

# Chattanooga Water Quality Program

## Stormwater Controls (BMPs) Maintenance



Don Green, LEED AP  
Water Quality Supervisor



Mo Minkara, Ph.D., P.E., CPSWQ  
Water Quality Manager

# Outline

- State/MS4 Stormwater BMPs permit Requirements
- Why BMP Maintenance?
- How are BMPs Maintained?
- BMPs Maintenance Guidelines
- BMPs Maintenance Problems?



**STATE OF TENNESSEE**

**NPDES PERMIT**

**No. TNS068063**

Authorization to discharge under the  
National Pollutant Discharge Elimination System (NPDES)

Issued By

Tennessee Department of Environment and Conservation  
Division of Water Pollution Control  
401 Church Street  
6th Floor, L & C Annex  
Nashville, Tennessee 37243-1534

Authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.)

Permittee: The City of Chattanooga, Hamilton County, Tennessee

Authorized to discharge stormwater runoff, in accordance with the following stormwater quality management program(s), effluent limitations, monitoring requirements and other provisions as set forth in Parts I through III of this permit, to all portions of the MS4, owned or operated by any permittee listed above, to Waters of the State of Tennessee.

This permit shall become effective on: December 1, 2010

This permit shall expire on: November 30, 2015

Effective date: November 12, 2010

*E. Davis*  
E. Davis, Director  
Division of Water Pollution Control

# State/MS4 Requirements

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- Previous BMP Maintenance Requirements
- Latest Requirements – Effective Dec. 2014



Water Reuse



Infiltration



# State/MS4 Requirements


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- Ensure long-term operation and maintenance of permanent BMPs.
- Included in the construction plans
- Maintenance Agreement
  - Transfer of responsibility in Deeds
- Property Owner Responsibility:
  - Inspection and Repair
- City Inspection
  - Corrective Action is required within 30 days
  - Enforcement/ERP



# WQ Fee Credit Requirements

- At least quarterly inspection
- Annual documentation submitted to the City

 **INSPECTION/MAINTENANCE FORM** Form I/M  
for Stormwater BMPs

\* Use this form to log and report annual inspection and maintenance activities on private BMPs (stormwater controls structures)

**RECEIVED**  
APR 10 2014  
STORM WATER

Property Owner Watson Properties Phone (423) 756-1331  
Email: David\_Watson@mvford.com

Contact Person David Watson Jeanine Clark Phone (423) 756-1331 ext. 1404  
Email: David\_Watson@mvford.com  
jeanine.clark@mvford.com

Property Address 250 E 20th Street Chattanooga, TN 37408  
300 E 20th Street Chattanooga, TN 37408

Inspection Company (if different than owner) \_\_\_\_\_  
Inspection Company Contact \_\_\_\_\_ Phone \_\_\_\_\_  
Email: \_\_\_\_\_

Company Address \_\_\_\_\_

List of all BMPs on site:

NO.	BMP	NO.	BMP
1	Detention Pond		Green Roof (square feet)
	Retention Pond		Underground Detention
	Bio-Retention		Grassed Swale
	Constructed Wetland		Bio-Swale
	Sand Filter		Permeable Pavement
	Stream Buffer		Sweeping (square feet)
	Proprietary Device (list type)		Other
	Bio-Retention Pond		Other
	Bio-Retention Pond		Other

\* Use One Sheet for Each BMP

**BMP REGIONAL POND** (See Overview Map)

**RECEIVED**  
APR 10 2014  
STORM WATER

Structure designation, type, number, area, etc. Detention Pond  
145 M D 002 Mr. View Ford Truck Center 250 E. 20th St.  
145 M E 001 Mr. View Chevrolet 300 E. 20th St.

Approximate date of installation 4/2009

Date of Last Inspection 1/15/2014

This Inspection Date 3/27/2014 Time 12:00 pm

Condition of this BMP (use the numerical ranking below): 3

3: Excellent condition (No Maintenance Needed)  
2: Acceptable condition (No Maintenance Needed)  
1: Needs improvement (Some Maintenance Needed)  
0: Poor condition (Major Maintenance Needed)

List improvement or maintenance activities conducted since last inspection:  
Routine maintenance - weekly mowing - clearing of debris

Description of current condition:  
No debris, grassy with two spots approximately 2ft in diameter of minor erosion. Grass should cover over erosion spots shortly.

