



# Privately-Owned Stormwater Management Systems

Operation & Maintenance

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2023



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## History/Background

# Federal Clean Water Act



- US Environmental Protection Agency requires each state to identify water bodies that are not 'fishable or swimmable'
- Each state also needs to identify the pollutants causing the water body impairment



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History/Background

# Pollutants Causing Impairment



Sediment



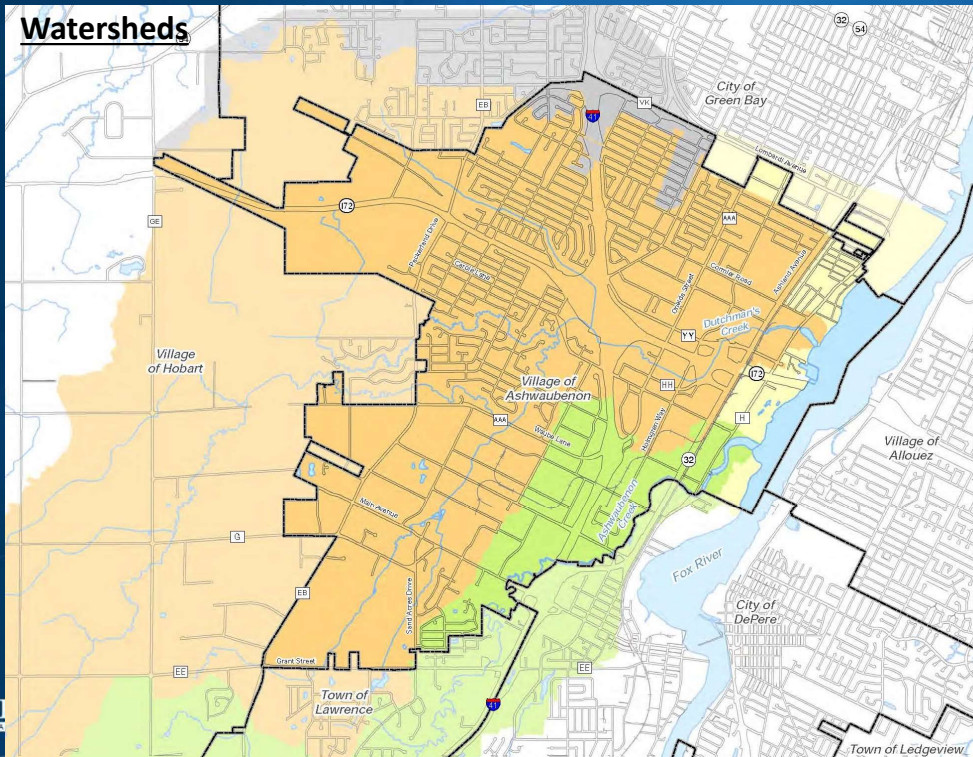
Phosphorus

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ASH  
WALK  
BEN  
ON

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## Watersheds



### Sub-Watersheds

-  Ashwaubenon Creek
-  Duck Creek
-  Dutchman Creek
-  Fox River Mainstem

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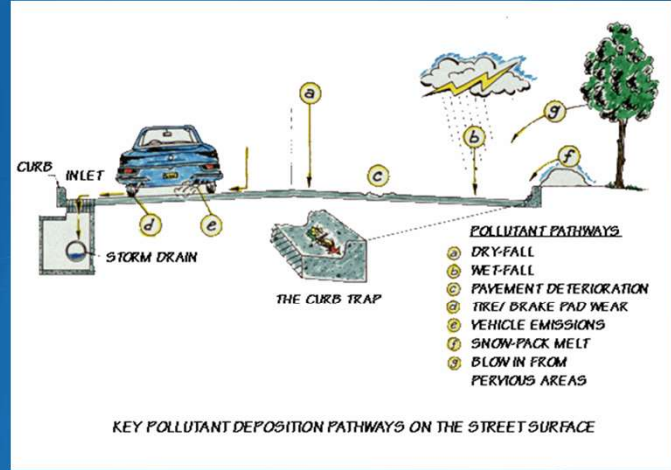
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# Stormwater Pollutant Pathways



