MAINTENANCE AND INSPECTION OF STORMWATER MANAGEMENT BEST MANAGEMENT PRACTICES CITY OF MONONA

1. BEST MANAGEMENT PRACTICE (BMP) OWNERSHIP

    a. Municipality-owned/maintained stormwater BMP.
        i. Develop a site specific maintenance plan/program, if necessary
        ii. Follow the maintenance plan/program, herein.
    b. Privately-owned/maintained BMP.
        i. Obtain a maintenance agreement that has an attached maintenance plan as required by the stormwater management ordinance.
        ii. Follow the maintenance plan/program, herein.

2. MAINTENANCE

The cornerstone of a preventive maintenance program is establishment of a routine inspection program. This program must contain routine and non-routine maintenance. The program is defined below. Use the attached Inspection and Maintenance Documentation Form to document the inspections and maintenance performed. Submit the forms by June 30th of each even numbered year to the City of Monona City Engineer/Director of Public Works documenting the previous year's activities.

    a. Routine Maintenance
        i. Inspections
            1. Inspect wet and dry detention basins, bioretention basins, and grass-lined swales after major storm events (2-year, 24 hour storm event: 2.6 inches) and at a minimum once per year.
            2. Obtain the construction as-built plans for reference during the inspection.

        ii. Mowing
            1. Wet Detention Basins – Mow the side slopes, embankments, and swales on a regular basis to discourage weeds, woody plants, and invasive species.
            2. Dry Detention Basins- Mow the side slopes, embankments, bottom and swales on a regular basis to discourage weeds, woody plants, and invasive species.
            3. Grass-Lined Swales – Mow the side slopes and bottom twice per year to maintain a dense stand of grass.
            4. Bioretention Basins - Mow the side slopes on a regular basis to discourage weeds, woody plants, and invasive species. With a string trimmer, trim the bottom of basin to height of 6 to 9 inches in the fall of each year.
            5. Mow at heights beneficial to the planted and desired vegetation cover.
                a. 3 to 4 inches for grasses.
                b. 6 inches for native plantings.

iii. Debris/Litter Removal

Remove debris and litter on a monthly basis from the basin edges, embankments, bottom (for dry detention basins) and outlet structure including the emergency spillway, as applicable.

iv. Erosion Control/Revegetation

Eroded areas of the basin edges, embankments, bottom (for dry detention basins), emergency spillway, and rip rapped areas shall be repaired in a timely manner. Consider reseeding/replanting with native vegetation with appropriate erosion control mat suited to site condition with possible consultation with an ecological-restoration company. For grass-lined swales, reseed and repair eroded areas with appropriate erosion control mat.

v. Nuisance Control – Provide control of algae and mosquitoes per recommendations from a pond maintenance contractor, as necessary.

b. Non-Routine Maintenance (Dry and Wet Detention Basins)

It is recommended that a more detailed inspection be done every 3 years on wet detention basins (forebay and permanent pool) to determine sediment depth. A forebay is typically located where flows enter the detention basin and has the purpose of settling out sediment in a more convenient location for ease of maintenance. At this time, a sediment depth survey should be performed to determine the approximate average depth of sediment. The survey would normally be done by obtaining the water surface elevation by surveyor's level and then measuring the distance from water surface to top of sediment from a boat using applicable safety standards. The depth is converted to an elevation to determine depth of sediment and to determine the permanent pool depth. The survey can be completed by the City if the capability exists. Otherwise, this would be consulted out. Sediment survey and sampling would normally be consulted out once a sediment removal project is necessary.

i. Outlet Structure – Provide maintenance, as needed. Replace outlet structure when not performing as originally intended.

ii. Sediment Removal/Excavation from Wet Detention Basins

1. Sediment Forebay

a. Maintain 3 feet of water depth except on safety shelves which will be shallower.
b. When the forebay accumulates sediment and there is 3 feet or less water depth, perform sediment removal /excavation to original depth (typically 5 feet or more). See as-builts for original elevations.
c. Sediment Removal/Excavation Frequency: Every 3 to 5 years, depending on source area loadings. Maintain records of sediment loading.

