Williamson County Engineering Department
Storm Water Management Program

2015/2016 Annual Report
Page 1

Stormwater Management Plan
Page 15

EPA Water Quality Scorecard
Page 36 - Appendix

National Pollution Discharge Elimination System Permit Number TNS000000 authorizes Williamson County to discharge stormwater runoff into Waters of the State of Tennessee in accordance with certain water quality management programs and provisions established within the permit. Williamson County is required to submit to the State of Tennessee a MS4 Annual Report, additional supporting documents as outlined within the Stormwater Management Plan, and the completed EPA Water Quality Scorecard.

Tennessee Department of Environment and Conservation
Division of Water Resources
William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
1-888-891-8332 (TDEC)

Municipal Separate Storm Sewer System (MS4) Annual Report

1. MS4 INFORMATION

Williamson County, TN	TNS075795
Name of MS4	MS4 Permit Number
Michael Scott, Storm Water Quality Coordinator	michaels@williamson-tn.org
Name of Contact Person	Email Address
615-790-5608	
Telephone (including area code)	
1320 West Main Street, Suite 400	
Mailing Address	

Franklin	TN	37064
City	State	ZIP code

What is the current population of your MS4? 50,976

What is the reporting period for this annual report? From 7/01/15 to 6/30/16

2. WATER QUALITY PRIORITIES (SECTION 3.1)

A. Does your MS4 discharge into waters listed as impaired on TN's most current 303(d) list and/or according to the on-line GIS mapping tool? ☒ Yes ☐ No

B. If yes, please attach a list all impaired waters within your jurisdictional area.

C. Does your MS4's jurisdictional area contain any waterbodies where a TMDL has been approved for parameters other than pathogens, siltation and habitat alterations? If yes, please attach a list.

D. Does your MS4 discharge to any Exceptional TN Waters (ETWs) or Outstanding National Resource Waters (ONRWs)? If yes, please attach a list. ☒ Yes ☐ No

E. Are you implementing additional specific provisions to ensure the continued integrity of ETWs or ONRWS located within your jurisdiction? ☒ Yes ☐ No

3. PROTECTION OF STATE OR FEDERALLY LISTED SPECIES (SECTION 3.2.1 General Permit for Phase II MS4s)

A. Are there any state or federally listed species within the MS4's jurisdiction? ☒ Yes ☐ No

B. Are any of the MS4 discharges or discharge-related activities likely to jeopardize any state or federally listed species? ☐ Yes ☒ No

C. Please attach any authorizations or determinations by U.S. Fish & Wildlife Service on the effect of the MS4 discharges on state or federally listed species.

4. PUBLIC EDUCATION AND PUBLIC PARTICIPATION (SECTION 4.2.1 AND 4.2.2)

A. Have you developed a Public Information and Education plan (PIE)? ☒ Yes ☐ No

B. Is your public education program targeting specific pollutants and sources of those pollutants, such as Hot Spots? ☒ Yes ☐ No

C. If yes, what are the specific causes, sources and/or pollutants addressed by your public education program? Siltation, Habitat Alteration, and Nutrients

D. Note specific successful outcome(s) (NOT tasks, events, publications) fully or partially attributable to your public education program during this reporting period. An increase in public awareness.

E. Do you have an advisory committee or other body comprised of the public and other stakeholders that provides regular input on your stormwater program? ☒ Yes ☐ No

F. How do you facilitate, advertise, and publicize public involvement and participation opportunities? Storm Water Appeals Board Meetings, which are generally open to the public, are facilitated in the Main Auditorium of the Williamson County Administrative Complex, and are advertised and publicized in the newspaper as specified in the Storm Water Management Regulations.

G. Do you have a webpage dedicated to your stormwater program? ☒ Yes ☐ No

If so, what is the link/URL: http://www.williamsoncounty-tn.gov/stormwater

H. Are you tracking and maintaining records of public education, outreach, involvement and participation activities? Please attach a summary of these activities. ☒ Yes ☐ No

5. Illicit Discharge Detection and Elimination (Section 4.2.3)

A. Have you completed a map of all outfalls and receiving waters of your storm sewer system? ☒ Yes ☐ No

B. Have you completed a map of all storm drain pipes of storm sewer system? ☒Yes ☐ No

C. How many outfalls have you identified in your system? 5,286

D. Have any of these outfalls been screened for dry weather discharges? ☒Yes ☐ No

F. What is your frequency for screening outfalls for illicit discharges? 100% Annually

G. Do you have an ordinance that effectively prohibits illicit discharges? ☒ Yes ☐ No

H. During this reporting period, how many illicit discharges/illegal connections have you discovered (or been reported to you)? 0

I. Of those illicit discharges/illegal connections that have been discovered or reported, how many have been eliminated? n/a

6. Construction Site Stormwater Runoff (Section 4.2.4)

A. Do you have an ordinance or adopted policies stipulating:

Erosion and sediment control requirements? ☒ Yes ☐ No

Other construction waste control requirements? ☒ Yes ☐ No

Requirement to submit construction plans for review? ☒ Yes ☐ No

MS4 enforcement authority? ☒ Yes ☐ No

B. How many active construction sites disturbing at least one acre were there in your jurisdiction this reporting period?52

C. How many of these active sites did you inspect this reporting period? 100%

D. On average, how many times each, or with what frequency, were these sites inspected (e.g., weekly, monthly, etc.)? Monthly

E. Do you prioritize certain construction sites for more frequent inspections? ☒Yes ☐ No

If Yes, based on what criteria? As needed based on activity and potential impacts to water quality.

7. PERMANENT STORMWATER CONTROLS (SECTION 4.2.5)

A. Do you have an ordinance or other mechanism to require:

Site plan reviews of all new and re-development projects?	☒ Yes	☐ No
Maintenance of stormwater management controls?	☒ Yes	☐ No
Retrofitting of existing BMPs with green infrastructure BMPs?	☒ Yes	☐ No

B What is the threshold for new/redevelopment stormwater plan review? (e.g., all projects, projects disturbing greater than one acre, etc.)A stormwater plan review is required where projects are subject to Land Disturbance Permits, which includes: 1) Activities resulting in greater than one (1) acre of land disturbance. 2) Activities that result in the disturbance of less than one (1) acre if it is part of a larger common plan of development or sale. 3) Activites resulting in the addition of ten thousand (10,000) square feet or greater of impervious surface. 4) Where land disturbance activities pose a threat to water, public health or safety. 5) Acceptance of fill material exceeding 10,000 square feet or more of associated disturbance. 6) Borrow Pits.

C. Have you implemented and enforced performance standards for permanent stormwater controls? ☒ Yes ☐ No

D. Do these performance standards go beyond the requirements found in Section 4.2.5.2 and require that pre-development hydrology be met for:

Flow volumes	☐ Yes	☒ No
Peak discharge rates	☒ Yes	☐ No
Discharge frequency	☒ Yes	☐ No
Flow duration	☐ Yes	☒ No

E. Please provide the URL/reference where all permanent stormwater management standards can be found.

http://www.williamsoncounty-tn.gov/stormwater - Select "Regulations" and navigate to "Final Stormwater Regulation"

F. How many development and redevelopment project plans were reviewed for this reporting period? 15

G. How many development and redevelopment project plans were approved? 15

H. How many permanent stormwater management practices/facilities were inspected? 4

I. How many were found to have inadequate maintenance? 0

J. Of those, how many were notified and remedied within 30 days? (If window is different than 30 days, please specify) n/a

K. How many enforcement actions were taken that address inadequate maintenance?n/a

L. Do you use an electronic tool (e.g., GIS, database, spreadsheet) to track post-construction BMPs, inspections and maintenance? ☒ Yes ☐ No

M. Do all municipal departments and/or staff (as relevant) have access to this tracking system? ☒ Yes ☐ No

N. Has the MS4 developed a program to allow for incentive standards for redeveloped sites? ☒ Yes ☐ No

O. How many maintenance agreements has the MS4 approved during the reporting period? 12

8. Codes and Ordinances Review and Update (Section 4.2.5.3)

A. Is a completed copy of the EPA Water Quality Scorecard submitted with this report? ☒ Yes ☐ No

B. Include status of implementation of code, ordinance and/or policy revisions associated with permanent stormwater management. Section 2 and Appendix A of the Williamson County Storm Water Management Regulations.

9. Stormwater Management for Municipal Operations (Section 4.2.6)

A. Have stormwater pollution prevention plans (or an equivalent plan) been developed for:

All parks, ball fields and other recreational facilities	☒ Yes	☐ No
All municipal turf grass/landscape management activities	☒ Yes	☐ No
All municipal vehicle fueling, operation and maintenance activities	☒ Yes	☐ No
All municipal maintenance yards	☒ Yes	☐ No
All municipal waste handling and disposal areas	☒ Yes	☐ No

B. Are stormwater inspections conducted at these facilities? ☒ Yes ☐ No

1. If Yes, at what frequency are inspections conducted? Annually

C. Have standard operating procedures or BMPs been developed for all MS4 field activities? (e.g., road repairs, catch basin cleaning, landscape management, etc.) ☒ Yes ☐ No

D. Do you have a prioritization system for storm sewer system and permanent BMP inspections? ☒ Yes ☐ No

E. On average, how frequently are catch basins and other inline treatment systems inspected? As needed by the Williamson County Highway Department.

F. On average, how frequently are catch basins and other inline treatment systems cleaned out/maintained? As needed by the Williamson County Highway Department.

G. Do municipal employees in all relevant positions and departments receive comprehensive training on stormwater management? ☒ Yes ☐ No

H. If yes, do you also provide regular updates and refreshers? ☒ Yes ☐ No

If so, how frequently and/or under what circumstances? Relevant training and/or access to information is offered annually with County Facility Stormwater Pollution Prevention Good Housekeeping Inspections. Additionally, more comprehensive training is offered periodically as needed.

10. Stormwater Management Program Update (Section 4.4)

A. Describe any changes to the MS4 program during the reporting period including but not limited to:

Changes adding (but not subtracting or replacing) components, controls or other requirements (Section 4.4.2.a). n/a

Changes to replace an ineffective or unfeasible BMP (Section 4.4.2.b). n/a

Information (e.g. additional acreage, outfalls, BMPs) on program area expansion based on annexation or newly urbanized areas. n/a

Changes to the program as required by the division (Section 4.4.3). n/a

11. Evaluating/Measuring Progress

A. What indicators do you use to evaluate the overall effectiveness of your Stormwater Management Program, how long have you been tracking them, and at what frequency? Note that these are not measurable goals for individual BMPs or tasks, but large-scale or long-term metrics for the overall program, such as in-stream macroinvertebrate community indices, measures of effective impervious cover in the watershed, indicators of in-stream hydrologic stability, etc.

Indicator	Began Tracking (year)	Frequency	Number of Locations
Biological Sampling	2014	Once per permit cycle	5 sites
Chemical Sampling	2014	Once per permit cycle	9 sites
Visual Stream Assessments	2015	Once per permit cycle	23 sites

B. Provide a summary of data (e.g., water quality information, performance data, modeling) collected in order to evaluate the performance of permanent stormwater controls installed throughout the system. This evaluation may include a comparison of current and past permanent stormwater control practices. Biological Sampling and/or Chemical Sampling was performed at 11 sites. Visual Stream Assessments (VSAs) were performed at 23 outfall locations. The report is available at http://www.williamsoncounty-tn.gov/stormwater

12. Enforcement (Section 4.5)

A. Identify which of the following types of enforcement actions you used during the reporting period, indicate the number of actions, the minimum measure (e.g., construction, illicit discharge, permanent stormwater control) or note those for which you do not have authority:

Action	Construction	Permanent Stormwater Controls	Illicit Discharge	Authority?	
Notice of violation	#151	#0	#20	☒ Yes	☐ No
Administrative fines	#n/a	#n/a	#n/a	☐ Yes	☒ No
Stop Work Orders (Cease and Desist)	#8 (cease and desist)	#0	#0	☒ Yes	☐ No
Civil penalties	#124	#0	#20	☒ Yes	☐ No
Criminal actions	#n/a	#n/a	#n/a	☐ Yes	☒ No
Administrative orders	#n/a	#n/a	#n/a	☐ Yes	☒ No
Other n/a	#n/a	#n/a	#n/a		

B. Do you use an electronic tool (e.g., GIS, data base, spreadsheet) to track the locations, inspection results, and enforcement actions in your jurisdiction? ☒ Yes ☐ No

C. What are the 3 most common types of violations documented during this reporting period? Notice of Violation, Civil Penalty, Cease and Desist

13. Program Resources (Optional)

A. What was your annual expenditure to implement the requirements of your MS4 NPDES permit and SWMP this past reporting period? $12,000.00 (not including salaries)

B. What is next year's budget for implementing the requirements of your MS4 NPDES permit and SWMP? $30,000.00 (not including salaries)

C. Do you have an independent financing mechanism for your stormwater program? ☒ Yes ☐ No

D. If so, what is it/are they (e.g., stormwater fees), and what is the annual revenue derived from this mechanism?

Source: Issuance of Land Disturbance Permits — Amount $62,400

Source: Issuance of Civil Penalties — Amount $58,150

E. How many full time employees does your municipality devote to the stormwater program (specifically for implementing the stormwater program vs. municipal employees with other primary responsibilities that dovetail with stormwater issues)? 2

F. Do you share program implementation responsibilities with any other entities? ☐ Yes ☒ No

Entity	Activity/Task/Responsibility	Your Oversight/Accountability Mechanism
n/a	n/a	n/a

G. Please attach a copy of your Organizational Chart

14. CERTIFICATION

This report must be signed by a ranking elected official or by a duly authorized representative of that person. See signatory requirements in sub-part 6.7.2 of the permit.

"I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."