# Municipal Stormwater Permit

- ❑ 1. Public Education
- ❑ 2. Public Involvement
- ❑ 3. Illicit Discharge Detection & Elimination
- ❑ 4. Construction Site Pollutant Control
- ❑ 5. Post-Construction Stormwater Management
- ❑ 6. Municipal Pollution Prevention
- ❑ 7. Stormwater Quality Management



Requirement which includes  
Private Stormwater Device  
Inspections & Maintenance

# Post-Construction Stormwater

## □ Wisconsin DNR & Village of Ashwaubenon Requirements:

- Comply with stormwater quality, peak discharge, infiltration, protective area, and petroleum sheen requirements
- Obtain a permit for the stormwater system design
- Construct the stormwater system
- Inspect, operate, and maintain the stormwater system
  - Determine Responsible Party (landowner)
  - Operation & Maintenance Plan (provide how to manual to landowners)
  - Landowner confirms to Village that maintenance was completed (annually)
  - Village audits the landowner's efforts (inspections): 1x per 5 year cycle

## Inspection & Maintenance Item 1:

# Debris & Litter



Sample Outlet and Structure (trash rack cleaning needed)



Sample channelized flow (or spillway) - check for erosion

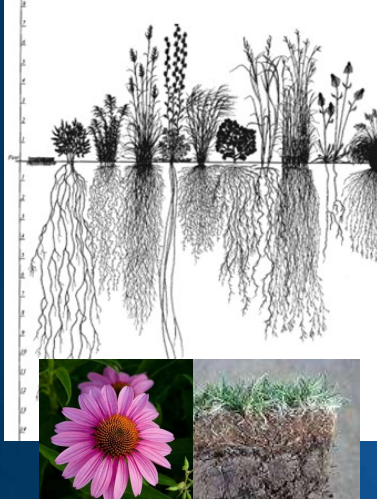
## □ Maintenance:

- Check Inlets
- Check Outlets
  - Trash racks
  - Orifices, weirs,
  - Channels, pipes, spillways
  - Filter or soil surfaces
- Check Other Areas
  - Open water, shoreline, vegetation

Inspection & Maintenance Item 2:

# Vegetation

Sample plant considerations – should have good coverage



- Maintenance:
  - Vegetation Health & Density
  - Mowing Height (swales)
  - Noxious Weed Growth
  - Unauthorized Growth (trees)
- Filtration and infiltration devices benefit from deep rooted plants

Inspection & Maintenance Item 3:

# Wildlife



- Maintenance:
  - Muskrats
    - Burrow holes in embankment, liner, etc.
  - Fish
    - Do not stock ponds
    - Carp can uproot wetland plants and stir up bottom sediment
  - Birds
    - Geese can damage wetland plants and degrade water quality
    - Large birds near airports are a hazard

Inspection & Maintenance Item 4:

# Erosion



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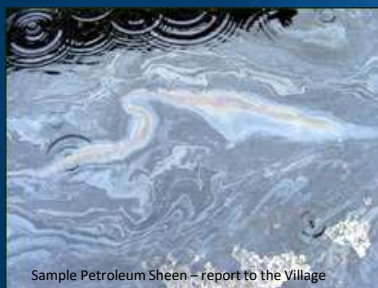
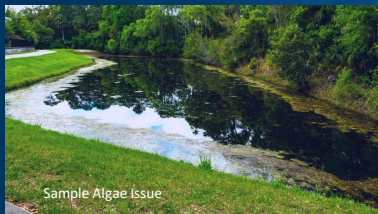
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- Erosion Types:
  - Channel, Rill, Scour, Shoreline
- Maintenance:
  - Topsoil, seed, fertilizer, mulch
  - Erosion mat (channels, slopes)
  - Turf reinforced mat
  - Riprap with geotextile fabric
  - Dense wetland planting (shoreline)