List needed improvement and maintenance activities:  
Weekly mowing and clearing of debris

Name Charles Signature \_\_\_\_\_ Date 3/27/14

# State/MS4 Requirements

## 3.2.5.7 Owner/Operator Inspections (cond't)

- Property owner shall perform routine inspections to ensure that the BMPs are properly functioning.
  - **Minimum once a year**
- These inspections shall be conducted by a person familiar with control measures implemented at a site.
  - **Promptly repair as necessary**
- Owners shall maintain documentation of these inspections and repair
  - **The City may require submittal of this document.**





# State/MS4 Requirements

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## 3.2.5.7 Owner/Operator Inspections (cond't)

### Five year Inspection

- Owners shall have comprehensive inspections conducted of all stormwater management facilities and practices.
  - Once every **five years, at a minimum**. Such inspections must be conducted by either a **professional engineer or landscape architect**.
- **I&M Documentation**
  - Photos, inspection & maintenance logs, contractor invoices
    - Showing that required inspection and appropriate maintenance and/or repairs have been completed.

# I&M Agreement

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Ordinance 11883 9-12-06

- All developments installing new detention facilities, retrofitting existing detention facilities or other stormwater management facilities shall be required to execute an **Inspection and Maintenance Agreement for Private Stormwater Management Facilities** designating the party or parties responsible for maintenance and granting the City the right to inspect said facilities.
- In case where the responsible party or parties do not perform required maintenance after being given appropriate notice in writing, the Agreement shall grant authority to the City to perform such maintenance as may be required and bill the responsible party in an amount equal to double the City's cost of maintenance and enforcement.



# I&M Agreement

Ordinance 11883 9-12-06



City of Chattanooga  
Mayor Andy Berke

**PREPARED BY:**

CITY OF CHATTANOOGA  
LAND DEVELOPMENT OFFICE  
1250 MARKET STREET, SUITE 1000  
CHATTANOOGA, TN 37402

Grading Permit No.: \_\_\_\_\_

**INSPECTION AND MAINTENANCE AGREEMENT OF PRIVATE STORMWATER MANAGEMENT FACILITIES**

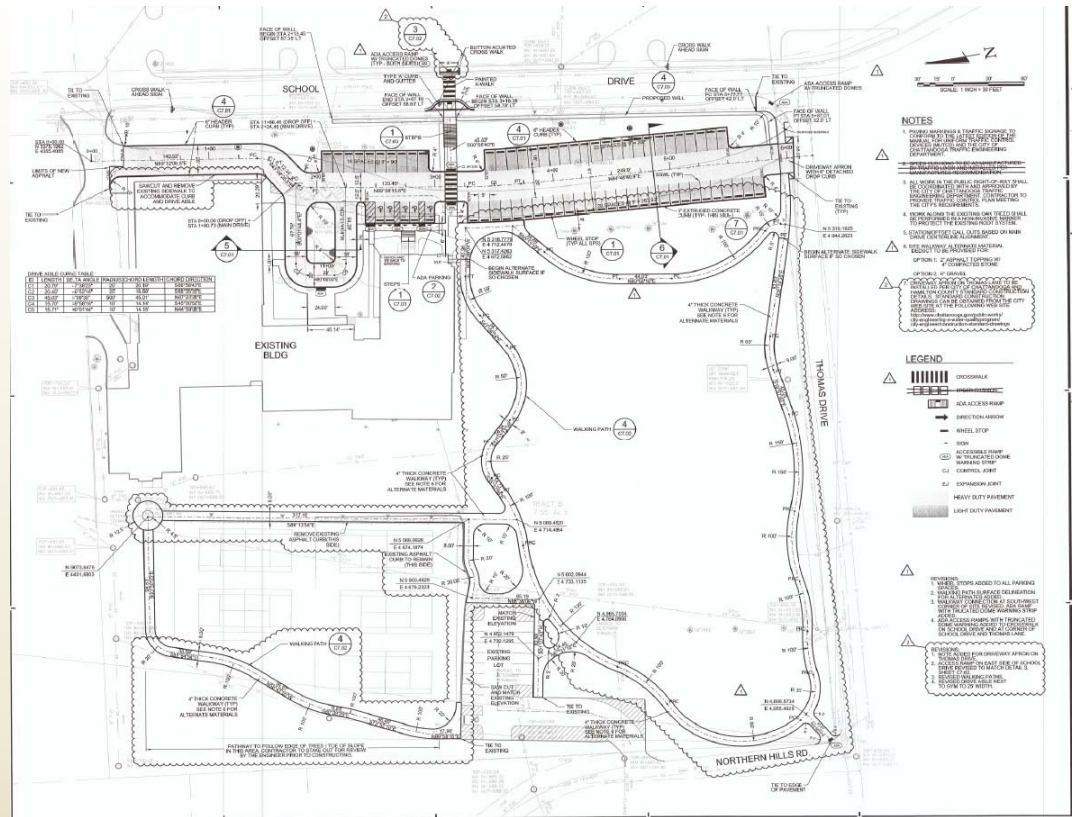
THIS AGREEMENT, made this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between \_\_\_\_\_, hereinafter referred to as the "Owner" of the property described on Exhibit "A" (the "Property"), and City of Chattanooga, Tennessee, hereinafter referred to as the "City",