Rogers C. Anderson
Mayor of Williamson County
1320 West Main - Suite 125
Franklin, TN 37064

Signature: Rogers C. Anderson

Date: 8/24/16

Annual reports must be submitted in accordance with the requirements of Section 5.4. (Reporting) of the permit. Annual reports must be submitted to the appropriate Environmental Field Office (EFO) by September 30 of each calendar year, as shown in the table below:

EFO	Street Address	City	Zip Code	Telephone
Chattanooga	1301 Riverfront Pkwy, Suite 206	Chattanooga	37402	(423) 634-5745
Columbia	1421 Hampshire Pike	Columbia	38401	(931) 380-3371
Cookeville	1221 South Willow Ave.	Cookeville	38506	(931) 432-4015
Jackson	1625 Hollywood Drive	Jackson	38305	(731) 512-1300
Johnson City	2305 Silverdale Road	Johnson City	37601	(423) 854-5400
Knoxville	3711 Middlebrook Pike	Knoxville	37921	(865) 594-6035
Memphis	8383 Wolf Lake Drive	Bartlett	38133	(901) 371-3000
Nashville	711 R S Gass Boulevard	Nashville	37216	(615) 687-7000

Impaired Waterways
Located within Unincorporated Williamson County
Final Version 2014 303(d) List

Waterbody I.D. #	Cause/TMDL Priority	Approved TMDL	MS4 Assigned to WLA
TN05130202 007 - 0900 & 0920 Owl Creek	Total Phosphorus / M Siltation / L Alteration of stream-side or littoral vegetation / L	☐ Yes ☒ No	☒ Yes ☐ No
TN05130202 007 - 5000 Mill Creek	Phosphorus / M Siltation / L Low DO / L E-Coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 009 -0600 Murray Branch	Habitat Alteration / NA Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 009 -0700 Brown Creek	Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 009 -0800 Unnamed Trib to Harpeth River	Habitat Alteration / NA Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 009 -0900 Trace Creek	Habitat Alteration / NA Siltation / L	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 009 - 3000 Harpeth River	Total Phosphorus / NA Low DO / NA	☒ Yes ☐ No	☒ Yes ☐ No
TN05130204 010 - 0720 Arkansas Creek	E-coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 013 - 0100 Hatcher Spring Creek	Habitat Alteration / L Siltation / L	☐ Yes ☒ No	☐ Yes ☒ No
TN05130204 013 - 0200 Polk Creek	Habitat Alteration / NA Siltation / NA E-Coli / H	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 013 - 0300 Unnamed Trib to West Harpeth River	Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 013 0400 Unnamed Trib to West Harpeth River	Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 013 - 0500 Kennedy Creek	Habitat Alteration / NA Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No

Impaired Waterways
Located within Unincorporated Williamson County
Final Version 2014 303(d) List

TN05130204 013 - 0700 Murfrees Fork	E-Coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 013 - 0710 Rattlesnake Branch	Habitat Alteration / NA Nutrients / NA E-coli / H	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 013 - 0720 Cayce Branch	Habitat Alteration / NA Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 013 - 0730 West Prong Murfrees Fork	E-coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 013 - 0750 Murfrees Fork	Total Phosphorus / L Habitat Alteration / L Siltation / L E-coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 013 - 2000 West Harpeth River	Habitat Alteration / L Siltation / L E-coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 016 - 0100 Lynwood Creek	Nutrients / L Habitat Alteration / NA Siltation / NA	☒ Yes ☐ No	☒ Yes ☐ No
TN05130204 016 - 0200 Spencer Creek	Habitat Alteration / L Siltation / NA E-coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 016 - 0500 Watson Branch	Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 016 - 0810 Paige Branch	Siltation / L Habitat Alteration / L	☐ Yes ☒ No	☐ Yes ☒ No
TN05130204 016 - 1000 Harpeth River	Siltation / L Low DO / NA Phosphorus / NA	☒ Yes ☐ No	☒ Yes ☐ No
TN05130204 016 - 1300 Fivemile Creek	Siltation / NA E-coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 016 - 1350 Fivemile Creek	E-coli / NA	☒ Yes ☐ No	☐ Yes ☒ No

Impaired Waterways
Located within Unincorporated Williamson County
Final Version 2014 303(d) List

TN05130204 016 - 1400 Donelson Creek	Habitat Alteration / L Siltation / NA	☒ Yes ☐ No	☒ Yes ☐ No
TN05130204 016 - 1500 Unnamed Trib to Harpeth River	Habitat Alteration / NA Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 016 - 3000 Harpeth River	Low DO / NA Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 016 - 4000 Harpeth River	Low DO / NA Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 018 - 2000 Harpeth River	Lead / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 021 - 0400 Beech Creek	Habitat Alteration / NA Siltation / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 021 - 1000 Little Harpeth River	Habitat Alteration / NA Siltation / NA E-coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN05130204 021 - 2000 Little Harpeth River	Habitat Alteration / NA Siltation / NA	☒ Yes ☐ No	☒ Yes ☐ No
TN06040002 047 - 0100 West Fork Spring Creek	Habitat Alteration / L Siltation / L	☐ Yes ☒ No	☐ Yes ☒ No
TN06040002 049 - 0400 Wallace Branch	E-coli / NA	☒ Yes ☐ No	☐ Yes ☒ No
TN06040003 034 - 3000 Rutherford Creek	Siltation / NA Nitrate + Nitrite / M Phosphorus / M	☒ Yes ☐ No	☒ Yes ☐ No

Exceptional TN Waters (ETWs) or Outstanding National Resource (ONRWs) Located Within Unincorporated Williamson County

Watershed	Waterbody	County	Description	Basis for Inclusion	From Lat	To Lat	From Long	To Long
Harpeth	Boston Branch	Williamson	From RM 1.6 to origin.	Exceptional biological diversity.	35.8303	35.826	-87.0545	-87.055
Harpeth	Burns Branch	Williamson	Portion in Natchez Trace Parkway National Park	Natchez Trace Parkway National Park.	35.8505	35.836	-87.0527	-87.066
Harpeth	Copperas Branch	Williamson	From Greens Hollow tributary to origin	Exceptional biological diversity.	35.9055	35.887	-87.098	-87.127
Harpeth	Dobbins Branch	Williamson	Portion in Natchez Trace Parkway National Park.	Natchez Trace Parkway National Park	35.9046	35.907	-87.0047	-87.008
Harpeth	Garrison Creek	Williamson	From Natchez Trace Parkway to headwaters.	Exceptional biological diversity. Portion in Natchez Trace NP.	35.8749	35.857	-87.0298	-87.085
Harpeth	Harpeth River	Williamson	From Nelson Creek to unnamed tributary just downstream Hwy 31A.	Exceptional biological diversity. WPC ecoregion reference stream for 71i.	35.8428	35.8	-86.707	-86.665
Harpeth	Kelley Creek including unnamed tributaries.	Williamson	From South Harpeth Creek to headwaters.	Exceptional biological diversity. Kelley Creek watershed has been deisgnated by the Nature Conservancy as a "Priority Area for Freshwater Biodiversity Conservation" in 2002.	35.9246	35.878	-87.0923	-87.092
Harpeth	Little East Fork	Williamson	Portion in Natchez Trace Parkway National Park.	Natchez Trace Parkway National Park	35.9877	35.982	-86.9965	-86.989

Exceptional TN Waters (ETWs) or Outstanding National Resource (ONRWs) Located Within Unincorporated Williamson County

Harpeth	Pinewood Branch	Williamson	Portion in Natchez Trace Parkway National Park.	Natchez Trace Parkway National Park	35.8906	35.893	-87.0179	-87.026
Harpeth	South Garrison Creek Unnamed Tributary	Williamson	Headwater tributary from confluence with South Garrison Creek to origin.	Exceptional biological diversity.	35.8495	35.85	-87.0715	-87.076
Harpeth	South Harpeth Creek	Williamson	From Arkansas Creek to confluence of headwaters.	Exceptional biological diversity. WPC ecoregion reference stream for 71f.	35.9305	35.91	-87.08	-87.134
Harpeth	Wilkie Branch	Williamson	Portion in Natchez Trace Parkway National Park.	Natchez Trace Parkway National Park	35.8931	35.896	-87.0145	-87.016
Duck-Lower	Litton Branch	Williamson	Portion in Natchez Trace Parkway National Park.	Natchez Trace Parkway National Park	35.8297	35.831	-87.0919	-87.091
Duck-Lower	South Fork Lick Creek	Williamson	Portion in Natchez Trace Parkway National Park.	Natchez Trace Parkway National Park	35.8531	35.834	-87.074	-87.074
Harpeth	Inman Branch Unnamed Tributary at boy scout camp	Williamson	From Inman Branch to headwaters.	Exceptional biological diversity.	35.9121	35.9112	-87.0649	-87.0561
Harpeth	Harpeth Creek Tributary	Williamson	Unnamed tributary to Harpeth Creek. The entire tributary is considered high quality	Exceptional biological diversity	35.9102	35.8907	-87.1341	-87.1383

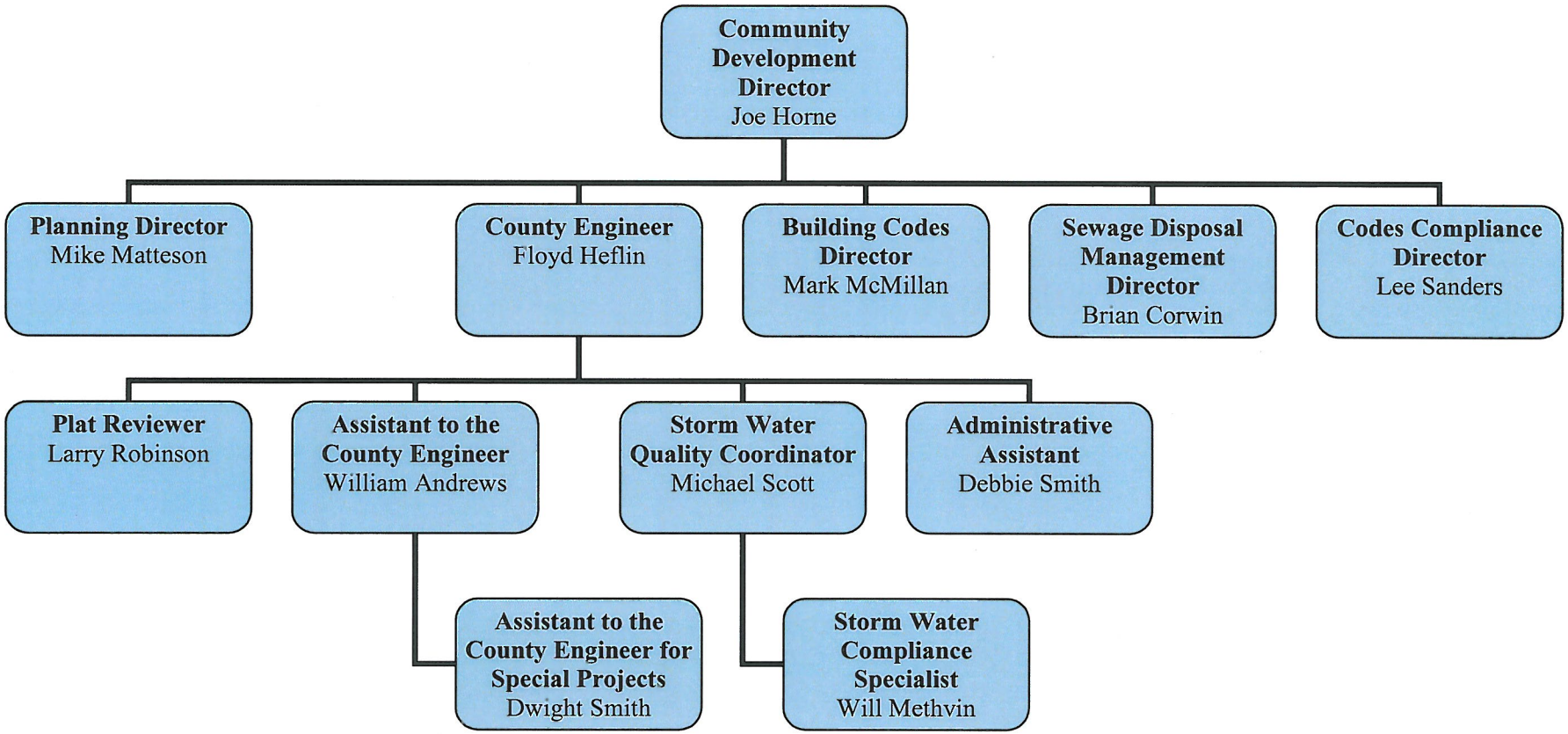
Exceptional TN Waters (ETWs) or Outstanding National Resource (ONRWs) Located Within Unincorporated Williamson County

Cumberland-Lower-Sycamore (Cheatham Lake)	Mill Creek Unnamed Tributary	Williamson	From Mill Creek d/s of Nolensville to confluence of headwaters	Federal endangered Crayfish	35.9569	35.933	-86.6725	-86.7015
Cumberland-Lower-Sycamore (Cheatham Lake)	Rock Springs Branch	Williamson	From Mill Creek to Williamson County Line	Federal endangered Nashville Crayfish	35.9433	35.9539	-86.6444	-86.625
Harpeth	Boston Branch Unnamed Tributary	Williamson	From RM 0.01 to origin	Exceptional Biological Diversity	35.8308	35.8325	-87.0578	-87.0622
Harpeth	Burns Branch Unnamed Tributary	Williamson	From Burns Branch to origin	Exceptional Biological Diversity	35.8392	35.836	-87.0599	-87.0603
Harpeth	South Garrison Creek Unnamed Tributary	Williamson	Headwater tributary from confluence with South Garrison Creek to origin	Exceptional biological integrity	35.8496	35.8417	-87.0715	-87.0697
Harpeth	South Harpeth Creek Unnamed Tributary	Williamson	Unnamed Tributary to South Harpeth Creek from confluence with unnamed tributary to origin.	Exceptional biological diversity.	35.9025	35.9011	-87.1367	-87.1501
Harpeth	Whiteoak Branch	Williamson	From confluence with Kelly Creek to origin.	Kelley Creek watershed has been designated by the Nature Conservancy as a "Priority Area for Freshwater Biodiversity Conservation" in 2002.	35.8884	35.883	-87.1058	-87.108

Exceptional TN Waters (ETWs) or Outstanding National Resource (ONRWs) Located Within Unincorporated Williamson County

Harpeth	Flatrock Branch	Williamson	From u/s Fairview WWTP to above first unnamed tributary upstream of Horn Tavern Rd.	Flatrock Branch has consistently exhibited exceptional biological diersity upstream of Fairvew WWTP. Family level biorecon scored a 15 on 8/29/06 with 23 total taxa, 10 EPT and 9 intolerant families. Family level biorecon scored a 15 on 4/16/99 with 31 total taxa, 16 EPT and 9 intolerant families. SQSH sample collected on 1/04/2012 scored 42.	36.0308	35.9996	-87.116	-87.1304

Community Development Organizational Chart
Engineering Department
Williamson County, Tennessee



Williamson County Engineering Department
Stormwater Management Program
Stormwater Management Plan

National Pollution Discharge Elimination System Permit Number TNS000000 authorizes Williamson County to discharge stormwater runoff into Waters of the State of Tennessee in accordance with certain water quality management programs and provisions established within the permit. Williamson County is required to develop a compilation of the elements of the Stormwater Management Program consisting of separate components which are outlined within the Stormwater Management Plan.