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Inspection & Maintenance Item 5:

# Aesthetics & Pollutants



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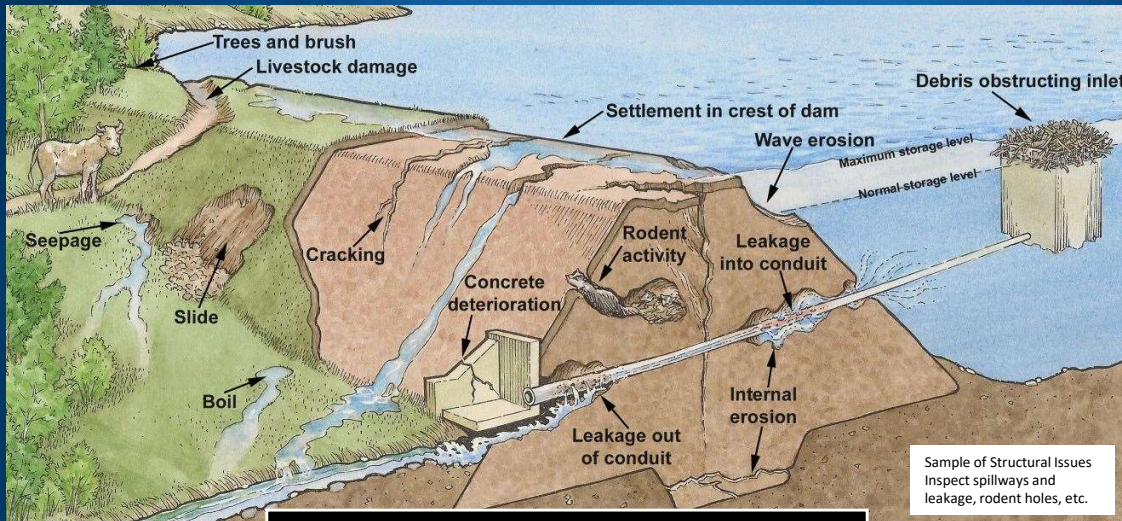
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- Maintenance:
  - Algae if an aesthetic concern
    - Remove with skimmer
    - Hide with shoreline wetland plants
    - Aerator or fountain (approval needed)
    - Chemicals (approval needed)
  - Graffiti on concrete structures
  - Potential Pollutants
    - Illicit discharge
    - Illegal dumping

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Inspection & Maintenance Item 6:

# Structural



**Embankments, Dams, Spillways, Liners**



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BMP\* Type 1:

# Wet Detention Pond (1001)



□ Maintenance:

- Debris, Vegetation, Wildlife, Erosion
- Structural
  - Embankments, dams, spillways, pipes, etc.
  - Clay or synthetic liner
- Sediment Accumulation
  - Wet Pond - Permanent pool < 3.5 feet water
  - Dry Pond – Storage volume reduced > 10%
  - NR 528 sediment testing before disposal
- Aerator or Fountain
  - Approval needed

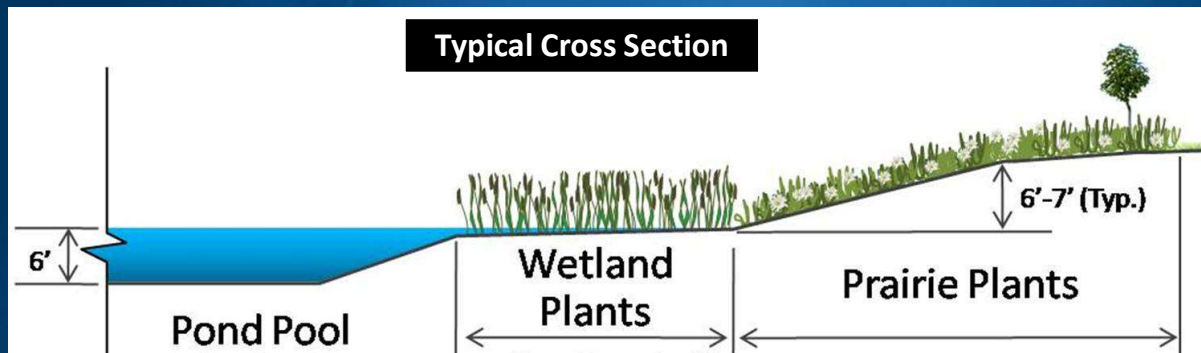


\* Note: BMP definition: "Best Management Practice"  
(Also known as: Stormwater Device)