**WITNESSETH:**

The Owner, with full authority to execute deeds, mortgages, other covenants, all rights, titles, and interests in the Property, does hereby covenant with the City and agrees as follows:

1. The Owner acknowledges the existence of storm water management facility or facilities (hereinafter referred to as the Facility) for the Property.
2. The Owner covenants and agrees to provide for an adequate long term maintenance of storm water control measures to ensure that the Facility is and remains in proper working condition in accordance with approved design and maintenance standards, rules and regulations, and applicable laws for the life of any storm water management facility/best management practice that exists on the Property. This Agreement requires maintenance of best management practices by the Owner, but it does not require updating to new standards unless there is a change in the amount of impervious area initiated by the Owner or unless required by state or federal law.
3. The Owner should reference activities outlined in the City's *Stormwater Best Management Practices Maintenance Manual* (hereinafter referred to as the "Manual") incorporated herein by reference, along with necessary landscaping (grass cutting, etc.) and trash removal as part of regular maintenance of the Facility. The Manual provides recommendations for frequency of inspections and maintenance and/or repair activities of the Facility. The Owner

1  
PUBLIC WORKS DEPARTMENT, ENGINEERING & WATER QUALITY DIVISION  
LAND DEVELOPMENT OFFICE  
1250 MARKET STREET, SUITE 2100, Chattanooga, Tennessee 37402-2713  
MAIN: (423) 643-6000 FAX: (423) 643-6008



# Maintenance Agreement & Plan

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- Land Disturbing Permit Application shall include:
- Inspection & Maintenance Agreement
  - “We promise to take care of our stormwater control structures.”
- Inspection & Maintenance Plan
  - “This is how we’re going to do it.”



# Maintenance Guidelines

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## Resource Management Guide

