the wetted perimeter of the swale. However, the swale is rarely flowing at capacity under the numerous smaller rainfall events that dominate an average year, so the wetted perimeter at the design capacity of the swale (typically a 2-year or 10-year storm) is not appropriate. The effective infiltration area is determined as follows:

Effective Infiltration Area (ft^2) = ½ * Wetted Perimeter (ft) * Length of Vegetated Infiltration Swale (ft)

For the purpose of NR 151, the wetted perimeter will be calculated at a 1-inch (0.083 feet) depth of flow. The 1-inch depth of flow is intended to simulate the water quality volume. The multiplication by ½ is to account for the reduced infiltration rate in swales compared to other practices such as infiltration basins were water is allowed to pond. Wetted perimeter can be calculated as outlined below.

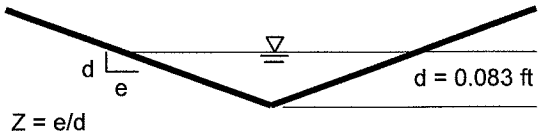
Trapezoidal Channel Cross section:

Wetted Perimeter, p
$p = b + 2d\,(Z^2 + 1)^{1/2}$



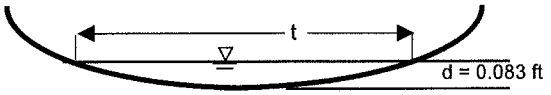
Triangular Channel Cross section:

Wetted Perimeter, p
$p = 2d\,(Z^2 + 1)^{1/2}$



Parabolic Channel Cross section

Wetted Perimeter, p	Top Width of flow, t	Cross-sectional Area of flow, a
$p = t + (8\,d^2) / (3\,t)$	$t = a / (0.67\,d)$	$a = 2/3\,(t\,d)$

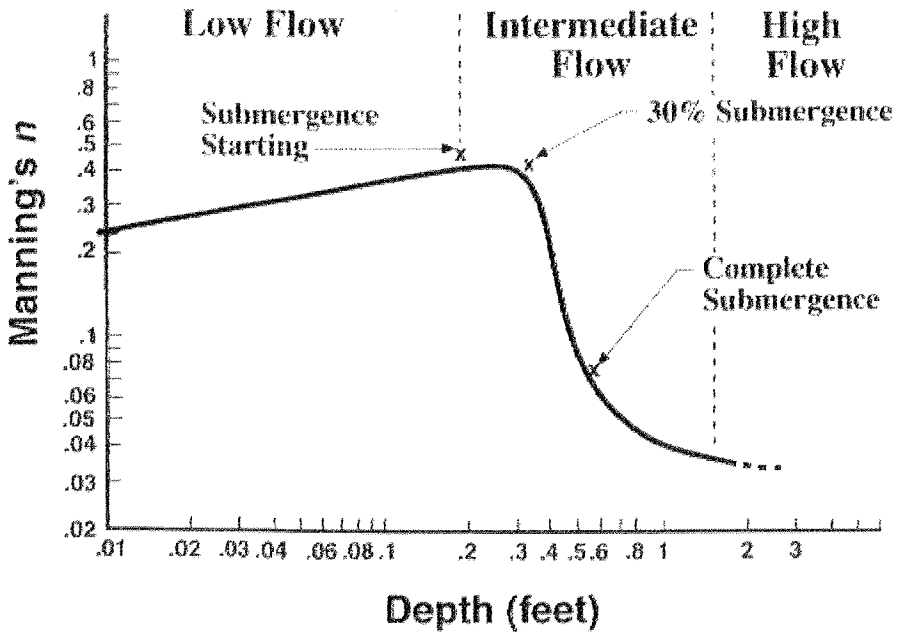


[1] Words in the standard that are shown in italics are described in IX. Definitions. The words are italicized the first time they are used in the text.