2. Permanent Pool

    a. Maintain 3 feet of water depth except on safety shelves which will be shallower.
    b. When the forebay accumulates sediment and there is 3 feet or less water depth, perform sediment removal /excavation to original depth (typically 5 feet or more). See record drawings for original elevations.
    c. Sediment Removal/Excavation Frequency: Every 15 to 20 years, depending on source area loadings. Maintain records of sediment removal.

3. Sediment Removal/Excavation/Disposal Regulations-Perform sediment removal/excavation according to applicable state, federal and local regulations.

    a. NR 103.06(4) (a)-Artificial wetland exemptions – Allows maintenance of ponds that revert to wetlands. Contact DNR for confirmation.
    b. Contact DNR for Chapter 30 jurisdictional determination.
    c. NR 216 Stormwater Discharge Permit (NOI) necessary for disturbance of one or more acres of land.
    d. Sediment Sampling-Contact DNR to determine if sediment sampling is necessary.
        i. Sediment and parent material sampling procedures should follow DNR guidance documents and NR 347 and NR 528.
        ii. Resources:
            1. *Guidance for Applying the Sediment Sampling Requirements of NR 347,* Wisconsin Administrative Code, WDNR Publication WT-778, 2003.
            2. *Technical Guidance for Contaminated Sediment Cleanup Decisions in Wisconsin.* WDNR. December 21, 1995
            3. *Consensus-Based Sediment Quality Guidelines (CBSQG), Recommendations for Use and Application, Interim Guidance,* WDNR, December 2003.
            4. Laboratory results to be checked for conformance with NR 204.07(5) pollutant concentration limits. Consult NR 204 land application standards.
            5. NR 528-Management of Accumulated Sediment From Stormwater Management Structures
    e. Sediment Disposal-See NR 528 and the above resources. Contact the WDNR.

iii. Sediment Removal/Excavation from Dry Detention Basins-Remove sediment and dispose of properly to maintain the originally-designed flood-storage capacity of the facility.

c. Non-Routine Maintenance (Bioretention Basins)

Bioretention basins are designed to capture sediment on the surface of the bioretention basin. Plug planting in the bottom of the basins is typically initially protected with a hardwood mulch layer. Over time, a bioretention basin may become clogged causing ponding on the surface of the bioretention basin. Bioretention basins are typically designed to drawdown within 24 hours

of the end of a storm event. If the drawdown time of a bioretention basin is greater than 36 hours, maintenance shall occur consisting of: (1) remove all hardwood mulch material while not disturbing established native vegetation, (2) Gently scarify the engineered soil surface to promote infiltration into the engineered soil while not disturbing established native vegetation, (3) replace bioretention soil mixture per WDNR Bioretention for Infiltration Technical Standard 1004 as necessary, (4) replace hardwood mulch layer per WDNR Bioretention for Infiltration Technical Standard 1004. Maintenance shall occur only during dry conditions while taking measures to minimize compaction of remaining engineered soil.

If bioretention basins are experiencing scour, consider removing mulch and engineered soil in those areas to allow for replacing with geotextile and appropriately sized stone to provide energy dissipation.

If bioretention basins have appreciable bare areas, plant with appropriate native plugs.

If bioretention basins appear to be experiencing compaction due to snow storage in the footprint of the bioretention basin, reinforce with the property owner that snow storage is not allowed within the footprint of the bioretention basin.

If bioretention basins appear to be experiencing clogging due to underdrain failure, underdrains shall be inspected. If necessary, underdrains shall be jetted to remove debris. If needed, the underdrain and all components of the bioretention basin above the underdrain shall be replaced per the WDNR Bioretention for Infiltration Technical Standard 1004.

d. Non-Routine Maintenance (Underground Wet Detention Basins)

Underground detention systems are considered confined spaces. Prior to entry into any underground detention systems, appropriate Occupational Safety and Health Administration (OSHA) and local safety regulations and guidelines must be followed.