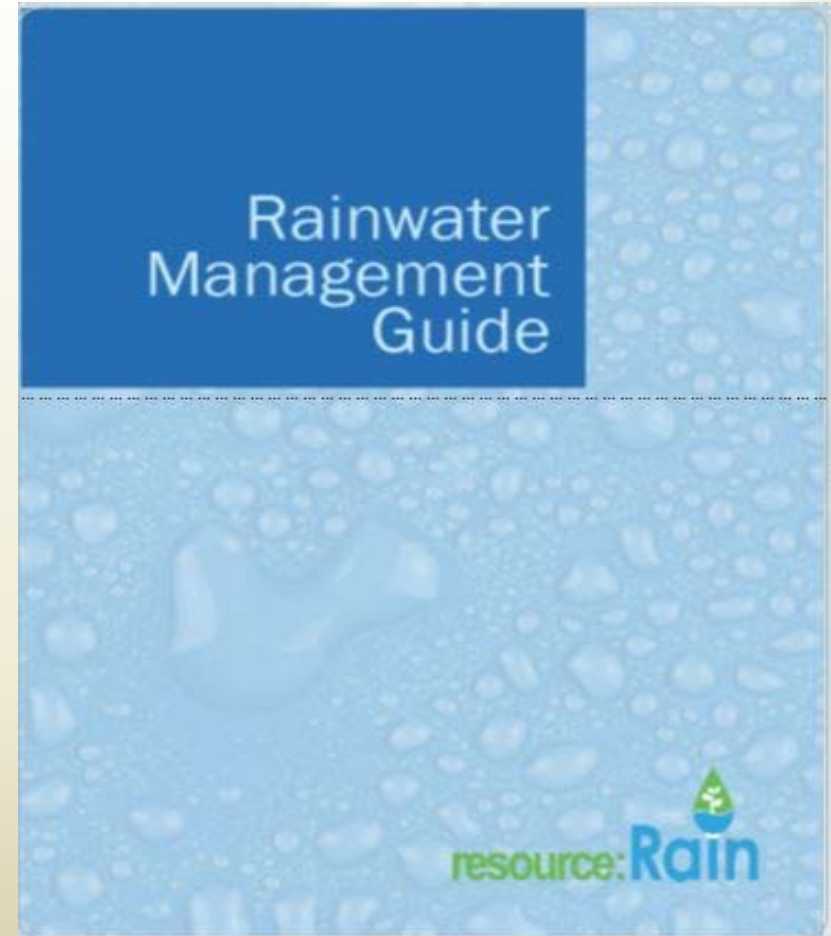
[www.chattanooga.gov/resourcerain](http://www.chattanooga.gov/resourcerain)

- 5.3.1 Pervious Pavement
- 5.3.2 Infiltration Bed
- 5.3.3 Infiltration Trench
- 5.3.4 Bioretention
- 5.3.5 Vegetated Swales
- 5.3.6 Vegetated Filter Strip
- 5.3.7 Infiltration Berm
- 5.3.8 Green Roofs

Where to apply; under what conditions.

**(Maintenance of a practice should be considered before it is put on the plans)**

*\* Operations and Maintenance at the end of all these documents.*



# Maintenance Guidelines

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RMG Was adopted in Ordinance Dec 2014

## 8.2 Operations and Maintenance Plan Requirements (Chapter 8 RMG)

Each project site must develop a site-specific Operations and Maintenance Plan that addresses all of the primary goals described above. At a minimum, a site-specific Operations and Maintenance Plan must include the following:

1. Map – A laminated copy of the Stormwater Management Plan drawing or map, drawn to a legible scale (maximum 1" = 100') that accurately identifies the location, type, and associated infrastructure components for each BMP installed on the project site.
2. Inspection and Maintenance Agreement – A legal document (legal form provided by the City) identifying the owner(s) as the individual(s) responsible for ensuring that inspection, operations, and maintenance activities are completed.
3. Schedule – A detailed schedule of inspection frequency and maintenance/repair actions required at the time of inspection and a schedule of regular maintenance activities required for continued BMP performance.
4. Procedures – Detailed procedures outlining the specific actions necessary, including material replacement/repair procedures, to perform all scheduled maintenance tasks.



# Maintenance Guidelines

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1. Map – A **Stormwater Management Plan** drawing or map, drawn to a legible scale (maximum 1" = 100') that accurately identifies the location, type, and associated infrastructure components for each BMP installed on the project site.
2. **Inspection and Maintenance Agreement** – A legal document (legal form provided by the City) identifying the owner(s) as the individual(s) responsible for ensuring that inspection, operations, and maintenance activities are completed.
3. Schedule – A **detailed schedule of inspection frequency** and maintenance/repair actions required at the time of inspection and a schedule of regular maintenance activities required for continued BMP performance.
4. Procedures – Detailed procedures outlining the **specific actions** necessary, including material replacement/repair procedures, to perform all scheduled maintenance tasks.

# Maintenance Guidelines

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RMG Was adopted in Ordinance Dec 2014

## 8.2 Operations and Maintenance Plan Requirements (Chapter 8 RMG)

Condt.

5. **As-built Drawings** – A laminated 11-inch by 17-inch copy of as-built construction plans showing all components of each BMP including inflow/outfall structures and monitoring areas and material certifications to ensure that repairs are completed in a manner consistent with intended design.
6. **Inspection and Maintenance Logs** – Forms by which persons performing inspections, operations, and maintenance activities can log their activities to document compliance with the Inspection and Maintenance Agreement.