Attachment 2:
Calculation of Manning's n Values
Vegetated Infiltration Swales (1005)

Manning's n, the roughness coefficient, varies with the type and height of vegetation and the depth of flow. Typically, vegetation creates a significant flow resistance at lower flows when the grass remains erect and the water surface is below the top of the vegetation. Vegetated infiltration swales are designed to convey runoff from smaller more frequent storm events and thus at lower flow depths than typically encountered using the typical design-storm methodology (i.e. 2-year or 10-year storm). Figure 1 shows a variation of Manning's n with flow depth. Figure 1 assumes dense turf type vegetation mowed to a height of 4-inches. This is consistent with published values that show a Manning's n value of 0.030 for short turf grass under higher flow conditions (Chow, 1959) in which the vegetation is submerged.

Figure 1: Manning's n Under Different Flow Depths



Source: Minton 2005

Research has shown that Manning's n can be related to the product of the flow velocity and the hydraulic radius. This relationship is further dependent again on the type and height of vegetation. Currently, data does not exist for native prairie vegetation.

[1] Words in the standard that are shown in italics are described in IX. Definitions. The words are italicized the first time they are used in the text.

Appendix H- WinSLAMM

Modeling Guidance

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 6, 2005

TO: Regional Water Leaders, Basin Leader & Experts
Storm Water Permit Staff (via Email)

FROM: Russ Rasmussen, Director
Bureau of Watershed Management

SUBJECT: Developed Urban Areas and the 20% and 40% TSS Reductions
Sections NR 151.13(2) and NR 216.07(6), Wis. Adm. Code

This document is intended solely as guidance, and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations, and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

Issue

Under s. NR 151.13 (2), Wis. Adm. Code, a municipality subject to the municipal storm water permit requirements of subch. I of ch. NR 216, Wis. Adm. Code, must, to the maximum extent practicable, implement a 20% and a 40% reduction in total suspended solids in runoff that enters waters of the state as compared to no controls, by March 10, 2008 and March 10, 2013, respectively. Staff who work with affected municipalities need guidance on what areas under the municipalities' jurisdictions will be included in this requirement. They also need to know what is meant by "no controls" and "with controls", and what methods are acceptable for making these calculations.

Discussion

Chapter NR 216, Wis. Adm. Code, is the implementation code for the developed urban area performance standard. Applicability for permit coverage purposes is dictated by s. NR 216.02, Wis. Adm. Code. Under this provision, owners or operators of the following municipal separate storm sewer systems (MS4s) are required to obtain coverage under a WPDES municipal storm water permit:

- MS4s serving populations of 100,000 or more.
- Previously notified owners or operators of municipal separate storm sewer systems.
- MS4s within urbanized areas as identified by EPA.
- MS4s serving populations over 10,000 unless exempted by DNR.

"MS4" means a conveyance or system of conveyances, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets all the following criteria:

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- Owned or operated by a municipality.
- Designed or used for collecting or conveying storm water.
- Not a combined sewer conveying both sanitary and storm water.
- Not part of a publicly owned wastewater treatment works that provides secondary or more stringent treatment.

Under s. NR 216.07(6)(a), Wis. Adm. Code, a municipality must develop a stormwater management program to achieve compliance with the developed urban area performance standard (s. NR 151.12(2), Wis. Adm. Code). Developed areas are generally those that were not subject to the post-construction performance standards (s. NR 151.12 or NR 151.24, Wis. Adm. Code). The total suspended solids control requirements of s. NR 151.13(2)(b)1.b. and 2., Wis. Adm. Code, may be achieved on an individual municipal basis. Control does not have to apply uniformly across the municipality. The control may also be applied on a regional basis by involving several municipalities.

A municipality is required under s. NR 216.07(6)(b), Wis. Adm. Code, to provide an assessment of the actions taken to comply with the performance standards. This assessment may take the form of an annual progress report. The initial assessment must include a pollutant-loading analysis using a model such as SLAMM, P8 or equivalent methodology that is approved by the department. At a minimum, a pollutant-loading analysis must be conducted for total suspended solids and phosphorus. A model would not be run again after the initial assessment unless significant management changes occurred that should be accounted for, or the progress report indicates a re-run is necessary.