It is recommended that an accelerated inspection schedule be implemented during the first 12 months of service. An accelerated schedule includes quarterly inspections and inspections two to three days after each significant rain event or runoff period. After the first year, it is recommended that a more detailed inspection be done every 3 years on underground wet detention basins (forebay and permanent pool) to determine sediment depth. A forebay is typically located where flows enter the detention basin and has the purpose of settling out sediment in a more convenient location for ease of maintenance. At this time, a sediment depth survey should be performed at each access manhole to determine the approximate average depth of sediment. This should include measuring the depth from the rim elevation of the access manholes to the water surface elevation and to the top and bottom of sediment. Obtaining record elevations of the access manhole rim elevations would be a good idea to compare elevations between access manholes. The survey can be completed by the City if the capability exists. Otherwise, this would be consulted out. Sediment survey and sampling would normally be consulted out once a sediment removal project is necessary.

i. Inlet Structure – Provide maintenance, as needed. Remove debris and litter, as applicable. Replace inlet structure when not performing as originally intended.

ii. Outlet Structure – Provide maintenance, as needed.

iii. Sediment Removal from Underground Wet Detention Basins

1. Underground Sediment Forebay

    a. When the forebay accumulates sediment and there is 2 feet or less water depth, perform sediment removal /excavation to original depth (3 feet). See as-builts for original elevations.
    b. Sediment Removal/Excavation Frequency: Every 3 to 5 years, or as necessary, depending on source area loadings. Maintain records of sediment loading.

2. Underground Detention System

    a. When the forebay accumulates sediment and there is 2 feet or less water depth, perform sediment removal /excavation to original depth (typically 3 feet). See record drawings for original elevations.
    b. Sediment Removal/Excavation Frequency: Every 15 to 20 years, or as necessary, depending on source area loadings. Maintain records of sediment removal.

3. Sediment Removal/Excavation/Disposal Regulations-Perform sediment removal/excavation according to applicable state, federal and local regulations.

    a. Contact DNR for Chapter 30 jurisdictional determination.
    b. Sediment Sampling-Contact DNR to determine if sediment sampling is necessary.
        i. Sediment and parent material sampling procedures should follow DNR guidance documents and NR 347 and NR 528.
        ii. Resources:
            1. *Guidance for Applying the Sediment Sampling Requirements of NR 347,* Wisconsin Administrative Code, WDNR Publication WT-778, 2003.
            2. *Technical Guidance for Contaminated Sediment Cleanup Decisions in Wisconsin.* WDNR. December 21, 1995
            3. *Consensus-Based Sediment Quality Guidelines (CBSQG), Recommendations for Use and Application, Interim Guidance,* WDNR, December 2003.
            4. Laboratory results to be checked for conformance with NR 204.07(5) pollutant concentration limits. Consult NR 204 land application standards.
            5. NR 528-Management of Accumulated Sediment From Stormwater Management Structures
    c. Sediment Disposal-See NR 528 and the above resources. Contact the WDNR.

Inspection and Maintenance Documentation Form
Stormwater Best Management Practices (BMPs)
Wet and Dry Detention Basins, Bioretention Basins, Grass-Lined Swales,
and Underground Wet Detention Basins
City of Monona, Wisconsin

Inspection Date: _____
Maintenance Date: _____

Inspector Name: _____ Maintenance Provided by: _____
Company Name: _____ Phone Number: _____
Company Address: _____ _____
_____ _____
Company Phone Number: _____ _____
Company Fax Number: _____

Stormwater Facility Location:_____
_____

- ☐ Wet Detention Basin
- ☐ Dry Detention Basin
- ☐ Bioretention Basin
- ☐ Grass-Lined Swale
- ☐ Underground Wet Detention Basin