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BMP Type 1:

# Wet Detention Pond (1001)



- Sediment Accumulates in Pool of Water
- Wetland Plants Reduce Shoreline Erosion
- Prairie Plants Reduce Mowing Effort

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BMP Type 2:

(Not typically found in clay soils)

# Infiltration Basin (1003)



- Maintenance:
  - Debris, Vegetation, Wildlife, Erosion
  - Level Spreader, Winter Bypass
  - Structural
    - Embankments, dams, spillways, pipes, etc.
  - Sediment Accumulation
    - Pretreatment device to protect infiltrating surface
    - Storage volume reduced > 10%
  - Soil Clogging or Compaction Mitigation
    - Surface water > 24 to 72 hrs after 0.5" rain

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BMP Type 3:

# Bioretention / Biofilter (1004)



Sample Street Biofilter



Sample Commercial Development Biofilter

## □ Maintenance:

- Debris, Vegetation, Wildlife, Erosion
- Surface Mulch (replenish, not too thick)
- Structural (standpipe, underdrain, filter)
- Sediment Accumulation
  - Storage volume reduced > 10%
- Soil Clogging or Compaction Mitigation
  - Surface water > 24 hrs after 0.5" rain
  - Subsurface water > 72 hrs after 0.5" rain

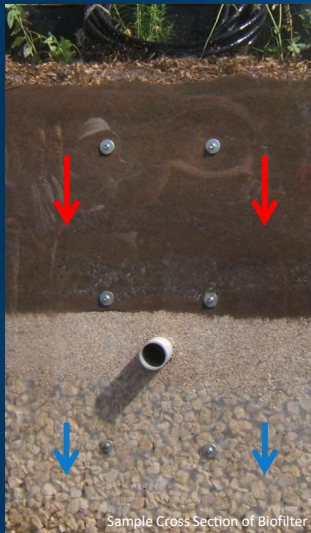
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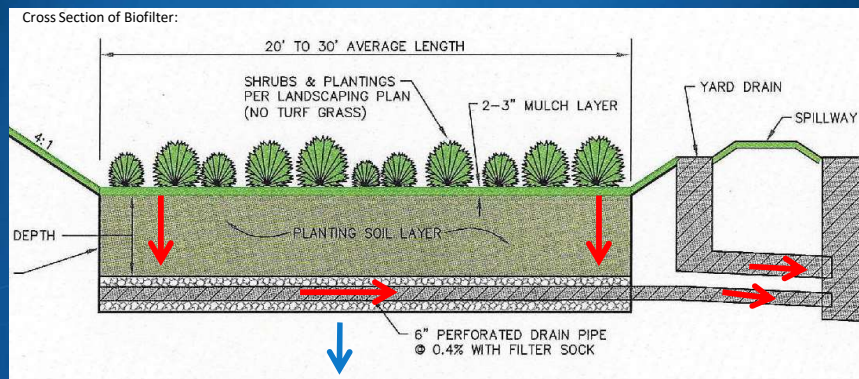
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BMP Type 3:

# Bioretention / Biofilter (1004)



Sample Cross Section of Biofilter



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BMP Type 4:

# Vegetated Swale (1005)



Sample Vegetated Swale



Sample Vegetated Swale during rain event

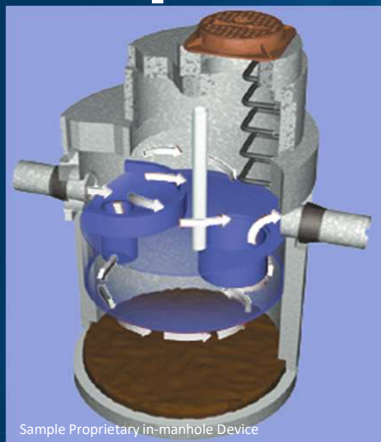


□ Maintenance:

- Debris, Vegetation, Wildlife, Erosion
  - Vegetation health and density
  - Mowing height (follow design requirement)
  - Length (follow design, not enclosed or lined)
- Permanent Ditch Check
- Sediment Accumulation
  - Storage volume reduced > 10%
- Soil Clogging or Compaction Mitigation
  - Surface water > 48 hrs after 0.5" rain

BMP Type 5:

# Proprietary Sediment (1006)



Sample Proprietary in-manhole Device



□ Maintenance:

- Debris, Litter, Obstructions
- Petroleum sheen (if required)
- Structural
  - Cracking, spalling, corrosion, joint leak, liner
- Sediment Accumulation (NR 528)
  - Follow proprietary manufacturer's recommendations for frequency of accumulated sediment removal
  - Test or landfill the removed sediment

BMP Type 6:

(Not typically found in clay soils)

# Infiltration Trench (1007)



Sample Infiltration Trench

## □ Maintenance:

- Debris, Vegetation, Wildlife, Erosion
- Surface Stone or Hardwood Mulch
- Structural (observation wells, pipes)
- Sediment Accumulation
  - Storage volume reduced > 10%
- Soil Clogging or Compaction Mitigation
  - Surface water > 24 hrs after 0.5" rain
  - Subsurface water > 72 hrs after 0.5" rain

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BMP Type 7:

# Porous Pavement (1008)



Sample Porous Pavement



Porous Pavement Sizing

## □ Maintenance:

- Debris, Erosion From Run On Area
- Regenerative Air or Vacuum Sweep
  - Twice per year to clean pavement surface
- Structural
  - Do not crack seal pavement surface
  - If pavers, joint aggregate (replenish, replace)
- Soil Clogging or Compaction Mitigation
  - Surface water > 24 hrs after 0.5" rain
  - Subsurface water > 72 hrs after 0.5" rain

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BMP Type 8:

# Rain Garden (1009)



Sample Rain Garden during rain event



Sample Rain Garden



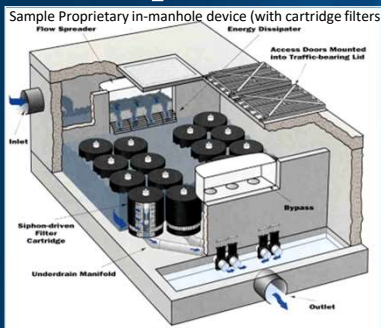
□ Maintenance:

- Debris, Vegetation, Wildlife, Erosion
- Surface Mulch (replenish, thickness)
- Sediment Accumulation
  - Storage volume reduced > 10%
- Soil Clogging or Compaction Mitigation
  - Surface water > 72 hrs after 0.5" rain

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BMP Type 9:

# Proprietary Filter (1010)



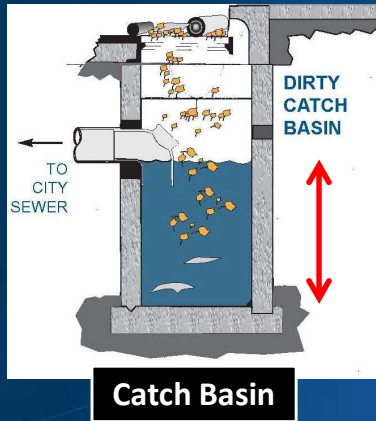
□ Maintenance:

- Debris, Litter, Obstructions
- Petroleum sheen (if required)
- Structural
  - Cracking, spalling, corrosion, joint leak, liner
- Sediment Accumulation
  - Pretreatment (settling chamber)
  - Follow proprietary manufacturer's recommendations for filter (life span, clogging)
  - Test or landfill the removed sediment