DNR Guidance

To comply with the code, the developed urban area must be modeled under a "no control" condition and a "with controls" condition. The 20% and 40% TSS reductions are assessed against the "no control" condition for the entire area served by the MS4 as defined below. They are not applied uniformly across the municipality, nor are they applied drainage area by drainage area within the municipal boundary. In most cases however, a calculation drainage basin by drainage basin will be used to determine the total loading and the achieved reductions.

Areas Required to be Included in the Calculations

A municipality must include the following areas when calculating compliance with the developed urban area standard (s. NR 151.13, Wis. Adm. Code):

1. Any developed area that was not subject to the post-construction performance standards of s. NR 151.12 or 151.24, Wis. Adm. Code, that went into effect October 1, 2004 and that drains to the MS4 owned or operated by the municipality.
2. Any area covered by an NOI submitted prior to October 1, 2004 where development is still underway. The pollutant load shall be based on full build out. If it is known that the future development of some parcels may require compliance with s. NR 151.12 or NR 151.24, Wis. Adm. Code, then these areas may be excluded from the calculation.
3. Any undeveloped (in-fill) areas under 5 acres. These areas must be modeled as fully developed, with a land use similar to the properties around them.
4. For municipalities with large areas of agricultural lands separating areas of development, only the areas within the urbanized area as defined by the U.S. Census Bureau.

5. Non-manufacturing areas of industrial facilities such as customer or employee parking lots. (The manufacturing, outside storage and vehicle maintenance areas of these industrial facilities are covered under a subch. II of ch. NR 216, Wis. Adm. Code, industrial permit.)
6. Any industry that has certified a condition of "no exposure" in accordance with s. NR 216.21(3), Wis. Adm. Code.
7. Any developed urban area where it is already established that the area will be annexed by the municipality prior to March 10, 2008. There must be an agreement with the municipality that will be losing the area, to prevent double counting.

Areas Prohibited from Inclusion in the Calculations

Areas and loadings that shall not be included:

1. Lands zoned for agricultural use and operating as such.
2. Pollutant loadings from an upstream MS4 (independent of whether it is regulated under a ch. NR 216, Wis. Adm. Code, permit)
3. Any internally drained area with natural infiltration. (This does not included engineered or constructed infiltration areas.) However, an internally drained area that discharges to a karst feature is not likely to be receiving adequate treatment prior to any contact with the groundwater. The municipality is encouraged to look at this area for possible treatment options.
4. Undeveloped land parcels over 5 acres within the municipality. These areas will be subject to s. NR 151.12 or 151.24, Wis. Adm. Code, when developed.

Optional Areas to Include in the Calculations

Areas a municipality may, but is not required to, include in the developed urban area load calculation:

1. Property that drains to *waters of the state* without passing through the permittee's MS4. Waters of the state include surface water, wetlands and groundwater and has the meaning given in s. 283.01(20), Stats. Waters of the state may overlap with the definition of MS4. For this purpose, if a waterway meets the definition of an MS4 it will be regulated as an MS4. The definition for MS4 is given in s. NR 216.002(17), Wis. Adm. Code. The significant language in that definition is whether or not the municipality owns or operates the drainage way (i.e., maintains, has easement access for work, etc.). For example, when a "stream" is designed or used for collecting or conveying storm water such as flowing through a municipally owned or operated culvert or bridge restriction, that "stream" is part of the MS4.
2. Any area that discharges to an adjacent municipality's MS4 (Municipality B) without passing through the jurisdictional municipality's MS4 (Municipality A). Municipality B that receives the discharge into their MS4 may choose to be responsible for this area from Municipality A. If Municipality B has a treatment device that serves a portion of A as well as a portion of B, then the practice must be modeled as receiving loads from both areas, independent of who carries the responsibility for the area.
3. Industrial facilities subject to a permit under subch. II of ch. NR 216, Wis. Adm. Code. This exclusion covers the facilities that are required to have permit coverage. Contact the regional stormwater specialist or central office to get a list of permitted facilities within a municipality.
    - The industrial NR 216 permit covers areas with industrial materials and activities, specifically areas with manufacturing, vehicle maintenance, storage of materials, etc.