Items Inspected	Checked		Maintenance Needed		Remarks
	Yes	No	Yes	No	
Wet and Dry Detention Basin (Items below are applicable to both wet and dry basins. Items in italics are applicable to only wet basins)					
A. Berms					
1. Settlement					
2. Breaks					
3. Erosion					
4. Signs of Piping Leakage					
5. Signs of Seepage					
B. Vegetation					
1. Woody growth on berm					
2. Need for cutting/trimming					
3. Need for reseeding					
4. Ruts					
5. Dead vegetation at water's edge					
C. Shoreline					
1. Erosion and rip rap failure					
2. Undermining					
3. Damage or deterioration					
4. Rodent or wildlife damage					

Items Inspected	Checked		Maintenance Needed		Remarks
	Yes	No	Yes	No	
Wet and Dry Detention Basin					
D. Outlet Structure and Emergency Outlet					
1. Obstruction blocking outlet pipe, channel, or spillway					
2. Condition of outlet and inlet structure					
a. Seepage					
b. Separation of joints					
c. Cracks, breaks or deterioration					
d. Differential Settlement					
e. Sediment level in relation to crest of inlet structure					
f. Sediment level in relation to crest of inlet structure					
g. Scour and erosion at outlet					
h. Condition of trash racks					
i. Gates or valves (Operate them twice per year)					
j. Damage by debris, ice, or freezing.					
k. Outlet channel condition downstream.					
E. Inlets					
1. Is trash on or inside pipe grate?					
2. Any ice damage to pipe outlet?					
3. Undermining of any of the pipe?					
F. Sediment Forebay					
1. Approximate depth of sediment =_____					
2. Sediment Removal Necessary					
3. Floating debris					
G. Permanent Pool					
1. Approximate depth of sediment =_____					
2. Sediment Removal Necessary					
3. Floating debris					

Items Inspected	Checked		Maintenance Needed		Remarks
	Yes	No	Yes	No	
Wet and Dry Detention Basin					
H. Access for Maintenance Equipment					
1. Obstructions					
2. Soft Areas					
3. Visible pollution					
4. Shoreline problems					
5. Other (specify)					
I. Safety Features					
1. Access Controls to Hazardous Areas					
2. Fences					
a. Loose or damaged posts					
b. Loose or broken wires					
c. Accumulated debris in fences?					
d. Condition of gates					
Bioretention Basins					
A. Sediment buildup					
B. Clogging/ponding of water					
C. Eroded areas					
D. Bare spots					
E. Trash					
F. Overflow Structure					
G. Plant health					
H. Compaction due to snow storage					
I. Adequate mulch layer					
Grass-Lined Swales					
A. Eroded areas					
B. Bare spots					
C. Mowing Necessary					
Underground Wet Detention Basins					
A. Pretreatment					
a. Sediment has accumulated					
b. Trash and debris have accumulated					
B. Inlets					
a. Poor structural condition					
b. Sediment, trash, or debris have accumulated and/or is blocking the inlets					
C. Chambers					
a. Sediment accumulation threshold has been reached (1/3 ponding depth)					

b. Trash and debris have accumulated in the chambers					
C. Other System Components					
a. Structural deterioration is evident					
D. Outlets					
a. Poor structural condition					
b. Sediment, trash, or debris					
c. Erosion					
E. Other					
a. Ponding water on area draining to system					
b. Evidence that water is not being conveyed through the system					
F. Sediment Forebay					
1. Approximate depth of sediment =_____					
2. Sediment Removal Necessary					
3. Floating debris					
G. Permanent Pool					
1. Approximate depth of sediment =_____					
2. Sediment Removal Necessary					
3. Floating debris					

NOTES:

1. Inspection/Maintenance Comments:

   _____

   _____

   _____

2. Overall Condition of Facility (Check One)

   ___ Acceptable
   ___ Unacceptable
   ____ Maintenance Completed