# Maintenance Guidelines

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RMG Was adopted in Ordinance Dec 2014

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Condt.

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# Maintenance Guidelines

From page 8-3 to 8-42 in **Chapter 8 RMG**, there are several Inspection checklists for permanent stormwater BMPs to work in conjunction with Operations and Maintenance Agreements covering

- 5.2 Damage Prevention and Protection Practices
- 5.3 Structural BMPS
- 5.4 Restoration Practices

## 5.3.1 Pervious Pavement Inspection Checklist FORM

Inspected by: \_\_\_\_\_ BMP ID#: \_\_\_\_\_ Property Owner: \_\_\_\_\_  
 Date of Inspection: \_\_\_\_\_ Weather: \_\_\_\_\_  
 Location Description: \_\_\_\_\_

Inspector Verification (Initial)	Maintenance Issue	Is This Issue Present? (Y/N)	Required Actions to Address Issues Present	Comments (Describe maintenance completed and, if needed maintenance was not conducted, note when it will be done.)
	Is there standing or pooling water, especially on pervious surfaces?		<ul style="list-style-type: none"> <li>• Check perforated pipe outlet for obstruction or damage.*</li> <li>• Rush perforated pipe to remove obstructions/sediment.*</li> <li>• Repair or replace perforated pipe, replace with new soil and regrade.</li> <li>• Subsurface layers may need cleaning and/or replacing.</li> <li>• In dry weather, use a mechanical sweeper or a vactor truck to vacuum clean surface area.</li> <li>• In wet weather, use a vactor truck to vacuum clean surface area.</li> </ul>	
	Is there visible water flowing over the surface of the pervious concrete/pavers during a low-intensity storm?		<ul style="list-style-type: none"> <li>• Check perforated pipe outlet for obstruction or damage.*</li> <li>• Rush perforated pipe to remove obstructions/sediment.*</li> <li>• Repair or replace perforated pipe, replace with new soil and regrade.</li> <li>• Subsurface layers may need cleaning and/or replacing.</li> <li>• In dry weather, use a mechanical sweeper or a vactor truck to vacuum clean surface area.</li> <li>• In wet weather, use a vactor truck to vacuum clean surface area.</li> </ul>	
	Is there sediment visible on the surface of the pervious concrete?		<ul style="list-style-type: none"> <li>• In dry weather, use a mechanical sweeper or a vactor truck to vacuum clean surface area.</li> </ul>	

\*If perforated pipe is present.

## 5.3.2/5.3.4 Infiltration/Bioretenion Inspection Checklist FORM

Inspected by: \_\_\_\_\_ BMP ID#: \_\_\_\_\_ Property Owner: \_\_\_\_\_  
 Date of Inspection: \_\_\_\_\_ Weather: \_\_\_\_\_  
 Location Description: \_\_\_\_\_

Inspector Verification (Initial)	Maintenance Issue	Is This Issue Present? (Y/N)	Required Actions to Address Issues Present	Comments (Describe maintenance completed and, if needed maintenance was not conducted, note when it will be done.)
	Is there accumulation of sediment (sand, dirt, mud) at the infiltration bed entrance or overflow locations?		<ul style="list-style-type: none"> <li>• Remove sediment and check the grading.</li> </ul>	
	Is there evidence of animal activity such as holes or dirt mounds from digging or burrowing?		<ul style="list-style-type: none"> <li>• Repair and fill in damaged areas.</li> <li>• Implement rodent control activities where warranted. Activities must be in accordance with applicable laws.</li> </ul>	
	From the inspection port or inlets, is there evidence of water remaining in the bed after 3 days of dry weather?		<ul style="list-style-type: none"> <li>• Further evaluate. Restoration may be required.</li> </ul>	
	Is there trash/debris in the area?		<ul style="list-style-type: none"> <li>• Remove all trash and debris.</li> </ul>	

This checklist is to be used in conjunction with the maintenance plan developed by a certified professional and in accordance with the Operations and Maintenance Agreement on file with the City of Chattanooga. Please review those documents prior to performing field inspections.



