

Municipal Policies for Maintenance of Green Infrastructure Practices

George A. Rodenhausen
Rapport Meyers LLP

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Maintenance of Green Infrastructure Practices

- It should be noted that **all SMPs** require routine inspection and maintenance.

NYS Stormwater Design Manual (2010) at 7-13

- Green infrastructure requires specialized long term maintenance.

Illinois EPA, Using Green Infrastructure To Manage Urban Stormwater Quality: A Review of Selected Practices and State Programs, at 66

Maintenance of Green Infrastructure Practices

Vegetated Swale

- Fertilize and lime as needed
- Mow grass during growing season to keep under 4 to 6 inches
- Remove sediment or debris by hand when depth reaches 2 inches
- Inspect for pools of standing water
- Regrade to restore design grade and revegetate
- Repair rills in channel bottom, seed and mulch
- Avoid use of heavy equipment
- Stabilize disturbed areas with seed and mulch
 - NYS Stormwater Management Design Manual at 5-62

Maintenance of Green Infrastructure Practices

Rain Garden

- Occasional replacement of plants, mulching, weeding and thinning
 - Watering essential the first year
 - Keep plants pruned if they start to get “leggy” and floppy
 - Cut off old flower heads after a plant is done blooming
 - Keep free of bare areas except where stepping stones are located
 - Inspect for sediment accumulations
 - Replace top few inches of soil when water ponds for more than 48 hours
 - Check for erosion of any dam or berm and repair
 - Correct any settlement or low spots
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- NYS Stormwater Management Design Manual at 5-84

Maintenance of Green Infrastructure Practices

Green Roofs

- Watering, fertilizing and weeding, greatest in the first two years
- Clear roof drains of soil, vegetation or debris
- Monitor vegetation establishment and viability
- Monitor after completion for plant establishment
- Monitor for leaks and other functional or structural concerns
- Attend to irrigation and fertilization during the first year
- Two visits per year for weeding of invasive species
- Inspections for safety and membrane integrity

NYS Stormwater Design Manual at 5-94

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Stormwater Planters

- Regular and thorough inspection regime is vital
- Debris and trash removal on a weekly or monthly basis
- Inspection after each storm event greater than 0.5 inches
- Inspection at least twice in the first six months
- Inspections seasonally and after 1-year storm event
- Pruning and replacing dead or dying vegetation, plant thinning, and erosion repair
- Inspect soil surface for sediment build-up
- NYS Stormwater Design Manual at 5-105

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Rain Barrels

- Maintenance requirements vary depending on the end use
- Winterization maintenance may be necessary
- Routine inspections to ensure the system is available for rain events
- Inspect roof catchments for particulate matter or other contaminants
- Inspect the gutters and downspouts for leaks or obstructions
- Inspect diverts, cleanout plugs, screens, covers, and overflow pipes
- Inspect inflow and outflow pipes
- Inspect connectors to adjacent storage containers or a water pump

- NYS Stormwater Design Manual at 5-112

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Porous Pavement

- Ensure that paving area is clean of debris monthly
- Ensure that paving dewaterers between storms monthly and after storms >0.5 in.
- Ensure that the area is clean of sediments monthly
- Mow upland and adjacent areas, and seed bare areas as needed
- Vacuum sweep frequently to keep surface free of sediments
- Inspect the surface for deterioration or spalling annually
- High-pressure washing when clogged or crusted material is removed.

- NYS Stormwater Design Manual at 5-105

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Stormwater Ponds

- Inspect vegetation and ground cover
- Inspect for embankment erosion, animal burrows
- Inspect for cracking, bulging, or sliding of dam
- Keep pond toe and chimney drains clear and functioning
- Inspect for seeps/leaks on downstream face
- Inspect for slope protection or riprap failure
- Maintain emergency spillway clear of obstructions and debris
- Maintain trash rack
- Inspect for sediment accumulation

- NYS Stormwater Guidance Manual App G-1

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Design Manual Maintenance Requirement

The responsibility for implementation of long term operation and maintenance of a post-construction stormwater management practice shall be vested with a responsible party by means of a legally binding and enforceable mechanism such as a maintenance agreement, deed covenant or other legal measure.

This mechanism shall protect the practice from neglect, adverse alteration and/or unauthorized removal.

The mechanism and Operation and Maintenance (O&M) plan must be included in the SWPPP.