Table of Contents:

Best Management Practices Programs and Processes----------16

Public Information and Education Plan (PIE)----------24

Stream Monitoring Summary----------26

Enforcement Response Plan (ERP)----------30

Operation and Maintenance Program----------34

Williamson County Engineering Department
Stormwater Management Program
Best Management Practices Programs and Processes

National Pollution Discharge Elimination System Permit Number TNS000000 authorizes Williamson County to discharge stormwater runoff into Waters of the State of Tennessee in accordance with certain water quality management programs and provisions established within the permit. Williamson County is required to develop specific goals and public information events/activities that will occur over the permit cycle, which are outlined within the Best Management Practices (BMP) Programs and Processes.

The Best Management Practices include the following:

1. Public Education and Public Participation
2. Illicit Discharge Detection and Elimination
3. Construction Site Runoff Program
4. Permanent (Post-Construction) Stormwater Management Program
5. Municipal Pollution Prevention and Good Housekeeping

All BMPs will be implemented by the Williamson County Engineering Department and/or other Departments as needed and will be coordinated by the Williamson County Storm Water Quality Coordinator. For a summary of the best management practices measurable goals and milestones, see Table 1.

2015/2016 BMP Summary

<u>BMP 1A. Public Information and Education Plan (PIE)</u>

The PIE has been completed and is being implemented.

<u>BMP 1B. Education and Outreach activities on stormwater</u>

A stream clean up event was hosted by Williamson County on May 27, 2016 involving public participation. Approximately six river miles of the Harpeth River from Moran Road to Hwy 100 was targeted. The following is a summary of the goals of the clean up event:

a. Visually assess bank stabilization and possible failures,
b. Record the location of specific areas that need additional attention, such as heavy debris, log jams, etc.,
c. Identify possible solutions for the safe extraction of objects within the channel,

d. Detection of possible illicit discharges, and
e. Remove trash that has been deposited in river/banks.

Williamson County assisted the City of Brentwood at the Deerwood Arboretum on the banks of the Little Harpeth River on October 1, 2015. The event included several different educational stations where students from Brentwood High School and Ravenwood High School had the opportunity to learn about different environmental topics using a hands-on approach. Williamson County co-directed a station which covered topics such as water quality, stream monitoring, and the importance of stream buffers. The event lasted most of the duration of the day, from morning to the afternoon.

BMP 1C. Web Site

The web site is updated with information on the storm water program, regulations, and educational material.

BMP 1D. Public Service Announcements

A local radio station (WAKM AM 950) broadcast an interview with a Williamson County representative regarding the Williamson County Stream Cleanup. Williamson County contracted with the TAB program for the 2015/2016 fiscal year for PSAs (public Service Announcements). TAB provides stormwater PSAs for Tennessee on local broadcasting stations including many in the Middle Tennessee area which serves Williamson County residents.

BMP 2A. Storm Sewer Systems Map

The most current storm sewer map is available.

BMP 2B. Hot Spots

Each Village in Williamson County is also designated a Hot Spot Area, where zoning regulations are tailored and education is targeted because of more intense uses and increased potential for stormwater contamination.

BMP 2C. Stream Monitoring

Stream Sampling is complete for the Harpeth River, Little Harpeth River, Owl Creek and Rutherford Creek. The report is available online at *williamsoncounty-tn.gov/stormwater*.

BMP 2D. Dry Weather Screening

All MS4 outfalls have been inspected during dry weather for evidence of illicit discharges.

BMP 3A. Regulations / Manual

The Storm Water Regulations are updated and consistent with State requirements regarding stream buffers, storm water system long-term operation and maintenance, etc. The Storm Water Regs and Storm Water Management Manual are available online.

BMP 3B. Enforcement Response Plan (ERP)

The ERP has been completed and is being implemented.

BMP 3C. Inventory

Active construction sites requiring a Land Disturbance Permit are being tracked electronically with GIS coordinates.

BMP 3D. Inspections and Enforcement

Inspections of sites with active Land Disturbance Permits are inspected monthly and enforcement is performed in accordance with the Storm Water Regulations and Enforcement Response Plan (ERP).

BMP 4A. Ordinance / Manual

The Storm Water Regulations have been updated to be consistent with State requirements with regards to Runoff Reduction (green infrastructure). The Storm Water Regulations and Storm Water Management Manual are available online.

BMP 4B. Runoff Reduction

The requirements for implementation of runoff reduction practices have been evaluated and are in effect as of July 1, 2013.

BMP 4C. Maintenance Agreements

Maintenance Agreements are submitted to Williamson County where permanent storm water runoff control facilities are involved and the procedures for the establishment of maintenance agreements and required inspections will be reviewed as needed.

BMP 4D. Inventory / Tracking

BMPs deployed at new development and redevelopment projects are being tracked electronically with GIS coordinates.

BMP 5A. Operation and Maintenance Program

An Operation and Maintenance Program has been developed and implemented with the goal of preventing or reducing pollutant runoff from municipal operations.

BMP 5B. Inspections

Inspections have been performed at all facilities/operations within the County that are not individually covered by a NPDES permit.

BMP 5C. Education

Employee education is performed in conjunction with the pollution prevention and good housekeeping inspections at county facilities/operations and may include discussions with the director/operator, providing guidance material, and/or training videos.

BMP 5D. Roadway and MS4 Development

Procedures for development of new roadways and MS4 are being evaluated and revised as needed. For example, the Williamson County Engineering Department currently has a cooperative method with the Highway Department for identifying intermittent/perennial streams located within the County right-of way.

Table 1: Best Management Practices Measurable Goals and Milestones

BEST MANAGEMENT PRACTICES FOR PUBLIC EDUCATION AND PUBLIC PARTICIPATION	
BMP 1A	MEASURABLE GOALS AND MILESTONES
Goal(s)	Public Information and Education Plan (PIE)
Milestone Year 1	Develop and implement spcific goals and specific public information events/activities related to storm water.
Milestone Year 2	Evaluate and continue
Milestone Year 3	Evaluate and continue
Milestone Year 4	Evaluate and continue
Milestone Year 5	Evaluate and continue
BMP 1B	MEASURABLE GOALS AND MILESTONES
Goal(s)	Education and Outreach activities on storm water
Milestone Year 1	Develop educational materials and outreach activities which may include videos, books, or other media as well as field demonstrations or other projects such as stream clean-up event.
Milestone Year 2	Evaluate and continue
Milestone Year 3	Evaluate and continue
Milestone Year 4	Evaluate and continue
Milestone Year 5	Evaluate and continue
BMP 1C	MEASURABLE GOALS AND MILESTONES
Goal(s)	Web-site
Milestone Year 1	Provide information on the storm water program, regulations, educational material, etc.
Milestone Year 2	Maintain
Milestone Year 3	Maintain
Milestone Year 4	Maintain
Milestone Year 5	Maintain
BMP 1D	MEASURABLE GOALS AND MILESTONES
Goal(s)	Public Service Announcement
Milestone Year 1	Develop and/or review materials to be broadcast via TV or other media.
Milestone Year 2	Evaluate and continue
Milestone Year 3	Evaluate and continue
Milestone Year 4	Evaluate and continue
Milestone Year 5	Evaluate and continue

Table 1: Best Management Practices Measurable Goals and Milestones (continued)

BEST MANAGEMENT PRACTICES FOR ILLICIT DISCHARGE DETECTION AND ELIMINATION	
BMP 2A	MEASURABLE GOALS AND MILESTONES
Goal(s)	Storm Sewer System Map
Milestone Year 1	Continue to develop and maintain a map that shows the location of outfalls where the municipal storm sewer system discharges into waters of the state.
Milestone Year 2	Update and continue
Milestone Year 3	Update and continue
Milestone Year 4	Update and continue
Milestone Year 5	Update and continue
BMP 2B	MEASURABLE GOALS AND MILESTONES
Goal(s)	Hot Spots
Milestone Year 1	Develop and implement more specific practices to prohibit contamination from hot spot areas.
Milestone Year 2	Evalutate and continue
Milestone Year 3	Evaluate and continue
Milestone Year 4	Evaluate and continue
Milestone Year 5	Evaluate and continue
BMP 2C	MEASURABLE GOALS AND MILESTONES
Goal(s)	Stream Monitoring
Milestone Year 1	Determine specific needs for analytical and non-anylitical stream monitoring.
Milestone Year 2	Begin collecting field data.
Milestone Year 3	Continue
Milestone Year 4	Continue
Milestone Year 5	Continue
BMP 2D	MEASURABLE GOALS AND MILESTONES
Goal(s)	Dry Weather Screening
Milestone Year 1	Inspect MS4 outfalls, during dry weather, for evidence of non storm water discharges.
Milestone Year 2	Continue
Milestone Year 3	Continue
Milestone Year 4	Continue
Milestone Year 5	Continue

Table 1: Best Management Practices Measurable Goals and Milestones (continued)

BEST MANAGEMENT PRACTICES FOR CONSTRUCTION SITE RUNOFF PROGRAM	
BMP 3A	MEASURABLE GOALS AND MILESTONES
Goal(s)	Regulations and Manual
Milestone Year 1	Review and update the Williamson County Storm Water Management Regulations and Storm Water Management Manual to be consistent with State requirements.
Milestone Year 2	Evaluate
Milestone Year 3	Evaluate
Milestone Year 4	Evaluate
Milestone Year 5	Evaluate
BMP 3B	MEASURABLE GOALS AND MILESTONES
Goal(s)	Enforcement Response Plan (ERP)
Milestone Year 1	Review requirement needed within the ERP, which will include elements for other control measures.
Milestone Year 2	Develop the ERP
Milestone Year 3	Evaluate
Milestone Year 4	Evaluate
Milestone Year 5	Evaluate
BMP 3C	MEASURABLE GOALS AND MILESTONES
Goal(s)	Inventory
Milestone Year 1	Develop and maintain an inventory of all active construction sites which require a Land Disturbance Permit.
Milestone Year 2	Update
Milestone Year 3	Update
Milestone Year 4	Update
Milestone Year 5	Update
BMP 3D	MEASURABLE GOALS AND MILESTONES
Goal(s)	Inspections & Enforcement
Milestone Year 1	Conduct inspections on construction sites at specified intervals and perform enforcement actions as specified within the regulations.
Milestone Year 2	Continue
Milestone Year 3	Continue
Milestone Year 4	Continue
Milestone Year 5	Continue

Table 1: Best Management Practices Measurable Goals and Milestones (continued)

BEST MANAGEMENT PRACTICES FOR PERMANENT (POST-CONSTRUCTION) STORMWATER MANAGEMENT PROGRAM	
BMP 4A	MEASURABLE GOALS AND MILESTONES
Goal(s)	Ordinance / Manual
Milestone Year 1	Revise the existing ordinance and/or storm water manual to clarify requirements for post-construction runoff controls.
Milestone Year 2	Continue
Milestone Year 3	Continue
Milestone Year 4	Implementation of Ordinance revisions regarding runoff reduction should be in effect.
Milestone Year 5	Evaluate and continue
BMP 4B	MEASURABLE GOALS AND MILESTONES
Goal(s)	Runoff Reduction
Milestone Year 1	Evaluate requirements for implementation of runoff reduction practices.
Milestone Year 2	Continue to evaluate
Milestone Year 3	Continue to evaluate
Milestone Year 4	Implementation of requirements for increased containment of storm water on site, which will include development of site plan review and approval, as well as enforcement actions for non-compliance, should be in effect.
Milestone Year 5	Evaluate and continue
BMP 4C	MEASURABLE GOALS AND MILESTONES
Goal(s)	Maintenace Agreements
Milestone Year 1	Continue to improve the procedures for establishment of maintenance agreements and required inspections.
Milestone Year 2	Evaluate and continue
Milestone Year 3	Evaluate and continue
Milestone Year 4	Evaluate and continue
Milestone Year 5	Evaluate and continue
BMP 4D	MEASURABLE GOALS AND MILESTONES
Goal(s)	Inventory / Tracking
Milestone Year 1	Develop a system designed to track BMPs deployed at new development and redevelopment projects.
Milestone Year 2	Continue
Milestone Year 3	Continue
Milestone Year 4	Continue
Milestone Year 5	Continue

Table 1: Best Management Practices Measurable Goals and Milestones (continued)

BEST MANAGEMENT PRACTICES FOR MUNICIPAL POLLUTION PREVENTION AND GOOD HOUSEKEEPING	
BMP 5A	MEASURABLE GOALS AND MILESTONES
Goal(s)	Operation and Maintenance Program
Milestone Year 1	Develop and implement an operation and maintenance program that has the goal of preventing or reducing pollutant runoff from municipal operations.
Milestone Year 2	Evaluate and continue
Milestone Year 3	Evaluate and continue
Milestone Year 4	Evaluate and continue
Milestone Year 5	Evaluate and continue
BMP 5B	MEASURABLE GOALS AND MILESTONES
Goal(s)	Inspections
Milestone Year 1	Perform inspections at facilities/operations within the County that are not individually covered by a NPDES permit.
Milestone Year 2	Continue
Milestone Year 3	Continue
Milestone Year 4	Continue
Milestone Year 5	Continue
BMP 5C	MEASURABLE GOALS AND MILESTONES
Goal(s)	Education
Milestone Year 1	Evaluate and perform employee education with the goal of minimizing storm water pollution potential from land disturbance activities as well as fleet, building, park, and MS4 maintenance.
Milestone Year 2	Continue
Milestone Year 3	Continue
Milestone Year 4	Continue
Milestone Year 5	Continue
BMP 5D	MEASURABLE GOALS AND MILESTONES
Goal(s)	Roadway and MS4 Development
Milestone Year 1	Evaluate procedures for development of new roadways and MS4 to ensure that these activities are performed in accordance with appropriate regulatory permits.
Milestone Year 2	Evaluate and continue
Milestone Year 3	Evaluate and continue
Milestone Year 4	Evaluate and continue
Milestone Year 5	Evaluate and continue

Williamson County Engineering Department
Storm Water Management Program
Public Information and Education Plan

National Pollution Discharge Elimination System Permit Number TNS000000 authorizes Williamson County to discharge stormwater runoff into Waters of the State of Tennessee in accordance with certain water quality management programs and provisions established within the permit. Williamson County is required to develop specific goals and public information events/activities that will occur over the permit cycle, which are outlined within the Public Information and Education Plan (PIE).