A municipality may include any of the areas identified above in their developed urban area as part of their load calculation provided the areas are not prohibited from inclusion in the calculation. If they choose to include an area, it must be included in both the "no controls" and "with controls" condition. Inclusion of areas they choose to be responsible for will allow them to take credit for any of those areas that may have

controls in place. For example, if an industrial park would have been excluded because all the industries in the industrial park have an NR 216 industrial permit, but the municipality chooses to keep this area in their "no controls" area, then any best management practices existing or built to serve the industrial park can be included in the "with controls" scenario.

Model Inputs

Model Version:
To model the TSS load in the area served by the MS4 the municipality must select a model that can track particle distribution. Such models include SLAMM and P8. In general, a municipality must use the most current version of a model that is available at the time of the analysis. However, a municipality may use an earlier version of a model if it was previously used to calculate loads in the municipality and these loads were documented in a stormwater management plan, database, or other report. The most current versions of SLAMM and P8 will be accessible through the DNR website with links to the authors. A summary of past versions and the changes made with each SLAMM update will also be posted. The DNR has recently received a grant to help upgrade P8 to a Windows format.

As part of the reporting process, the municipality must identify which version it is using. It must use the same version for both the "no controls" scenario and the "with controls" scenario. If an older version of the model is used, this may mean that as the model is updated a municipality cannot take credit for some practices that are only available in the most recent models. In order to take credit for practices that are in recent versions of the models, both the "no controls" and "with controls" scenario must be run with the latest model. A municipality must run all drainage basins in the developed urban area with the same model and model version.

"No control"
The "no controls" condition can be based on the standard land use files for different land uses in SLAMM. This assumes certain default parameter files, an assumed level of disconnection and an assumed distribution of road smoothness. For the drainage system, the default will be curb and gutter (even if the drainage system is currently swale drainage), in fair condition. For "no controls" there will be no recognition of street sweeping, catch basin cleaning, swale drainage, or the existence of any engineered best management practices. These practices and facilities will be accounted for under the "with controls" condition. A municipality is not required to use the standard land use files if it has surveyed the land uses in its developed urban area and has "real" source area data on which to base the input files.

"With controls"
The "with controls" condition is applied to the developed urban area with the inclusion of the practices and facilities (existing and proposed). Modeling is a means to confirm a device's efficiency for the conditions found in Wisconsin. If the model cannot predict efficiencies for certain practices that the municipality identifies as water quality practices, then a literature review must be conducted to estimate the reduction value. However, proprietary devices that utilize settling as their means of solids reduction should be modeled as catch basins with sumps. The efficiency of proprietary devices that utilize filtration as a means of solids reduction cannot currently be modeled using SLAMM.

Practices on private property that drain to an MS4 can be included in the "with controls" scenario for a municipality, if the municipality is able to ensure that the practice will continue to be maintained. The efficiency of the practice on private property must be modeled using the best information the municipality

can obtain on the design of the practice. For example, permanent pool area is not sufficient information to know the pollutant reduction efficiency of a wet detention basin even if it matches the area requirements identified in Technical Standard 1001 Wet Detention Basin for an 80% reduction. Information on the depth of the sediment storage layer and the outlet design are critical features that determine whether a detention pond is providing 80% TSS reduction.

As information on proprietary practices or new stormwater designs becomes available through monitoring, the model will be adjusted to reflect changes in efficiency.

Again, future versions of the model can be used to evaluate the "with controls" condition, but only if the "no controls" scenario is also run with the new version.

Further clarifications

- If a portion of a municipality's MS4 drains to a stormwater treatment facility in an adjacent municipality, the municipality generating the load will not receive any treatment credit unless there is an inter-municipal agreement for maintenance of the BMP. This contract must be in writing with signatures from both municipalities at the time of the evaluation.
- The model results will be the basis for determining compliance with the permit for "no controls" and "with controls" TSS load. No credit will be given for implementation of ordinances or information and education programs.
- For reporting purposes, the pollutant load must be summarized as the cumulative total for the developed urban area served by the MS4. Additionally pollutant loads for grouped drainage areas as modeled shall also be reported. Drainage areas may be grouped at the discretion of the modeler for such reasons as to emphasize higher priority areas, balance model development with targeting or for cost-effectiveness.