- DEC, NYS Stormwater Design Manual (2010) at 3-12

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Design Manual Maintenance Requirement

At a minimum, the O&M plan must address each of the following:

1. Owner shall erect or post, in immediate vicinity of SMP, a conspicuous and legible sign not less than 18 inches by 24 inches bearing the following information:

STORMWATER MANAGEMENT PRACTICE - (*name of the practice*)

Project Identification - (*SPDES Construction Permit #, other*)

Must Be Maintained In Accordance With O&M Plan

DO NOT REMOVE OR ALTER

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Design Manual Maintenance Requirement

- 2. Identification of entity responsible for long term operation and maintenance
- 3. Identification and copy of mechanism to ensure long term operation and maintenance (Deed covenant, easements/rights-of-way, executed maintenance agreement, etc.)
- 4. Schematics of the practice, with the measurements of design specifications clearly defined.
- DEC, NYS Stormwater Design Manual (2010) at 3-12

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Questions on Maintenance of GI

Who will be responsible after GI is implemented?

If a residential development, is homeowner knowledgeable in GI maintenance?

Should there be a requirement to hire professional landscaping company to maintain private property?

Once the property changes hands, who will be responsible?

How will municipality fund and staff inspections to be sure GI is properly maintained?

Illinois EPA, Using Green Infrastructure To Manage Urban Stormwater Quality: A Review of Selected Practices and State Programs, at 67

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DEC SAMPLE STORMWATER CONTROL FACILITY MAINTENANCE AGREEMENT

- **Between the municipality and the facility owner**
 - **Does not specifically address GI**
 - **Inspection at least every 5 years by PE**
 - **Does not provide any guarantee**
 - **Does provide for bond or letter of credit**
 - **Requires inclusion in offering plan**
 - **Does not provide for enforcement by injunction**
 - **Does not provide for levy on taxes of muni's expenses**
 - **Requires recording with county clerk**
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- **DEC, Stormwater Management Guidance Manual for Local Officials Construction and Post-Construction Stormwater Runoff Management September 2004, Schedule B**

Maintenance of Green Infrastructure Practices

Local Law Required by MS4 Permit

Equivalent to one of the versions of the DEC Sample Local Laws for Stormwater Management and Erosion and Sediment Control

- by adoption of one of the sample local laws without changes;
- by using the NYSDEC Gap Analysis Workbook; or
- by adoption of a modified version of the sample law, or an alternative law, and certification by the attorney representing the MS4 that the adopted law is equivalent to one of the sample local laws

SPDES General Permit for Stormwater Discharge from MS4s, GP-0-10-002

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Sample Local Law for Stormwater Management and Erosion & Sediment Control

Article 1 - General Provisions

Article 2 - Amendment to Zoning Law

Article 3 - Amendment to Subdivision Law

Article 4 - Amendment to Site Plan Review Law

Article 5 - Amendment to Erosion & Sediment Control Law

Article 6 - Administration and Enforcement

Schedule A - Stormwater Management Practices Acceptable for Water Quality

Schedule B - Sample Stormwater Control Facility Maintenance Agreement

- DEC, Stormwater Management Guidance Manual for Local Officials Construction and Post-Construction Stormwater Runoff Management September 2004

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MS4 Permit

MS4s are required to review the GI practices defined in the Design Manual at a site level, and are encouraged to review and revise local codes and laws that preclude GI or construction techniques that minimize or reduce pollutant loadings.

SPDES General Permit for Stormwater Discharge from MS4s, GP-0-10-002

Maintenance of Green Infrastructure Practices

Municipal Policies for Public Facilities

- **Establish an operation and maintenance local law**
 - **Make provisions for maintenance in the design and construction of management practices**
 - **Identify mechanisms for program funding**
 - **Plan regular inspections**
 - **Schedule maintenance, cleaning, and debris removal to avoid sediment accumulation**
 - **Make provisions for monitoring treatment criteria**
 - **Implement training and certification programs to provide educational opportunities for management practice operators**
 - **Disposal of residuals**
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- EPA, National Management Measures to Control Nonpoint Source Pollution from Urban Areas-- Management Measure 11: Operation and Maintenance (2005) at

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MS4 Permit

- Maintain an inventory of post-construction stormwater management practices within the MS4's jurisdiction.
- The inventory shall include at a minimum:
 - location of practice (street address or coordinates);
 - type of practice;
 - maintenance needed per the NYS Stormwater Management Design Manual, SWPPP, or other documentation; and
 - dates and type of maintenance performed

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EPA's Inspection Guidance

- Legal authority to require and enforce erosion and sediment control BMPs
- System for tracking construction plans and active construction projects
- Coordinating local erosion and sediment control requirements with SPDES construction general permit requirements
- Process for reviewing plans to ensure stormwater BMPs are addressed
- How stormwater inspections are conducted at construction sites
- Frequency of construction site inspections
- Training of inspectors and plan review staff

EPA, MS4 Program Evaluation Guidance (2007)