On an annual basis, Williamson County will perform public education and outreach activities. The activities may target local students, citizen/church groups and the general public, and may focus on Hot Spot areas and areas that discharge stormwater into impaired streams. The activities will emphasis various stormwater issues associated with water quality/water quantity.

The anticipated public education and outreach activities may include the following:

- Targeted mailings
- Stream Clean-up
- Public Service Announcement broadcasts
- Educational Day(s) for local school
- Stormwater information on County website

For more information on targeted educational campaigns, goals and results/effectiveness, see Table 2.

Table 2: Educational Campaigns, Goals and Results/Effectiveness

Williamson County Storm Water Management Program Public Information and Education Plan (PIE)		
Targeted Educational Campaign	**Goals**	**Results / Effectiveness**
a. General public awareness on the impacts on water quality from general housekeeping maintenance/activities.	Provide awareness via the County website, broadcasting public service announcements, and/or targeted mailings to hot spots, areas that discharge stormwater into impaired streams or other areas of concern.	County website is kept up to date with stormwater information, PSAs are broadcast on WC-TV Channel 3 or other media, and brochures are sent to targeted areas such as hot spots or areas that discharge stormwater into impaired streams.
b. Home owner associations and other operators of permanent BMPs awareness of the importance of maintenance activities.	Develop more informative operation and maintenance agreement standards for homeowner's associations.	Continue to monitor operation and maintenance agreements and make modifications as needed.
c. Local engineering and development community awareness of the stormwater ordinances, regulations, and guidance materials related to long-term water quality impacts.	Conduct meetings with developers/engineers discussing water quality issues prior to issuance of land disturbance permits on large construction projects.	Meetings are held with developers/engineers prior to issuance of the land disturbance permits on developments/non-residential projects.
d. General public and professional chemical applicators awareness on the proper storage, use, and disposal of pesticides, herbicides, and fertilizers use.	Provide awareness via the County website, broadcasting public service announcements, and/or targeted mailings to hot spots, areas that discharge stormwater into impaired streams or other areas of concern.	County website is kept up to date with stormwater information, PSAs are broadcast on WC-TV Channel 3 or other media, and brochures are sent to targeted areas such as hot spots or areas that discharge stormwater into impaired streams.
e. General public and professional chemical applicators awareness on the proper storage, use, and disposal of oil and other automotive-related fluids.	Provide awareness via the County website, broadcasting public service announcements, and/or targeted mailings to hot spots, areas that discharge stormwater into impaired streams or other areas of concern.	County website is kept up to date with stormwater information, PSAs are broadcast on WC-TV Channel 3 or other media, and brochures are sent to targeted areas such as hot spots or areas that discharge stormwater into impaired streams.
f. General public and municipal employees on the awareness of identifying and reporting procedures for illicit connections/discharges, sanitary sewer seepage, spills, etc.	Provide awareness via the County website, broadcasting public service announcements, and/or targeted mailings to hot spots, areas that discharge stormwater into impaired streams or other areas of concern.	County website is kept up to date with stormwater information, PSAs are broadcast on WC-TV Channel 3 or other media, and brochures are sent to targeted areas such as hot spots or areas that discharge stormwater into impaired streams.
g. Local engineering, development, and construction community awareness of stormwater ordinances, regulations and guidance materials related to construction phase water quality impacts.	Provide access to the County Storm Water Management Regulations and the Storm Water Management Manual via the County website.	County website has the current Storm Water Regulations and the Storm Water Management Manual available to the public.
h. Municipal employee/contractor awareness of water quality impacts from daily operations.	Perform inspections at County facilities / operations that are not individually covered by a NPDES permit.	Inspections are performed at County facilities / operations on an annual basis.

Williamson County Engineering Department
Stormwater Management Program
Stream Monitoring Summary

National Pollution Discharge Elimination System Permit Number TNS000000 authorizes Williamson County to discharge stormwater runoff into Waters of the State of Tennessee in accordance with certain water quality management programs and provisions established within the permit. Williamson County is required to implement a stream monitoring plan for impaired streams that may be associated with discharges from the MS4.

Stream Monitoring Overview

Williamson County has performed stream monitoring on impaired streams where the MS4 has been identified as the source of impairment as described in the Final 303 (d) list. Table 3 provides an outline for the streams which have been sampled or may be sampled. Pollutant sources as well as specific BMPs are also provided on that table. Williamson County has developed a "Guide to Waterway Natural Areas" brochure as part of the Public Education and Information (PIE) Plan, which is being distributed to residents whose property is adjacent to those impaired segments. Figure 1 illustrates the impaired streams as well as current and proposed sampling locations.

Williamson County has completed the stream sampling with the assistance of a private consulting biologist, who is assists with sampling protocols, coordinating lab analysis, and data reporting. Also, private engineering consultants have assisted Williamson County in developing the Stream Monitoring Plan. Per that Stream Monitoring Plan, three types of monitoring have been performed:

1. Non-analytical Visual Stream Surveys and Impairment Inventories,
2. Analytical Biological Stream Sampling, and
3. Analytical Chemical Sampling.

Visual Stream Surveys and Impairment Inventories
(Section 2.1.1 of the Stream Monitoring Plan)

Visual Stream Surveys and Impairment Inventories consist of assessing three aspects of stream health: physical characteristics, water quality, and visual-based habitat assessment. The physical survey quantifies general land use, stream origin and type, and riparian features. In situ water

quality measurements are made using a water quality meter. Visual-based habitat assessment describes the structure of the habitat including the variety and quality of substrate, channel morphology, bank structure, and riparian vegetation.

Biological Stream Sampling
(Section 2.1.2 of the Stream Monitoring Plan)

Biological Stream Sampling consists of measuring the stream health by determining the presence and number of macroinvertebrates in collected samples. Biological Stream Sampling is performed according to the Semi-Quantitative Single Habitat (SQSH) Method described in TDEC's *Quality System Standard Operating Procedure (QSSOP) for Macroinvertebrate Stream Survey.*

Chemical Stream Sampling
(Section 2.1.3 of the Stream Monitoring Plan)

Chemical Stream Sampling consists of measuring the stream health by determining the presence of nutrients and / or oxygen. Chemical Stream Sampling is performed according to the methods described in TDEC's *Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water.*

Amendments to the Stream Monitoring Plan

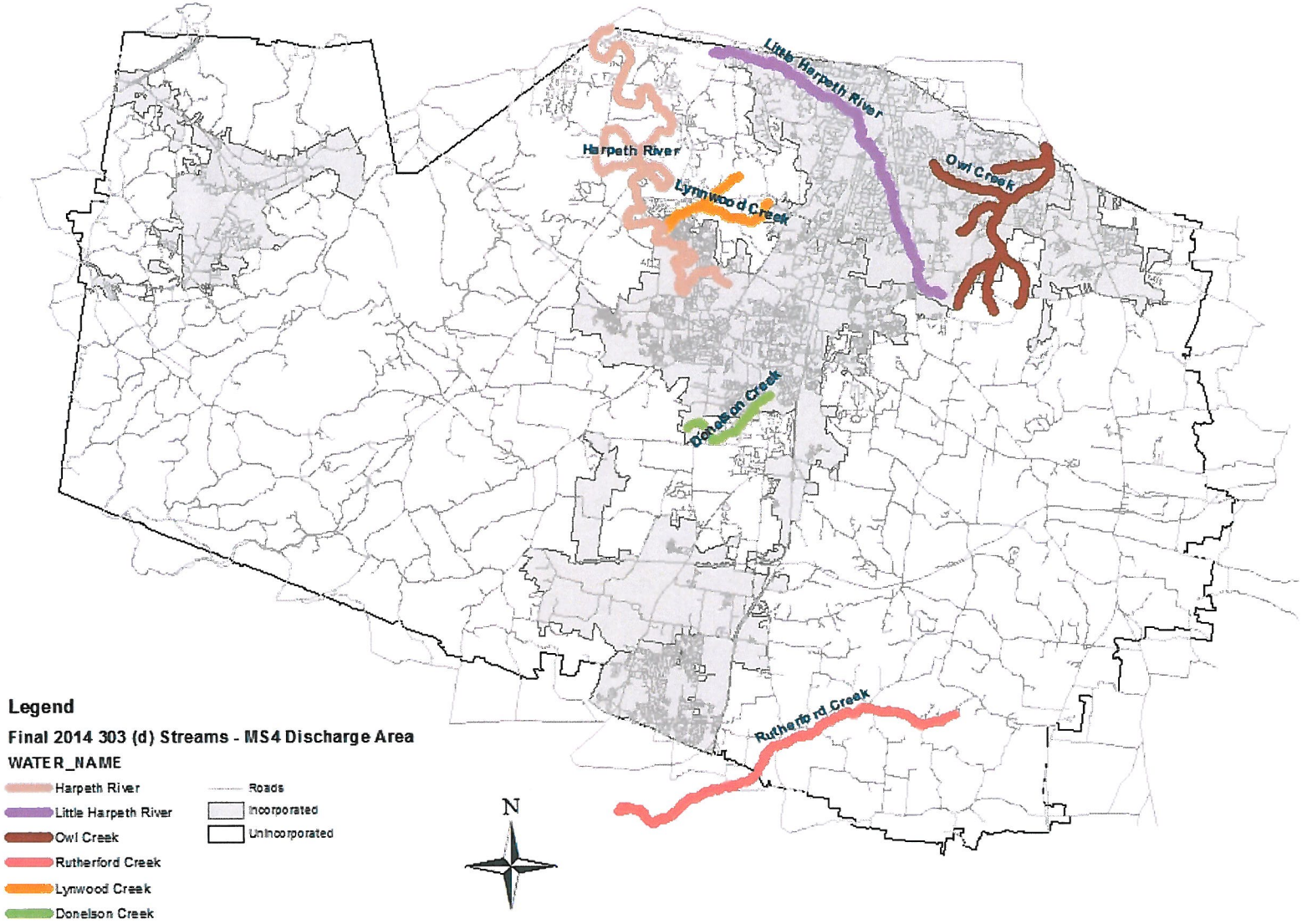
It is important to note that the Stream Monitoring Plan has been updated since the initial proposed plan described in the Annual Report that Williamson County prepared for the 2011/2012 year. Factors for updating the plan include:

1. Initially, a list of 303(d) impaired streams that had pollutant sources listed as either Land Development, Discharges from MS4 Area, or Highway, Road, Bridge Infrastructure Construction, were outlined. However, it has since come to the attention of Williamson County that only impaired streams where discharges from the MS4 have been identified are required to be monitored.
2. Based on the recommendation of the engineering consultants who developed the Stream Monitoring Plan, it was determined that Spencer Creek, which is within the City of Franklin, and McCutcheon Creek, which is within the Town of Thompson's Station and the City of Spring Hill, should be removed from the previous proposed monitoring plan because those streams are located entirely or almost entirely within incorporated areas not under the jurisdiction of Williamson County.
3. Per the 2014 Final 303(d) List, it appears that Lynwood Creek and Donelson Creek may require future stream monitoring. The Final 303(d) list references that the potential pollutant sources are discharges from the MS4 area. Both streams have listed habitat alteration and siltation as causes. Additionally, the 303(d) list also cites nutrients as an impairment cause for Lynwood Creek.

Table 3: 303(d) Streams in Williamson County Impaired from Discharges Associated with the MS4 Area

Waterbody I.D# - Name	Approved TMDL Cause	Not Approved TMDL Cause	Pollutant Source	Proposed BMP & Projected Implementation
TN05130204016_1000 - Harpeth River	Low DO Total Phosphorus	Siltation	Municipal Point Source Discharges from MS4 Area	1A - Public Information and Education (PIE) - 2014 2C - Stream Monitoring - 2014 3D - Inspections and Enforcement - Continuously
TN05130204009_3000 - Harpeth River	Total Phosphorus Low DO		Municipal Point Source Discharges from MS4 Area	1A - Public Information and Education (PIE) – 2014 2C - Stream Monitoring - 2014 3D - Inspections and Enforcement - Continuously
TN05130204021_2000 - Little Harpeth River	Habitat Alteration Siltation		Pasture Grazing Discharges from MS4 Area	1A - Public Information and Education (PIE) - 2014 2C - Stream Monitoring – 2014 3D - Inspections and Enforcement – Continuously
TN05130202007_0900 - Owl Creek		Total Phosphorous Siltation Habitat Alteration	Discharges from MS4 Area	1A - Public Information and Education (PIE) - 2015 2C - Stream Monitoring - 2015 3D - Inspections and Enforcement – Continuously
TN06040003034_3000 - Rutherford Creek	Siltation	Nitrate + Nitrite Total Phosphorous	Pasture Grazing Discharge from MS4 Area	1A - Public Information and Education (PIE) – 2015 2C - Stream Monitoring - 2015 3D - Inspections and Enforcement - Continuously
---Proposed--- TN05130204016_0100 - Lynwood Creek	Habitat Alteration Siltation	Nutrients	Pasture Grazing Land Development Discharges from MS4 Area	1A - Public Information and Education (PIE) – TBD 2C - Stream Monitoring - TBD 3D - Inspections and Enforcement - TBD
---Proposed--- TN05130204016_1400 - Donelson Creek	Siltation	Habitat Alteration	Discharges from MS4 Area	1A - Public Information and Education (PIE) – TBD 2C - Stream Monitoring - TBD 3D - Inspections and Enforcement - TBD

Figure 1: Williamson County 303(d) Listed Streams Impaired from Stormwater Discharge Associated with the MS4 Area



Williamson County Engineering Department
Stormwater Management Program
Enforcement Response Plan

National Pollution Discharge Elimination System Permit Number TNS000000 authorizes Williamson County to discharge stormwater runoff into Waters of the State of Tennessee in accordance with certain water quality management programs and provisions established within the permit. Williamson County is required to develop project review, approval and enforcement procedures, which are outlined within the Enforcement Response Plan (ERP).