Approved By:

Gordon Stevenson, Chief Runoff Management Section	Eric S. Rortvedt Storm Water Program Coordinator

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: April 24, 2008
TO: Regional Water Leaders, Basin Leaders and Experts
Storm Water Permit Staff (via email)

FROM: Russ Rasmussen, Director, Bureau of Watershed Management
DNR Storm Water Permit Engineers

SUBJECT: Process to Assess and Model Grass Swales for ss. NR 151.13(2) and NR 216.07(6), Wis. Adm. Code - Total Suspended Solids Reduction

This document is intended solely as guidance, and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations, and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

Issue

Under s. NR 151.13(2), Wis. Adm. Code, a municipality subject to the municipal storm water permit requirements of s. NR 216.07(6), Wis. Adm. Code, must implement a 20% reduction in total suspended solids (TSS), by March 10, 2008 or 24 months from coverage under the Municipal Separate Storm Sewer System (MS4) general permit, and a 40% TSS reduction by March 10, 2013. This memorandum provides DNR staff with guidance to advise affected municipalities and their consultants on how to evaluate grassed swales in the developed urban area for water quality credit. (This guidance does not address design of grassed swales to serve new development. The Vegetated Infiltration Swale, Interim Technical Standard, No. 1005 provides information on construction of new grassed swales.)

Discussion

To meet the requirements of the MS4 permit and the TSS reduction goal of s. NR 151.13(2), Wis. Adm. Code, a municipality must assess existing best management practices (BMPs) for TSS control and propose additional BMPs if the performance standard cannot be met with existing practices. One BMP available to many permitted municipalities is the grassed swale. This guidance provides a basis for assessing and modeling swales for TSS reduction to foster consistent application of this practice in all permitted municipalities. The goals of this guidance are to:

- Determine which water quality swales in the MS4 are eligible to receive TSS reduction credit, and
- Identify a typical swale geometry that can be considered representative. (It may be appropriate to develop more than one typical swale geometry if the swale characteristics in the MS4 are highly variable.)

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DNR Guidance

Step 1. Identify which swales in the municipality can be considered water quality swales for the purpose of meeting the 20% and 40% TSS reduction goal.

The following limitations apply for all swales if they are to be considered water quality swales:

A. Swales in commercial or industrial areas should have pretreatment swales or equivalent pretreatment in accordance with Vegetated Infiltration Swale Technical Standard, No. 1005. If the pretreatment is not adequate, swales in commercial or industrial areas must be evaluated assuming an infiltration rate of zero or using an infiltration rate that is measured in the field using a scientifically credible field test method.
B. The longitudinal slope must be less than 4% unless slope interruption devices are installed in the swales to ensure low flow velocities. Slope interruption devices must be consistent with Ditch Check Technical Standard, No. 1062. Swales with slope interruption devices will be evaluated using a modified longitudinal slope of 1%.
C. The Department is concerned about channel scouring and re-suspension of previously settled particles in swales that are being used for MS4 pollutant removal credit. To address this concern, all swales should be inspected for visual evidence of scour. Swales with visual evidence of scour, such as channel cuts in the bottom or areas of bare soil, can not be included.

There are two ways of identifying water quality swales within an MS4:

A. If swale survey data is available, determine the locations of water quality swales and arrive at typical swale geometry based on statistical methods.
B. In the absence of survey data, a desktop and field survey would be appropriate. The desktop and field procedure is as follows:

    1. Identify potential water quality swale areas by using available topographic, land use and soil information.

    2. Based on results of the desktop evaluation, select a representative number of typical swale locations in the MS4 by conducting a field survey. A minimum of five locations should be selected. At each location:

        - Measure the width of the swale bottom using a tape measure.
        - For side slopes, measure the vertical drop over the level length using a carpenter's level and tape measure.
        - Select at least three cross-sections of the swale and average the results to determine the bottom width and side slopes.
        - Determine longitudinal slope using 2-ft contour mapping or other available topographic information.