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- **EPA's Inspection Guidance**
- Post-construction design standards and legal authority
- Process for reviewing plans to ensure post-construction BMPs are addressed
- Post-construction operation and maintenance program (including inventory of post-construction BMPs and inspection and maintenance schedule)
- EPA, MS4 Program Evaluation Guidance (2007)

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Regional Programs

- Facilitate coordination between departments within each permittee, between co-permittees, and between the permittee and other organizations and agencies
- Some permits that regulate multiple co-permittees may allow for a separate “umbrella” management structure to perform certain functions
- These umbrella structures can be managed by the lead permittee or by consultants hired collectively by all co-permittees
- EPA, MS4 Program Evaluation Guidance (2007)

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- EOH Watershed Corporation being formed by 20 municipalities located East of the Hudson River in the New York City Watershed
- Program Director being sought!
- See RFQ at http://www.somersny.com/Pages/SomersNY_Events/eohwatershedprogramdirector.pdf

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- DEC response to EOH claims regarding unfairness of MS4 Permit requiring retrofits East of Hudson in the NYC Watershed was included in 12/24/10 Water Supply Permit issued by DEC to New York City.
 - \$15.5 million from NYC for stormwater retrofits
 - \$4.5 million from NYC continued under 2007 FAD
 - \$18.2 million from Putnam and Westchester WQIP
 - \$0.0 for operation and maintenance

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Stormwater Drainage Districts

General Municipal Law (GML) Article 5-E: “construction and development of capacity in excess of its own needs for the purpose of conveying and disposing of storm waters and other surface or sub-surface waters collected by another public corporation or improvement district.”

Broader authority in Article 5-G of the GML. The authority given under GML Art. 5-E, is additional authority for intermunicipal drainage construction without the necessity to create a district.

DEC, Stormwater Management Guidance Manual for Local Officials Construction and Post-Construction Stormwater Runoff Management September 2004

Maintenance of Green Infrastructure Practices

- Common policies in 12 surveyed municipalities:
 - Stormwater regulation
 - Review and revise local codes
 - Demonstration and pilot projects
 - Capital and Transportation projects
 - Education and outreach
 - Stormwater fees
 - Stormwater fee discounts
 - Other Incentives

EPA, Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure (August, 2010) at 4

Maintenance of Green Infrastructure Practices

- Stormwater Regulations
 - Require development to use GI
 - Minimize site disturbance
 - Reduce size of impervious surfaces
 - Manage runoff before leaving site
 - Reduce off site runoff

EPA, Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure (August, 2010)

Maintenance of Green Infrastructure Practices

- Review and Revise Local Codes
 - Remove barriers to GI Practices
 - Amend Zoning law to incorporate GI Practices
 - Amend Subdivision law to incorporate GI practices
 - Assure coordination among all local laws
 - Assure coordination among all local agencies – policy audit
 - Review EPA Water Quality Scorecard

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Demonstration and Pilot Projects

- Small projects with few complications
- Allow staff to figure out logistics of GI
- Pilot projects for large scale proposals
- Proper signage and advertising

EPA, Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure (August, 2010)

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Capital and Transportation Projects

- Significant funding sources for repairs
- Street trees
- Porous pavement
- Bioswales, rain gardens and infiltration practices
- Vegetated medians and shoulders

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- Education and Outreach
 - Take advantage of built GI projects
 - Signage and brochures
 - Portland's stormwater cycling tour
 - How-to guide to installing a rain barrel
 - Planting native trees
 - Avoiding use of pesticides

EPA, Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure (August, 2010)

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- Stormwater Fees
 - Generate a dedicated revenue stream
 - Impervious surface based billing system
 - Reflect contribution of runoff from a particular site
 - May be based on GIS and overflight photos
 - Add fee to water, sewer or utility bills or property tax

EPA, Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure (August, 2010)

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- Stormwater Fee Discounts
 - Incentive to decrease amount of runoff
 - Encourage retrofits in existing development
 - Encourages GI in new development
 - Set appropriate management goals
 - Determine how to credit property owners

EPA, Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure (August, 2010)

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- Other Incentives
 - Fee Discount
 - Zoning upgrades, expedited permitting
 - Reduced stormwater requirements
 - Funding, tax credits or reimbursement
 - Awards and recognition programs

EPA, Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure (August, 2010)

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3-Step Policy Implementation

First Step - Stormwater regulation, Code Review

Second Step - Demonstration and Pilots. Education and Outreach, Incentives

Third Step - Capital and Transportation Projects, Stormwater Fee, Fee Discounts

EPA, Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure (August, 2010)

Municipal Policies for Maintenance of Green Infrastructure Practices

George A. Rodenhausen

Rapport Meyers LLP

20 Spring Brook Park

Rhinebeck, NY 12513

grodenhausen@rapportmeyers.com

845-473-7766