A. Site Plan Review and Approval

1. Development and Non-residential
    a. Applicant will be required to apply for Land Disturbance Permit as outlined in Sec. 6 of the Storm Water Regulations.
    b. Prior to issuance of Land Disturbance Permit, a pre-construction meeting will be held by staff with the owner/operator.
    c. The construction plans will be reviewed for adequate pre, during and post control BMPs.

2. Residential Lots
    a. Applicants will be required to apply for Land Disturbance Permit as outlined in Sec. 6 of the Storm Water Regulations.
    b. A site specific erosion control plan will be reviewed for adequate construction site BMPs.

3. Any changes to the plans will require re-submittal to the Engineering Department for review. Upon expiration of the Land Disturbance Permit, the owner/operator must submit plans for a new permit. If the plans have been amended, then a Land Disturbance Permit application fee will be required.

B. Performance Standards and BMP Maintenance

1. Runoff Reduction
    a. Implemented July 1, 2013 as specified within Sec. 2 of the Storm Water Regulations.
    b. Proposed BMPs will be reviewed by staff prior to issuance of Land Disturbance Permit.

2. Pollutant Removal
    a. Applicants subject to standards specified within Sec. 2 of the Storm Water Regulations.
    b. Proposed BMPs will be reviewed by staff prior to issuance of Land Disturbance Permit.
    c. Reference material is provided to assist the BMP designer to meet the required standards.

3. BMP maintenance
    Storm Water Long-Term Operation and Maintenance requirements will be implemented as described in Section 5 of the Storm Water Regulations.

C. Permanent Stormwater BMP installation

1. Final storm water management BMPs must be inspected and certified that the BMPs are in accordance with the approved plans.

2. BMP inspections as described in Sec. 5 of the Storm Water Regulations are required to be submitted to Williamson County.

Enforcement

A violation of the Storm Water Regulations shall result from:

A. Illicit discharge into any watercourse under County jurisdiction;

B. Illicit discharge from any site required to have a Land Disturbance Permit;

C. Failure to obtain a Land Disturbance Permit;

D. Failure to install or maintain erosion prevention and sediment controls; OR

E. Unapproved or unpermitted encroachment into the Waterway Natural Area (WNA).

Williamson County shall have the authority to issue Notices of Violation and citations, to impose the civil penalties, and to institute appropriate actions or proceedings at law or equity for the enforcement of the Storm Water Regulations.

For potential enforcement actions and descriptions, see Table 4.

Table 4: Potential Enforcement Actions

Williamson County Engineering Department Storm Water Management Program Enforcement Response Plan (ERP)	
Enforcement	**Description**
a. Verbal Warnings	Verbal Warnings may be used in combination with other enforcement actions or as an initial notice to the owner/operator, depending on the severity of the violation(s) or other relevant factors.
b. Notification of Violations	Notice of Violation (NOV) Consent Orders Cease and Desist Orders
c. Civil Penalties	1) Residential A. Failure to install or maintain erosion controls - $250.00 per occurrence B. Illicit Discharge - $500.00 per occurrence C. Failure to Obtain a Land Disturbance Permit - $1,000.00 per occurrence 2) Development and Non-residential A. Failure to install or maintain erosion controls - $500.00 per occurrence B. Illicit Discharge - $1,000.00 per occurrence C. Failure to Obtain a Land Disturbance Permit - $5,000.00 per occurrence Unapproved or unpermitted encroachment into the Waterway Natural Area (WNA) -$1,000.00 Additionally, the following may be considered when assessing Civil Penalties: A. The harm done to the public health or the environment; B. Whether the civil penalty imposed will be a substantial economic deterrent to the illegal activity; C. The economic benefit gained by the violator; D. The amount of effort put forth by the violator to remedy this violation; E. Any unusual or extraordinary enforcement costs incurred by the municipality; F. The amount of penalty established by ordinance or resolution for specific violations; and G. Any equities of the situation which outweigh the benefit of imposing any penalty or damage assessment.
d. Cease and Desist Order	Residential - Halt all grading and land disturbance activities on the lot until remedial or preventive action is taken. Development and non-residential - Halt all construction operations on development infrastructure within that Section of the development, except where necessary to take remedial or preventive action.
e. Withholding of Plan Approvals or Other Authorizations	Residential - Advise the Building Codes Director to not conduct any future inspections and withhold issuance of any Certificates of Occupancy until remedial action has been completed. Development and non-residential A. Advise the Building Codes Director to withhold issuance of any new building permits within that section of the development until remedial or preventive action has been completed. B. Advise the Planning Director to withhold placing future submittals within the same development on the agenda of the Planning Commission until remedial or preventive action has been completed. C. Withhold issuance of any future land disturbance permits within the same development until a revised SWPPP has been submitted to the County Engineer.
f. Additional Measures	Williamson County may recover all damages proximately caused by the violator to Williamson County, which may include any reasonable expenses incurred in investigating violations of, and enforcing compliance with the Storm Water Regulations, or any other actual damages caused by the violation. Williamson County may recover costs for maintenance of storm water facilities when the user of such facilities fails to maintain them as required.

Williamson County Engineering Department
Stormwater Management Program
Operation and Maintenance Program

National Pollution Discharge Elimination System Permit Number TNS000000 authorizes Williamson County to discharge stormwater runoff into Waters of the State of Tennessee in accordance with certain water quality management programs and provisions established within the permit. Williamson County is required to develop and implement an operation and maintenance program that has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.

On an annual basis, Williamson County will perform pollution prevention and good housekeeping inspections at the following County operated facilities:

- Highway Department Garage
- Convenience Centers
- School Bus Facility
- Maintenance Garage
- AgExpo Park
- Parks and Rec Maintenance Facility

Inspections will document the following concerns:

- Erosion Prevention and Sediment Control Site Conditions
- Material Handling
- Spill Prevention and Control
- Waste Management
- Vehicle and Equipment Cleaning, Fueling and Maintenance

Pollutant potentials that are observed at the facility during the inspection will be discussed in detail and the facility director will be advised to make necessary corrections. Training videos will be available, and the facility director will be encourage or directed to view them, along with all other staff that may benefit. Additionally, educational material such as best management practices guidance may be distributed to the facility director for their review and implementation.

See Figure 2 for the Inspection Report Form that is completed annually at County facilities.

Figure 2: County Facilities Inspection Report Form

Rogers C. Anderson
Williamson County Mayor

Engineering
Floyd Heflin
Director

Best Management Practices and Good Housekeeping Inspection Report

Facility Information

Facility: _____

Inspection Date: _____

Erosion Prevention and Sediment Control Site Conditions:

Does the site appear to be stabilized with structures functioning adequately and no evidence of pollutants leaving site? ☐Yes ☐No ☐N/A

_____

Material Handling:

Are materials such as soil; pesticides and herbicides; fertilizers; detergents; petroleum products such as fuel, oil, and grease; and other hazardous chemical such as acids, lime, glues, paints, and solvents delivered, stored, and used properly? ☐Yes ☐No ☐N/A

_____

Spill Prevention and Control:

Are there adequate measures in place for spill prevention and control of chemicals and hazardous substances such as pesticides, herbicides, fertilizers, fuels, lubricants, and other petroleum distillates? ☐Yes ☐No ☐N/A

_____

Waste Management:

Are all wastes, including solid waste, hazardous waste, contaminated soil waste, construction waste, and sanitary/septic waste managed and disposed of properly? ☐Yes ☐No ☐N/A

_____

Vehicle and Equipment Cleaning, Fueling and Maintenance:

Are best management practices being followed to reduce the potential of contamination from activities associated with vehicle and equipment cleaning, fueling, and maintenance? ☐Yes ☐No ☐N/A

_____

Comments: _____

_____

Inspector: _____

Williamson County Engineering Department
Storm Water Management Program
Appendix

National Pollution Discharge Elimination System Permit Number TNS000000 authorizes Williamson County to discharge stormwater runoff into Waters of the State of Tennessee in accordance with certain water quality management programs and provisions established within the permit. Williamson County is required to complete an EPA Water Quality Scorecard and submit a copy of it with the Annual Report.

EPA Water Quality Scorecard

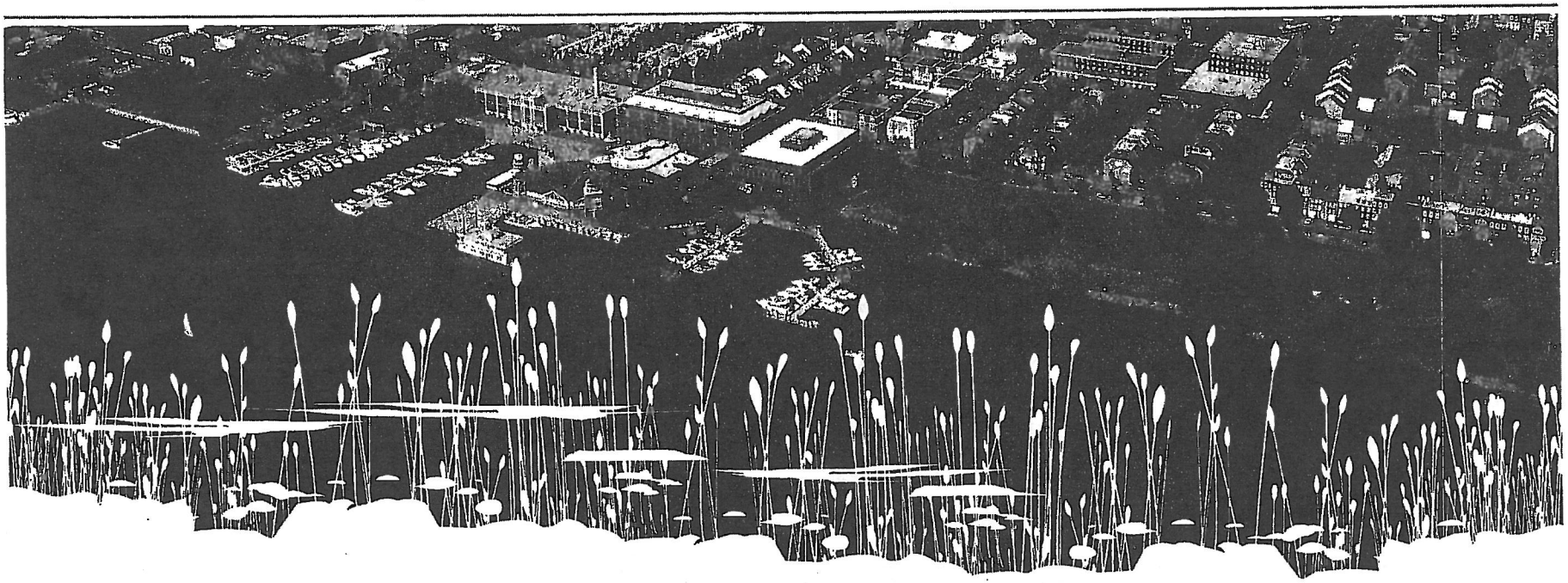
The EPA Water Quality Scorecard is available on our website at:
williamsoncounty-tn.gov/stormwater.

EPA
United States
Environmental Protection
Agency

EPA 231B09001 | October 2009 | http://www.epa.gov

WATERQUALITY SCORECARD

Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales



1 Executive Summary

Many communities across the United States face the challenge of balancing water quality protection with the desire to accommodate new growth and development. These cities and counties are finding that a review of local ordinances beyond just stormwater regulations is necessary to remove barriers and ensure coordination across all development codes for better stormwater management and watershed protection. Local policies, such as landscaping and parking requirements or street design criteria, should complement strong stormwater standards and make it easier for developers to meet multiple requirements simultaneously.

EPA's Water Quality Scorecard was developed to help local governments identify opportunities to remove barriers, and revise and create codes, ordinances, and incentives for better water quality protection. It guides municipal staff through a review of relevant local codes and ordinances, across multiple municipal departments and at the three scales within the jurisdiction of a local government (municipality, neighborhood, and site),[1] to ensure that these codes work together to protect water quality goals. The two main goals of this tool are to: (1) help communities protect water quality by identifying ways to reduce the amount of stormwater flows in a community and (2) educate stakeholders on the wide range of policies and regulations that have water quality implications.

The scorecard is for municipalities of various sizes in rural, suburban, and urban settings, including those that have combined sewers, municipal separate storm sewers, and those with limited or no existing stormwater infrastructure. It can help municipal staff, stormwater managers, planners, and other stakeholders to understand better where a municipality's[2] land development regulations and other ordinances may present barriers or opportunities to implementing a comprehensive water quality protection approach. The scorecard provides policy options, resources, and case studies to help communities develop a comprehensive water quality program.