    3. Use the typical swale geometry that best represents each drainage area.

Step 2. Model the swales identified in **Step 1.** using a model such as SLAMM or P8.

When modeling swales in SLAMM or P8 the following must be considered:

How should drainage basins with a mix of swale and storm sewer conveyance systems be evaluated?

Drainage basins with a combination of swales and storm sewer should be subdivided by conveyance system type and the subdivisions modeled separately. In SLAMM, swales need to be modeled separately because drainage system type (eg., swale vs. storm sewer) cannot be assigned to individual source areas.

Where swale density varies within a modeled area, the swale density should be an area weighted average across the model area. For example, if a 100 acre modeled area has 90 acres of residential land use with an average swale density of 359 ft/acre and 10 acres of strip commercial with an average swale density of 412 ft/acre then the area weighted average across modeled area is [(90 x 359) + (10 x 412)] / 100 = 364 ft/acre.

Table 1 identifies the average swale density used in the standard land use files from SLAMM version 9.2. It is recommended that rather than using these averages, the municipality should identify the actual swale density for each of the representative areas.

TABLE 1

Land use	Swale Density (ft/acre)
Low density residential	238
Medium density residential	359
High density residential	385
Strip commercial	412
Shopping centers	92
Industrial	265
Freeway (Shoulder only)	1309
Freeway (Shoulder and Center)	1964

Note: These average swale density figures are from the SLAMM version 9.2 Standard Land Use files available on the USGS website at: http://wi.water.usgs.gov/slamm/

Should swales be modeled using the "wetted perimeter" or "typical swale geometry" option?

The typical swale geometry option must be used. Both SLAMM and P8 calculate wetted perimeter from the geometry for each storm event, which is more accurate than a user selected defined wetted perimeter.

What Manning's "n" should be used for the typical swale geometry[1]?

A Manning's "n" value of 0.30 or less is recommended, based on type of vegetation, mowing height and depth of flow. Supporting documentation should be provided if Manning's "n" values greater than 0.30 are used

How should the infiltration rate be determined?

The guidance provided in the Site Evaluation for Stormwater Infiltration Technical Standard, No. 1002 should be followed. The swale infiltration rate should be determined based on the representative soil texture identified in the USGS soil survey or other soil data if available. When the representative soil texture has been determined, the appropriate design infiltration rate should be selected from Table 2 of the Technical Standard, No. 1002. If the infiltration rate is measured in the field using a scientifically credible field test method, the measured value can be used for the static infiltration rate without using the correction factors in Table 3 of Technical Standard, No. 1002. **Prior to entering an infiltration rate in the model, the design infiltration rate from Table 2, or the measured infiltration rate must be reduced by 50%.** The SLAMM default "infiltration rate by soil type" values should not be used.

Are velocity calculations required?

The swales that were not eliminated by visual inspection should be evaluated for scour and re-suspension using the results of velocity or shear stress calculations conducted at the representative swale locations from **Step 1**. Velocity or shear stress calculations should be conducted based on the peak discharge rate for a 2-yr, 24-hr design event (or a reasonably equivalent event from the SLAMM or P8 rainfall file for the area) to verify that scour and re-suspension will not be a problem.

Do water quality swales need to meet the slope parameters identified in Vegetated Infiltration Swale, Interim Technical Standard, No. 1005?

If functioning as vegetated conveyance systems, swales with longitudinal slope less than 1% can be used. However, there is concern that swales with slopes less than 1% can clog. Where visual evidence indicates that the infiltration rate has been reduced (e.g., significant duration of ponded water or evidence of wetland vegetation), infiltration rates appropriate for clay soils should be used.

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[1] SLAMM version 9.3 will adjust Manning's "n" based on flow, swale geometry and vegetative retardance classifications

SLAMM has a drainage system type of "undeveloped roadside". What is meant by undeveloped roadside drainage system?

In SLAMM, an undeveloped roadside is assumed to have no loss of runoff volume or associated pollutants. This would apply to areas where runoff stays within the roadway and/or drains to the shoulder area in a concentrated flow path such as a ditch.