# Maintenance Problems



Infiltration  
device not  
functioning



Drainage:  
- Surface water should  
drain w/n 24 hrs  
- Subsurface w/n 72 hrs





# Maintenance Problems



Overgrowth in  
detention  
ponds



Solids, oil/grease, & sediment in  
WQ Devices

# Inspection and Maintenance

## Items to consider:

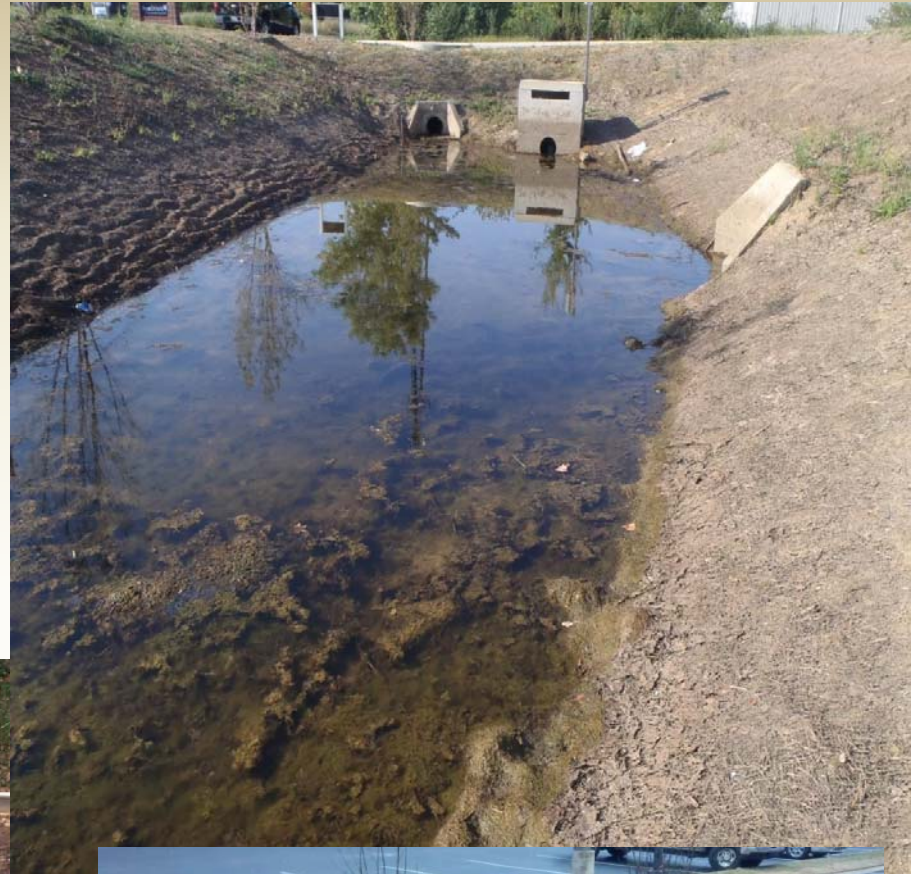
- **Instillation and Placement of BMP System**
  - Forebay
  - Timing of Instillation
- **Inspections**
  - Quarterly/Yearly
  - Consistent
  - Documentation
- **Operations and Maintenance**
  - Signage, prevention, repair



Extending the geotextile over the stone bed during construction of this pervious concrete sidewalk prevents sediment from entering the bed.









# Green Grants

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Grants for Restoration and Enhancement of Environment and Neighborhoods.

Program offers financial assistance for green infrastructure projects on privately owned, commercial and multi-family residential properties.

## Retrofit/Redevelopment

- \* Follow Resource Rain RMG guidelines: Reduce quantity and improve quality of Stormwater Runoff.
- \* Pilot project focused on South Chickamauga Creek.



# Green Grants

## Grants for Restoration and Enhancement of Environment and Neighborhoods.

- Minimum of SOV ½ inch from 50% of property impervious area
- Long Term Maintenance Agreement
- \$14-15 /cubic ft. reduced beyond the required SOV
- Max no more than \$100,000/property
- No more than 20% for design

### Incentives:

- Reduce Water Quality fee
- Mitigation Credit Coupons beyond required SOV



Chickamauga Crayfish





Thank You