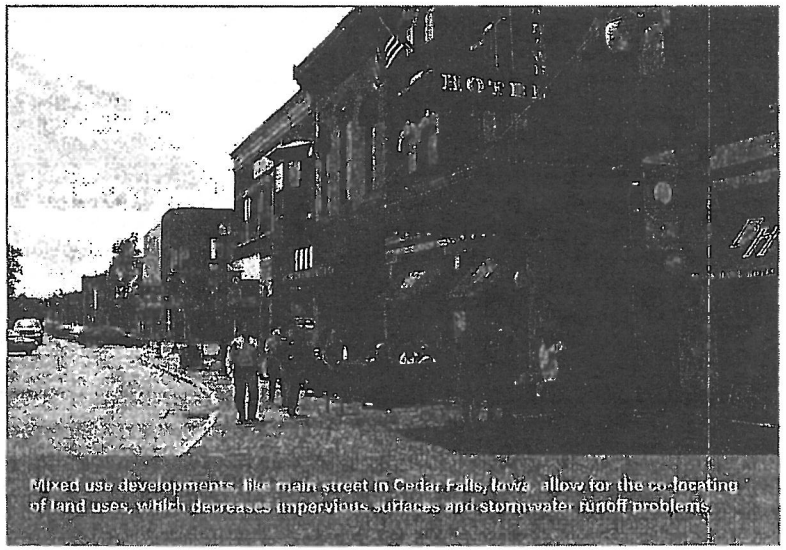
1 While the watershed scale is the best scale at which to look regionally at water quality protection strategies, it can be difficult to align policies, incentives, and regulations across political boundaries. For purposes of implementation, the largest scale the scorecard uses is the municipality.

2 The term "municipality" as used by the International City/County Management Association (ICMA) refers to local government at both the city and county levels.

2 Background

Growth and development expand communities' opportunities by bringing in new residents, businesses, and investments. Growth can give a community the resources to revitalize a downtown, refurbish a main street, build new schools, and develop vibrant places to live, work, shop, and play. The environmental impacts of development, however, can make it more difficult for communities to protect their natural resources. The U.S. Census Bureau projects that the U.S. population will reach 400 million people by about 2040, which will add continued development pressure on local communities and the environment. Many communities are asking where and how they can accommodate this growth while maintaining and improving their water resources.

Land development directly affects watershed functions. When development occurs in previously undeveloped areas, the resulting alterations to the land can dramatically change the transportation and storage of water. Residential and commercial development creates impervious surfaces and compacted soils that filter less water, which increases surface runoff and decreases groundwater infiltration. These changes can increase the volume and velocity of runoff, the frequency and severity of flooding, and peak storm flows.

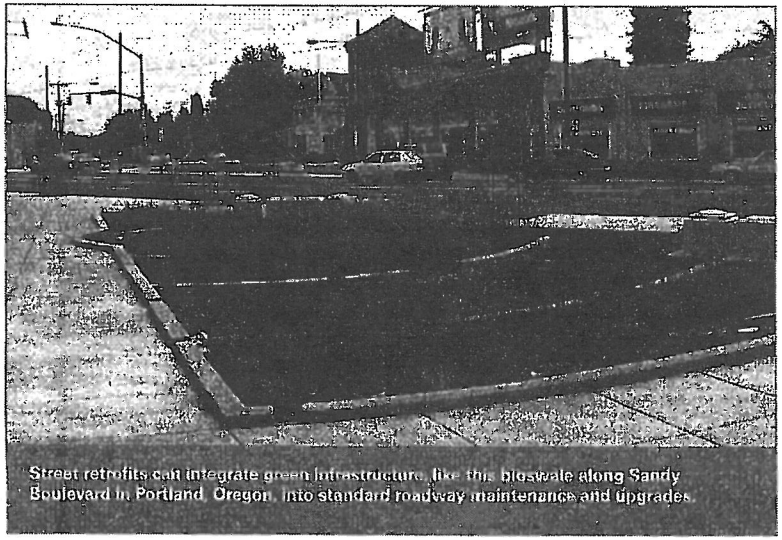


Mixed use developments, like main street in Cedar Falls, Iowa, allow for the co-locating of land uses, which decreases impervious surfaces and stormwater runoff problems.

At the municipal scale, decisions about where and how our towns, cities, and regions grow are the first, and perhaps most important, development decisions related to water quality. Preserving and restoring natural landscape features (such as forests, floodplains, and wetlands) are critical components of green infrastructure. By choosing not to develop on and thereby protecting these ecologically sensitive areas, communities can improve water quality while providing wildlife habitat and opportunities for outdoor recreation. In addition, using land more efficiently reduces and better manages stormwater runoff by reducing total impervious areas. Perhaps the single most effective strategy for efficient land use is redevelopment of already degraded sites, such as abandoned shopping centers or underused parking lots, rather than paving greenfield sites.

At the intermediate or neighborhood scale, green infrastructure includes planning and design approaches such as compact, mixed-use development, narrowing streets and roads, parking reduction strategies, and urban forestry that reduce impervious surfaces and better integrate the natural and the built environment.

At the site scale, green infrastructure practices include rain gardens, porous pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting for non-potable uses such as toilet flushing and landscape irrigation.



Street retrofits can integrate green infrastructure, like this bioswale along Sandy Boulevard in Portland, Oregon, into standard roadway maintenance and upgrades.

These processes represent a new approach to stormwater management that is not only sustainable and environmentally friendly, but cost-effective as well.

Municipalities are realizing that green infrastructure can be a solution to the many and increasing water-related challenges facing municipalities, including flood control, combined sewer overflows, Clean Water Act requirements, and basic asset management of publicly owned treatment systems. Communities need new solutions and strategies to ensure that they can continue to grow while maintaining and improving their water resources. This Water Quality Scorecard seeks to provide the policy tools, resources, and case studies to both accommodate growth and protect water resources.

3 The Water Quality Scorecard

EPA worked with numerous water quality experts, local government staff, developers, urban designers, and others working on land use and water quality issues to develop this Water Quality Scorecard. The purpose of the scorecard is to address water quality protection across multiple scales (municipality, neighborhood, and site) and across multiple municipal departments. This scorecard can help municipal staff, stormwater managers, planners, and other stakeholders to understand better where a municipality's land development regulations and other ordinances may present barriers or opportunities to implementing a comprehensive green infrastructure approach. The tool's two main goals are to: (1) help communities protect water quality by identifying ways to reduce the amount of stormwater flows in a community and (2) educate stakeholders on the wide range of policies and regulations that have water quality implications.

Communities throughout the U.S. are implementing stormwater regulations that require or encourage the use of green infrastructure for managing stormwater on site. These cities and counties are finding that, to better manage stormwater and protect watersheds, green infrastructure policies require a review of many other local ordinances to remove barriers and ensure coordination across all development codes. Local policies, such as landscaping and parking requirements or street design criteria, should complement strong stormwater standards and make it easier for developers to meet multiple requirements simultaneously. At the same time, if these policies support water quality goals, they can independently reduce and better manage stormwater runoff.

language. It emphasizes best practices and helps municipalities understand the incremental steps for changing specific policies and internal agency practices. The scorecard divides the tools and policies into four categories:

1. Adopt plans/Educate
2. Remove barriers
3. Adopt incentives
4. Enact regulations

These four categories provide greater structure to the compiled tools by organizing the policies or approaches as incremental changes and updates. These categories may help municipal staff prioritize which tools to work on based on local factors like resources, time, and political support. For example, an appropriate first step in the process of updating local regulations may be to remove a barrier rather than enacting a new regulation. Most policy options avoid specific performance guidance so that the tool is useful to a range of municipalities in different contexts. However, the case studies and resources provide locally appropriate performance measures where possible.

To highlight the diverse nature of green infrastructure approaches, as well as the fact that oversight over these policies resides in various municipal agencies, the scorecard has five sections:

1. Protect Natural Resources (Including Trees) and Open Space
2. Promote Efficient, Compact Development Patterns and Infill
3. Design Complete, Smart Streets that Reduce Overall Imperviousness
4. Encourage Efficient Provision of Parking
5. Adopt Green Infrastructure Stormwater Management Provisions

The five sections organize green infrastructure approaches based on drivers of impervious cover at the municipal, neighborhood, and site scales. Yet all three scales may be in any single section. For example, the parking section will have questions that address the municipal, neighborhood and site level considerations.

The scorecard describes alternative policy or ordinance information that, when implemented, would support a comprehensive green infrastructure approach, and will allow the municipality to determine where, in the broad spectrum of policy implementation, their policies fall.

A Note about the Point System

The tool includes a point system to make it easier to evaluate and improve local programs. The municipality can decide whether to use the point system at all. If the point system is used, municipalities can set locally appropriate thresholds and goals.

Governments could choose to use the point system in many different ways, including:

- State governments could require municipalities to complete the Water Quality Scorecard and establish measures for improvement over different permit cycles. For example, a municipality might have to improve its score by some number of points before the next permit cycle.
- Local governments could determine a score based on existing programs and policies and then set goals from this baseline. Local targets may include incremental yearly improvements or achieving additional points in a particular section, such as "Encourage Efficient Parking Supply" or "Protect Natural Resources and Open Space."
- Stakeholders such as watershed groups or environmental organizations could complete the scorecard and then provide feedback and information assistance to the local government about sections within the scorecard that received few points and might be an area for improvement.
- The total score or scores in certain sections could educate elected officials, decision makers, and others about the importance of these issues and the role of local policies in addressing them.
- A lack of points in one section may alert a municipality that a certain area, such as parking, lacks local ordinances that support green infrastructure and may be ripe for improvement.
- Variation in the number of points achieved across the five sections may help a municipality to better assess local sources of impervious cover and potential for the introduction of green infrastructure.

Because the scorecard is intended for use by a range of community types and sizes in locations throughout the U.S., please note that no single municipality will be able to receive every point. Some questions and points may only be

Table 1: Water Quality Scorecard Quick Reference Guide

Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales (SUMMARY)

	Policy Question	Goal
PROTECT NATURAL RESOURCES (INCLUDING TREES) AND OPEN SPACE		
1A.	**NATURAL RESOURCE PROTECTION**	
	Are development policies, regulations, and incentives in place to protect natural resource areas and critical habitat?	Protect natural resource areas (e.g., forests, prairies) and critical habitat (e.g., conservation corridors, buffer zones, wildlife preserves) from future development.
	Are no-development buffer zones and other protective tools in place around wetlands, riparian areas, and floodplains to improve/protect water quality?	Protect critical areas such as wetlands, floodplains, lakes, rivers, and estuaries with a mandatory no-development buffer.
	Does the community have protection measures for source water protection areas through land use controls and stewardship activities?	Protect source water areas from current or potential sources of contamination.
1B.	**OPEN SPACE PROTECTION**	
	Does the jurisdiction have adequate open space in both developed and greenfield areas of the community?	Create open networks throughout a community that serve a dual function of providing recreational areas and assisting in management of stormwater runoff.
1C.	**TREE PRESERVATION**	
	Does the local government have a comprehensive public urban forestry program?	Protect and maintain trees on public property and rights-of-way and plant additional trees to enhance the urban tree canopy.
	Has the community taken steps to protect trees on private property?	Preserve trees on private property and require replacement when trees are removed or damaged during development.
	Do local codes encourage or require street trees as part of road and public right-of-way capital improvement projects?	Leverage existing capital funds to plant more street trees and add multiple benefits to the public right-of-way.
PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL		
2A.	**INFILL AND REDEVELOPMENT**	
	Are policy incentives in place to direct development to previously developed areas?	Municipalities implement a range of policies and tools to direct development to specific areas.
2B.	**DEVELOPMENT IN AREAS WITH EXISTING INFRASTRUCTURE**	
	Is the jurisdiction directing growth to areas with existing infrastructure, such as sewer, water, and roads?	Adopt policies, incentives, and regulations to direct new development to areas that have infrastructure, such as water and sewer.
2C.	**MIXED-USE DEVELOPMENT**	
	Are mixed-use and transit-oriented developments allowed or encouraged?	Revise codes and ordinances to allow for the "by right" building of mixed-use and transit-oriented developments.

Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales (SUMMARY) continued

	Policy Question	Goal
	Do local building and plumbing codes allow harvested rainwater use for exterior uses such as irrigation and non-potable interior uses such as toilet flushing?	Ensure that the municipality allows and encourages stormwater reuse for non-potable uses.
	Are provisions available to meet stormwater requirements in other ways, such as off-site management within the same sewershed or "payment in lieu" of programs, to the extent that on-site alternatives are not technically feasible?	Allow off-site management of runoff while still holding developers responsible for meeting stormwater management goals.
5B.	**MAINTENANCE/ENFORCEMENT**	
	Does your stormwater ordinance include monitoring, tracking, and maintenance requirements for stormwater management practices?	Incorporate monitoring, tracking, and maintenance requirements for stormwater management practices into your municipal stormwater ordinance.

1 Protect Natural Resources (Including Trees) and Open Space

Sensitive Natural Lands/Critical Area Protection

QUESTION: Are development policies, regulations, and incentives in place to protect natural resource areas and critical habitat?

GOAL: Protect natural resource areas (e.g., forests, prairies) and critical habitat (e.g., conservation corridors, buffer zones, wildlife preserves) from future development.