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BMP Type 10:

# Hydro Dynamic Separators



- Oversized Manhole, Catch Basin
- Maintenance:
  - Debris, Litter, Obstructions
  - Structural
    - Cracking, spalling, corrosion, joint leak, liner
  - Sediment Accumulation
    - Follow O&M Plan recommendations for frequency of accumulated sediment removal
    - Test or landfill the removed sediment

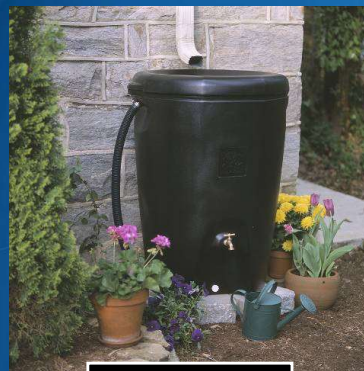
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Other BMP Types:

# Other Stormwater Devices



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Private BMP Owners Requirements:

# Inspection & Maintenance Record Keeping

- How do I obtain a copy of approved plans for my property?
  - Search your files, request from your designer's files, or ask the public works department
- How long do I need to keep my inspection forms?
  - Inspection forms should be kept for 7 years
- What happens if I don't perform the required maintenance?
  - The Village is required to perform an audit on private BMP sites once every 5-year period.

**STORMWATER MANAGEMENT SYSTEM  
INSPECTION, OPERATION, & MAINTENANCE FORM**

|                                                                                                                                                                                                                                                                              |  |                                                                                |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------|--|
| Site or Subdivision Name: _____                                                                                                                                                                                                                                              |  | Parcel ID: _____                                                               |  |
| Site Address / Location: _____                                                                                                                                                                                                                                               |  |                                                                                |  |
| Inspection Frequency (check one): <input type="checkbox"/> > 0.5 Inch Rain (R) <input type="checkbox"/> Monthly (M) <input type="checkbox"/> Biannual (B) <input type="checkbox"/> Annual (A) <input type="checkbox"/> 5-Year Cycle (C) <input type="checkbox"/> Other _____ |  |                                                                                |  |
| Date of Inspection: _____                                                                                                                                                                                                                                                    |  | Inspection Leader Name: _____                                                  |  |
| <b>Maintenance Items – Wet or Dry Detention</b>                                                                                                                                                                                                                              |  | <b>Inspector Comments</b>                                                      |  |
| 1. Debris & Litter – At inlets and outlets (gr _____)                                                                                                                                                                                                                        |  | Maintenance Completed <input type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 2. Debris & Litter – At other device location _____                                                                                                                                                                                                                          |  | Maintenance Completed <input type="checkbox"/> Yes <input type="checkbox"/> No |  |

**Sample Inspection & Maintenance Form**



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Private BMP Owners Requirements:

# Inspection & Maintenance Record Keeping

- Annual Inspection Certification
  - Complete the online or paper copy\* of your annual inspection certification

*\*Note: if paper copy, submit to the public works department)*

**Sample Online Annual Inspection Certification**

**Stormwater Device Inspection and Maintenance Confirmation**

Thank you for completing all required sections on the Municipal Stormwater Device Inspection and Maintenance Confirmation Form.

Site Name\*  
Provide business or owner name

Site Address\*  
Location of stormwater device

Parcel Number/Tax Key Number\*  
Located on tax bill or on the [Brown County GIS site](#)

Landowner Name (if different than Site/Owner Name)

Contact's Name\*

Contact's Title\*

Site (such as landowner, manager, etc.)

Contact's Phone Number\*  
(000-000-0000)

Contact's Email Address\*

Contact's Mailing Address\*

As landowner or on behalf of the Landowner, I confirm the stormwater device/system was inspected and maintained\*

Yes  No

Year stormwater device/system was inspected and maintained\*  
(0000)



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*Thank You for watching the presentation!*

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*Values. Culture. Relationships*