For roads where runoff sheet flows off to the side of the road and is dispersed into adjacent pervious areas with no concentrated flow path in the vicinity, the roadway would be considered a disconnected impervious surface. Currently, SLAMM does not have the option of disconnecting a roadway, whereas rooftops and driveways can be disconnected. Therefore, an alternative method is needed to give treatment credit for such a system. If there is no concentrated flow path near the roadway and the runoff is dispersed as sheet flow across healthy vegetated areas, assume this flow path will provide an 80% TSS removal rate. An 80% removal rate can be manually input into SLAMM as an "other control" device.

Approved By:

Gordon Stevenson, P.E.
Chief, Runoff Management Section

Mary Anne Lowndes, Urban Storm Water Engineer
On Behalf of DNR Storm Water Permit Engineers

APPENDIX I- WDNR REVIEW AND APPROVAL OF WINSLAMM MODELING

Chuck Nahn

From: Rortvedt, Eric - DNR [Eric.Rortvedt@Wisconsin.gov]
Sent: Thursday, April 15, 2010 3:56 PM
To: Chuck Nahn
Cc: Bub, Laura A - DNR
Subject: RE: MS4 SLAMM Analysis - Town of Dunn

Chuck,

Thank you for responding to my comments and adjusting the analysis to take out undeveloped areas of 5 acres or more. You have addressed my concerns and I have no further questions on the analysis which indicates that the Town of Dunn's MS4 runoff receives over 40% TSS control.

Eric

From: Chuck Nahn [mailto:cnahn@tds.net]
Sent: Friday, February 19, 2010 12:21 PM
To: Rortvedt, Eric - DNR
Subject: RE: MS4 SLAMM Analysis - Town of Dunn

Eric,

Enclosed is the revised WinSLAMM modeling for the Town of Dunn and my responses to your comments below (In MS Word 2007 and 2003 format).

I have also included the revised TSS removal outfall summary and SLAMM results with the open space areas removed (see Comment #1)(**-"osremoved" in the file name above) for you to compare with the original submittal (without " –osremoved" in the file name above))

Thanks, Eric and "please don't hesitate to call me at 608-831-2334 if you have any questions."

Chuck Nahn, P.E.
Nahn and Associates, LLC

From: Rortvedt, Eric - DNR [mailto:Eric.Rortvedt@Wisconsin.gov]
Sent: Monday, November 02, 2009 1:29 PM
To: townhall@town.dunn.wi.us; Nahn, Chuck
Cc: Bub, Laura A - DNR
Subject: MS4 SLAMM Analysis - Town of Dunn

Hi Ed and Chuck,

I reviewed the Town of Dunn MS4 modeling, performed by Nahn and Associates and received August 10, 2009 to show compliance with the DNR developed urban area performance standard. I have the following questions/comments on the analysis:

- There was a lot of undeveloped area included in the analysis, such as in drainage area 24. DNR's Developed Urban Areas modeling guidance memo dated June 6, 2005, directs that undeveloped land parcels over 5 acres not be included in the analysis (except to the extent that runoff volume should be included to model treatment practice performance). This guidance is available at: http://www.dnr.state.wi.us/runoff/stormwater/guidance/Guidance_TSS.pdf

Please explain why the pollutant load should be included in the analysis and/or revise the analysis as appropriate.

- How was the swale density of 313 feet/acre established? Is an average density reasonable to use across all the modeled drainage areas especially in drainage area that were mostly classified as undeveloped?

- How was the dynamic infiltration rate of 0.237 in/hr established?

- How was the 0.021 ft/ft longitudinal swale slope established?

- Are there grassed swale sections with slopes greater than 4%? DNR's grass swale guidance recommends removing such sections unless slope interruption devices are included. Link to DNR swale modeling guidance: http://www.dnr.state.wi.us/runoff/stormwater/guidance/GrassSwales080424.pdf

- Was field verification performed to confirm that all modeled swale sections are stabile and properly vegetated (no areas devoid of vegetation and no standing water)?

Thank you for your cooperation in adjusting the analysis and responding to these questions.

Eric S. Rortvedt, P.E.
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Wisconsin Department of Natural Resources
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