WHY: Protection of significant tracts of critical lands and wildlife habitat will aid in protecting and improving water quality by increasing infiltration and groundwater recharge, preventing erosion and contamination of ground water and surface water resources, and protecting sources of drinking water.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE			
Identify and map critical natural resource areas (e.g., steep slopes, wildlife habitat, forests, drinking water source areas).	1	1	Stormwater Regs - Sec 4 / Zoning Ordinance Article 13
The local comprehensive plan contains a natural resource protection element with goals calling for preservation of identified critical natural resource areas.	1	1	Comprehensive Plan
Identify key natural resource areas for protection in jurisdiction's parks and open space plan.	1	1	Stormwater Regs - Sec 4 / Zoning Ord. Art. 13/14
Assist landowners in identifying sensitive natural areas and laying out developments to avoid such areas.	1	1	Stormwater Regs - Sec 4 / Zoning Ord. Art. 13/14
Local plans establish and enforce areas which are available for development and which lands are a priority for preservation.	1	1	Stormwater Regs - Sec 4 / Zoning Ord Art. 13/14
REMOVE BARRIERS			
Protection of sensitive natural areas and wildlife habitat qualifies for credit towards local open space dedication and set-aside requirements.	1	1	Stormwater Regs. Sec 4 / Zoning Ord. Art. 13/14
ADOPT INCENTIVES			
Provide financial support to or collaborate with land trusts to acquire critical natural areas.	1	0	
Establish a dedicated source of funding for open space acquisition and management (e.g., bond proceeds, sales tax).	2	0	
Adopt a transferable developments rights program to provide an incentive for landowners to preserve sensitive natural lands and wildlife habitat.	1	0	
		6 PAGE TOTAL	◄ CARRY THIS SUBTOTAL TO NEXT PAGE = 6

1.A.2a

Protection Of Water Bodies/Aquifers

QUESTION: Are no-development buffer zones and other protective tools in place around wetlands, riparian areas, and floodplains that improve/protect water quality?

GOAL: Protect critical areas such as wetlands, floodplains, lakes, rivers, and estuaries with a mandatory no-development buffer.

WHY: The use of these practices will reduce pollutant loads and hydrologic alterations to water bodies.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Identify and map critical water resource areas.	1	1	Stormwater Regs - Sec 4
The local comprehensive plan contains a water quality protection element with goals calling for protection of identified water bodies and other water resource areas such as wetlands.	1	1	Stormwater Regs - Sec 4
Identify key critical water resource areas for protection in jurisdiction's parks and open space plan.	1	1	Stormwater Regs - Sec 4
Cooperate in developing regional approaches to watershed protection and stormwater management.	1	0	
REMOVE BARRIERS:			
Wetlands and other water bodies and buffer areas qualify for credit against local open space dedication/set-aside regulations.	1	1	Stormwater Regs - Sec 4 / Zoning Ord. - Art. 13
ADOPT INCENTIVES:			
Protected water bodies and buffer areas qualify for twice the credit (or more) against open space requirements set by the municipality.	1	0	
Restoration of degraded riparian/wetland areas qualifies for additional open space credit within the local municipal system.	1	0	
Transfer of density from protected riparian areas/buffers to upland portions of development sites.	1	0	
ENACT REGULATIONS:			
Riparian and wetland buffer areas required by local land use regulations · Buffer is at least 50 feet (as measured from the top of bank) = 1 point · Buffer is at least 100 feet (as measured from the top of bank) = 2 points · Buffer is greater than 100 feet (as measured from the top of bank) = 3 points	1 to 3	2	Stormwater Regs - Sec 4
Critical water resource areas cannot be counted in calculating allowable density on a site (e.g., on a 200-acre site with 50 acres of wetlands, only 150 acres can be used to calculate density under zone district regulations, and only those 150 acres may be developed).	1	0	

PAGE TOTAL 6 + SUBTOTAL FROM PREVIOUS PAGE 12 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 18

1.A.2b Protection Of Water Bodies/Aquifers

QUESTION: Does the community have protection measures for source water protection areas through land use controls and stewardship activities?

GOAL: Protect source water areas from current or potential sources of contamination.

WHY: These practices will help safeguard community health, reduce the risk of water supply contamination, and potentially reduce water treatment costs.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE			
Local land use plans identify aquifer recharge/source water areas and recommend protective measures.	1	1	Comprehensive Plan
Require that all stormwater inlets carry a notice regarding discharge to receiving waters.	1	0	
Map and publish wellhead and aquifer recharge areas to alert developers to potential restrictions.	1	0	
ADOPT INCENTIVES			
Identification of drinking water source protection and aquifer recharge areas with a dedicated funding source in place to purchase and protect such areas.	1	0	
Protection of critical water source areas qualifies for additional credit towards local open space requirements.	1	1	Stormwater Regs - Sec 4
ENACT REGULATIONS			
Adopt well-head protection regulations/zones to prevent incompatible development and uses.	1	0	
Adopt aquifer protection regulations/zones to prevent incompatible development and uses.	2	0	

PAGE TOTAL 2 + SUBTOTAL FROM PREVIOUS PAGE 22 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 24

1.C TREE PROTECTION

1.C.1

QUESTION: Does the local government have a comprehensive public urban forestry program?

GOAL: Protect and maintain trees on public property and rights-of-way and plant additional trees to enhance the urban tree canopy.

WHY: Mature trees provide multiple community benefits, reduce overall stormwater runoff, and improve stormwater quality.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Survey and inventory existing trees on public lands and street rights-of-way. Document the characteristics and location of street trees and urban tree canopy to inform public tree planting, adoption, and maintenance programs.	1	0	
Select tree species based on known performance for managing stormwater runoff. Publish list and make widely available for homeowners/others that plant street trees.	1	0	
Conduct education and outreach about tree protection, proper maintenance, and replanting opportunities through printed materials, workshops, events, and signage.	1	0	
Adopt a policy to protect existing trees on local government development sites (e.g., municipal parking lots, municipal buildings).	1	0	
Maintain an active tree maintenance program for public trees, including pest control, pruning, watering, and similar measures.	1	0	
REMOVE BARRIERS:			
Acknowledge trees as part of community infrastructure and develop a coordinated design for locating public utilities to provide enough space for mature tree canopy and root development.	1	0	
ADOPT INCENTIVES:			
Provide free or reduced-price trees to homeowners to be used as street trees.	1	0	
ENACT REGULATIONS:			
Require any public trees removed or damaged during construction associated with private development to be replaced on- or off-site with an equivalent amount of tree caliper (e.g., remove a 24-inch diameter tree/replace with 6 four-inch diameter trees).	1	0	
Adopt construction protection rules for all public trees (e.g., fencing, no storage of hazardous materials, avoid cutting into root zones).	1	0	

PAGE TOTAL 0 + SUBTOTAL FROM PREVIOUS PAGE 26 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 26

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ENACT REGULATIONS:			
Require permits before removing trees on proposed development or redevelopment sites. Provide fines and/or stop-work authority for permit violations.	1	1	Stormwater Regs- Sec 4/6/8/9
Set minimum tree preservation standards for new development sites.	1	1	Zoning Ordinance - Art. 13
Require site plans or stormwater plans to include tree preservation.	1	0	
Require/allow tree replacement off-site for infill sites.	1	0	

2 PAGE TOTAL + SUBTOTAL FROM PREVIOUS PAGE 28 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 30

Resources

- Planner's Guide to Wetland Buffers for Local Governments, Environmental Law Institute: *http://www.elistore.org/reports_detail.asp?ID=11272*
- Mertes, James D. and James R. Hall. Park, Recreation, Open Space and Greenway Guidelines. National Recreation and Park Association, 1996.
- Center for Watershed Protection guidance on aquatic buffers: *http://www.cwp.org/Resource_Library/Restoration_and_Watershed_Stewardship/perviousarea.htm*
- "Protecting Stream and River Corridors: Creating Effective Local Riparian Buffer Ordinances," Carl Vinson Institute of Government, The University of Georgia: *http://www.rivercenter.uga.edu/publications/pdf/riparian_buffer_guidebook.pdf*
- No Adverse Impact Floodplain Management, Association of State Floodplain Managers: *http://www.floods.org/index.asp?menuID=349&firstlevelmenuID=187&siteID=1*
- Riparian Toolbox: Model Regulations and Legal Issues, Long Island Sound Study: *http://www.longislandsoundstudy.net/riparian/legal.htm*
- Model Ordinances to Protect Local Resources: Aquatic Buffers, U.S. EPA: *http://www.epa.gov/owow/nps/ordinance/osm1.htm*
- Duerksen, Christopher and Cara Snyder. Nature-Friendly Communities: Habitat Protection and Land Use Planning. Island Press, 2005.
- City Trees: Sustainability Guidelines and Best Practices: *http://www.treetrust.org/pdf/community-forestry-city-trees-bonestroo.pdf*
- Guide to Setting Urban Tree Canopy Goals, American Forests: *http://www.americanforests.org/resources/urbanforests/treedeficit.php*
- Urban Forestry Manual, Center for Watershed Protection: *http://www.cwp.org/forestry/part3forestrymanual.pdf* (pg. 69))
- Duerksen, Christopher and Suzanne Richman, "Tree Conservation Ordinances." American Planning Association. 1993: Planning Advisory Service Report No. 446.
- Duerksen, Christopher , Mowery, M. and McGlyn M. "Tree Preservation." Zoning Practice. July 2006: American Planning Association, Volume 23 Number 7.
- "Trees for green streets: An illustrated guide," Portland Metro: *http://www.metro-region.org/index.cfm/go/by.web/id=26337*
- *Tree Preservation Information Guide, Portland, Oregon: http://www.sustainableportland.org/shared/cfm/image.cfm?id=72545*
- Storm Water Pollution Prevention Plan (SWPPP) Guide, U.S. EPA: *http://cfpub.epa.gov/npdes/stormwater/swppp.cfm*
- Center for Urban Forest Research, U.S. Forest Service: *http://www.fs.fed.us/psw/programs/cufr/*
- Urban Forest Policy and Management, U.S. Forest Service: *http://www.fs.fed.us/psw/programs/cufr/research/studies.php?TopicID=1*
- Plants for Stormwater Design Volume II, Great River Greening: *http://www.greatrivergreening.org/_downloads/PSD%20II%20Sample.PDF*

Case Studies

- Alachua County, Florida's land conservation and acquisition program, *Alachua County Forever,* has conserved over 17,000 acres of environmentally sensitive land: *http://www.alachuacounty.us/government/depts/epd/land/filesforms.aspx*
- Baltimore County, Maryland's Master Plan 2010 designates land management areas that include agricultural preservation areas and resource preservation areas: *http://www.baltimorecountymd.gov/Agencies/planning/masterplanning/smartgrowth.html*
- King County, Washington's Greenprint Project is an open space and resource conservation strategy that focuses on land acquisition, restoration projects, regulatory changes and protection within the urban growth boundary: *http://dnr.metrokc.gov/wlr/greenprint/about.htm*
- The Pennsylvania Horticultural Society's *Philadelphia Green* program revitalizes and maintains abandoned land and public spaces by partnering with government, businesses and the community: *http://www.pennsylvaniahorticulturalsociety.org/phlgreen/about.html*
- Chicago, Illinois's Open Space Impact Fee Ordinance charges a fee associated with residential development building permits and spends the funds on acquisition of neighborhood open space in the same area where development occurs: *http://egov.cityofchicago.org/city/webportal/portalContentItemAction.do?blockName=Buildings%2FContent&deptMainCategoryOID=-536901233&entityName=Buildings&topChannelName=Dept&contentOID=536988877&contenTypeName=COC_EDITORIAL*
- Lenexa, Kansas's Watershed Management Plan includes erosion and sediment control, stream buffers, subwatershed protection and

2 Promote Efficient, Compact Development Patterns and Infill

2.A Support Infill and Redevelopment

2.A.1

QUESTION: Are policy incentives in place to direct development to previously developed areas?

GOAL: Municipalities implement a range of policies and tools to direct development to specific areas.

WHY: Municipalities can realize a significant reduction in regional runoff if they take advantage of underused properties, such as infill, brownfield, or greyfield sites. Redeveloping already degraded sites such as abandoned shopping centers or underutilized parking lots rather than paving greenfield sites for new development can dramatically reduce total impervious area while allowing communities to experience the benefits and opportunities associated with growth.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE			
Local plans identify potential brownfield and greyfield sites, and support their redevelopment.	1	0	
Capital improvement plans include infrastructure improvements (water, sewer, road, sidewalk, etc. upgrades) for identified brownfield and greyfield sites.	1	0	
Educate lending and financial institutions about benefits and local priorities of directing development to existing areas.	1	0	
Conduct outreach to the community to ensure support for local forms and patterns of development.	1	0	
REMOVE BARRIERS			
Establish a brownfields program to remove uncertainty regarding cleanup and liability issues.	1	0	
ADOPT INCENTIVES			
Provide incentives such as density bonuses and accelerated permitting for brownfield and greyfield sites.	1	0	
Adopt funding mechanisms for remediating/redeveloping brownfield and greyfield sites.	1	0	
Streamline permitting procedures to facilitate infill and brownfield redevelopment plan review.	1	0	
Establish tax increment financing (TIF) districts to encourage redevelopment.	1	0	
ENACT REGULATIONS			
In local codes, ordinances, and policies, the municipality differentiates between greenfield and infill development.	1	0	
		0 PAGE TOTAL	◀ CARRY THIS SUBTOTAL TO NEXT PAGE = 0

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Technical information and analysis on the effectiveness of various treatment systems are readily available to developers. Local governments have determined which systems work best for their soil conditions and topography and have made this information available to the development community.	1	1	Stormwater Management Manual
Allow a wide variety of housing types and sizes within infill areas and reduced minimum lot sizes.	1	0	
ADOPT INCENTIVES			
Increase development densities and allowable height in infill areas.	1	0	
Reduce impact fees for infill development based on less demand for new infrastructure.	1	0	
Create development incentives for green roofs (e.g., increased floor area ratio [FAR] bonus, additional building height).	1	0	
Include provision in stormwater management requirement that reduces on-site management requirements for projects that decrease total imperviousness on previously developed sites.	1	1	Storm water Regs - Sec. 2
ENACT REGULATIONS			
Zoning and land development regulations implement urban service areas/ urban growth boundary policies by restricting development in outlying areas.	1	1	Zoning Ord. — Art. 10
Adopt adequate public facility and concurrency ordinances that require adequate public infrastructure to be available when development comes on line (e.g., water, sewer, roads).	1	0	
Adopt large-lot/agricultural zoning (e.g., 1 unit/160 acres) on fringe of city to restrict inappropriate greenfield development.	1	0	
Enact transitional compatibility standards to ensure that new denser infill development is compatible with existing neighborhoods/adjacent development.	1	0	
		3 PAGE TOTAL	SUBTOTAL FROM PREVIOUS PAGE + 5 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE = 8

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ENACT REGULATIONS			
Zoning code requires a minimum mix of uses and minimum density in designated mixed-use and transit-oriented development areas.	1	0	
Auto-oriented uses and drive-throughs are restricted or prohibited in mixed-use and transit-oriented development areas.	1	0	

0 PAGE TOTAL

SUBTOTAL FROM PREVIOUS PAGE + 13 = 13 (TOTAL POINTS AVAILABLE: 45)

▼ **Total score for SECTION 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL**

This section has been reviewed and scored by Michael Scott

Department name Engineering Signee Michael Scott

3 Design Complete, Smart Streets That Reduce Overall Imperviousness

3.A Street Design

3.A.1

QUESTION: Do local street design standards and engineering practices encourage streets to be no wider than necessary to move traffic effectively?

Do street designs vary according to:

- **street type** (arterial streets, collector streets, neighborhood streets) and
- **urban context** (urban core, transit station area, suburban center, general suburban, rural)?

Do policies allow narrow neighborhood streets designed to slow traffic and create safer conditions for pedestrians and bicyclists?

GOAL: Appropriate street widths allow narrower lanes for certain street types, thereby reducing overall imperviousness.

WHY: The width of travel lanes, parking lanes and sidewalks should be tailored to the urban setting. Where appropriate, narrowing travel lane width to 10-11 feet, rather than the standard 12-13 feet, can significantly reduce the total amount of impervious surfaces. Such streets can also substantially improve conditions for walking, biking, and using transit, which reduces automobile use and overall demand for parking spaces.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE			
Comprehensive plan/transportation plan emphasizes alternative modes of transportation (walking, biking, and transit) to reduce vehicle miles traveled and width and prominence of roads/streets.	1	1	Comprehensive Plan
Comprehensive/transportation plan calls for distributing traffic across several parallel streets, reducing the need for high capacity streets with wide rights-of-way.	1	0	
Comprehensive/transportation planning process brings emergency response and other local government departments (e.g., public works, utilities) to the table early in the process to discuss street design.	1	1	Comprehensive Plan
Adopt formal bicycle/pedestrian master plan.	1	0	
Create "safe routes to school" programs or other pedestrian/bike safety initiatives.	1	0	
Make consistent improvements to walking/biking conditions or develop a formal bicycle/pedestrian master plan.	1	0	
REMOVE BARRIERS			
Comprehensive plan endorses context-sensitive street design with narrower streets in appropriate locations.	1	0	
Improve pedestrian crossing at intersections to encourage walking.	1	0	
Consolidate utilities in street right-of-way to improve sidewalk design and function.	1	0	
		2 PAGE TOTAL	◄ CARRY THIS SUBTOTAL TO NEXT PAGE = 2

3:A:2	
QUESTION:	Are shared driveways, reduced driveway widths, two-track driveways, and rear garages and alleys encouraged for all single-family developments?
GOAL:	Encourage alternative forms and decreased dimensions of residential driveways and parking areas.
WHY:	Off-street parking and driveways contribute significantly to the impervious areas on a residential lot. Reducing such dimensions can minimize the amount of stormwater runoff from a site.

REMOVE BARRIERS			
Allow developments that utilize shared driveways and rear-loaded garages to permit overnight parking in driveways and on-street.	1	0	
Development code prohibits homeowner covenants forbidding overnight parking in driveways, on-street overnight parking, and shared driveways.	1	0	
ADOPT INCENTIVES			
Allow developments with narrow driveways and rear-loaded garages to reduce number of parking spaces for guests.	1	0	
Zoning/subdivision regulations require minimum number of connections between new project and surrounding developments and neighborhoods.	1	1	Zoning Ord. / Subdivison Regs
ENACT REGULATIONS			
Shared driveways are permitted or required for single-family residential developments.	1	1	Zoning Ord.
Minimum widths for single-family driveways reduced to 9 feet.	1	0	
Two-track driveways are allowed by technical street/subdivision specifications.	1	1	Zoning Ord.
Single-family residential developments encouraged/required to be designed with minimum percentage of alley-accessible, rear-loading garages. · Alleys/garages encouraged = 1 points · Alleys/garages required = 2 points	1 to 2	0	
		3 PAGE TOTAL	

SUBTOTAL FROM PREVIOUS PAGE + 7 = 10 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

QUESTION: Do regulations and policies promote use of pervious materials for all paving areas, including alleys, streets, sidewalks, crosswalks, driveways, and parking lots?

GOAL: Build and retrofit these surfaces with pervious materials to reduce stormwater runoff and its negative impacts.

NOTE: While eliminating sidewalks or placing sidewalks on only one side of the road can reduce impervious cover, this strategy is typically most appropriate for rural areas. However, other effective strategies can achieve the same runoff reductions that will not limit residents' options for recreation and transportation.

WHY: Streets, sidewalks, and other hard surfaces contribute a large portion to a municipality's total imperviousness. Making these impervious surfaces more permeable protects water quality, reduces flooding, and can recharge groundwater.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE			
Sponsor/approve pilot programs to determine appropriate pervious materials for different paving areas (e.g., permeable concrete for sidewalks, permeable pavers for driveways), as well as process for installation and maintenance.	1	0	
Pilot project results incorporated into standard practice for all new paved areas and retrofits of existing paved surfaces.	1	0	
Adopt policy to replace impervious materials with pervious materials where practical.	1	0	
REMOVE BARRIERS			
Technical street specifications allow pervious paving materials in appropriate circumstances (e.g., not allowed over aquifer recharge areas).	1	0	
ADOPT INCENTIVES			
Create formal program offering incentives (e.g., cost sharing, reduction in street widths/parking requirements, assistance with maintenance) to property owners who utilize pervious pavement elements.	1	0	
ENACT REGULATIONS			
Adopt requirement that some percentage of parking lots, alleys, or roads in a development utilize pervious materials.	1	1	Zoning Ord. – Art. 17
Development approvals that allow/require use of pervious materials include requirements for continuing maintenance/cleaning of pervious surfaces.	1	1	Zoning Ord. – Art. 17

PAGE TOTAL: 2

SUBTOTAL FROM PREVIOUS PAGE + 12 = 14 (TOTAL POINTS AVAILABLE: 50)

▼ **Total score for SECTION 3: DESIGN COMPLETE, SMART STREETS THAT REDUCE OVERALL IMPERVIOUSNESS**

This section has been reviewed and scored by Michael Scott

Department name Engineering Signee Michael Scott

- North Carolina Department of Environment and Natural Resources offers guidance to developers on eliminating curbs and gutters, including siting and design considerations, maintenance concerns, effectiveness and cost considerations: ***http://www.p2pays.org/ref/41/40403.pdf***
- New York City requires street trees for every 25 feet of street frontage of a zoning lot: ***http://www.nyc.gov/html/dcp/pdf/street_tree_planting/tree_adopted_cc_043008.pdf***, page 8.
- Seattle Public Utilities' Natural Drainage System projects redesign residential streets to include vegetated drainage systems that use swales, wetlands, trees and other natural features to treat pollutants and minimize the speed and volume of road runoff: ***http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/***

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Create parking districts to finance/construct centralized parking lots/ structures as shared parking facilities to reduce on-site parking.	1	0	
ENACT REGULATIONS:			
Revise parking regulations to reduce minimums below standard ITE (Institute of Transportation Engineers) requirements based on analysis of local developments and actual parking demand/experience.	2	6	
Charge developers for every space beyond parking minimums to offset environmental impacts.	1	0	
Enact parking standards that allow credit for adjacent on-street parking.	1	0	
Create zones with reduced parking requirements (e.g., transit overlay districts, mixed-use activity centers, multi-modal districts).	1	1	Zoning Ord. - Art 10
Waive all parking minimums in downtown and other locations that are pedestrian-oriented and/or have good transit access.	1	0	
Adopt parking standards that reduce requirements based on sliding scale tied to degree of walkability/transit access locations (20% reduction in areas well served by bus, 30% reduction in areas served by rail stations).	1	0	
Require shared parking agreements where appropriate complementary uses exist.	1	0	
Adopt maximum parking caps (e.g., 125% above minimum) for multi-family and commercial developments.	2	2	Zoning Ord. - Art. 17
Reduce minimum parking space size based on analysis of average vehicle size in jurisdiction.	1	0	
		PAGE TOTAL 3	SUBTOTAL FROM PREVIOUS PAGE + 4 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 7

4.C MINIMIZE STORMWATER FROM PARKING LOTS

4.C.1

QUESTION: Are there requirements for landscaping designed to minimize stormwater in parking lots?

GOAL: Require substantial landscaping to help reduce runoff.

WHY: Parking lots generate a large amount of impervious cover. Requiring landscaping reduces the environmental impact of parking and can provide additional community benefits by providing shade and, if appropriately placed, creating natural barriers between pedestrians and cars.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE			
Comprehensive plan calls for landscaping in parking lots to help reduce stormwater runoff.	1	1	Zoning Ord. – Art. 15
REMOVE BARRIERS			
Allow alternative or innovative landscaping solutions that provide stormwater management functions to count towards perimeter or other landscaping requirements.	1	1	Stormwater Regs – Sec 2
ADOPT INCENTIVES			
Parking lot landscaping and green roofs on parking structures credited towards meeting local stormwater management requirements.	1	1	Stormwater Regs – Sec 2
Give additional landscaping credit for preservation of large, mature trees within parking lots.	1	1	Zoning Ord. Art. 15
Do not count parking structures with green roofs against the allowable floor area ratio of a site.	1	0	
ENACT REGULATIONS			
Adopt parking lot landscape regulations that require provision of trees, minimum percent of parking lot interior area to be landscaped (e.g., 10%), and minimum sized landscaping areas (e.g., minimum of 25 square feet for island planting areas).	1	1	Zoning Ord. – Art. 15
In parking lot landscaping regulations, specify the types and sizes of shrubs and trees most appropriate for controlling/reducing stormwater runoff.	1	1	Zoning Ord. – Art. 15
Adopt standards requiring a minimum area of the parking lot to drain into landscaped areas.	1	1	Stormwater Regs – Sec 2
Require the management of runoff from parking lots through green infrastructure practices, including trees, vegetated islands, swales, rain gardens, or other approaches.	1	1	Stormwater Regs – Sec 2

8 PAGE TOTAL + SUBTOTAL FROM PREVIOUS PAGE 7 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 15

Resources

- "Parking Spaces/Community Places: Finding the Balance through Smart Growth Solutions" (pg. 14, 18-19, 21), U.S. EPA Development, Community and Environment Division: ***http://www.epa.gov/piedpage/pdf/EPAParkingSpaces06.pdf***
- "Shared Parking, Second Edition," Urban Land Institute: ***www.uli.org/bookstore/***
- "Developing Parking Policies to Support Smart Growth in Local Jurisdictions: Best Practices," Metropolitan Transportation Commission: ***http://www.mtc.ca.gov/planning/smart_growth/parking_study/April07/bestpractice_042307.pdf***
- "Driving Urban Environments: Smart Growth Parking Best Practices," Maryland Governor's Office of Smart Growth: ***http://www.smartgrowth.state.md.us/pdf/Final%20Parking%20Paper.pdf***
- "Design Principles for Parking Lots," Tennessee Valley Authority Economic Development: ***http://www.tvaed.com/sustainable/parking.htm***
- Efficient Parking Strategies, Centralina Council of Governments and Catawba Regional Council of Governments: ***http://www.epa.gov/region4/airqualitytoolkit/9_CaseStudies/SEQL%20-%20Efficient%20Parking%20Strategies.pdf***
- "Parking Management: Strategies, Evaluation and Planning," Victoria Transport Policy Institute: ***http://www.vtpi.org/park_man.pdf***
- "Smart Growth Alternatives to Minimum Parking Requirements," *Proceedings from the 2nd Urban Street Symposium*, July 28-30, 2003: ***http://transtoolkit.mapc.org/Parking/Referenced_pdfs/Forinash_SmartGrowthParkingAlternatives.pdf***
- "Flexible Parking Standards," Georgia Quality Growth Partnership: ***http://www.dca.state.ga.us/toolkit/ToolDetail.asp?GetTool=17***
- "Multifunctional Landscaping: Putting Your Parking Lot Design Requirements to Work for Water Quality," University of Illinois Extension: ***http://urbanext.illinois.edu/lcr/LGIEN2002-0017.html***
- "Low-Impact Parking Lot Design Reduces Runoff and Pollutant Loads," Journal of Water Resources Planning and Management, 2001: ***http://cedb.asce.org/cgi/WWWdisplay.cgi?0101775***
- "Managing Stormwater for Urban Sustainability Using Trees and Structural Soils," Virginia Polytechnic Institute and State University: ***http://www.cnr.vt.edu/urbanforestry/stormwater/Resources/TreesAndStructuralSoilsManual.pdf***

Case Studies

- San Mateo County, California's "Sustainable Green Streets and Parking Lots Design Guidebook" provides policy guidance and design and construction details, including site layout strategies, green infrastructure design guidelines and case studies for both streets and parking lots: ***http://www.flowstobay.org/ms_sustainable_streets.php***
- Minneapolis, Minnesota's zoning code includes regulations to support pedestrian-oriented off-street parking, including parking maximums, shared parking allowances, pedestrian-overlay districts with reduced parking requirements, replacing off-street parking spaces with bicycle racks, and more: ***http://www.ci.minneapolis.mn.us/lrtrezoning/tod-haiwatha-09.asp***
- Boston Metropolitan Area Planning Council gives detailed guidance for reducing parking demand and developing parking requirements based on local factors such as access to transit, expected demographics, auto ownership rates and access to destinations and transit service: ***http://transtoolkit.mapc.org/Parking/Strategies/flexiblerequirements.htm***
- San Diego, California's Community Parking District Program helps older commercial districts collect revenue and implement parking plans to construct public parking facilities, make public transit enhancements, and maximize off-street parking inventory: ***http://www.sandiego.gov/economic-development/business-assistance/small-business/pmd.shtml***
- Placer County, California enacted an In-Lieu Parking Fee that allows developments within specific parking districts to pay a fee in lieu of complying with off-street parking standards. The collected fees are then used to construct new public parking spaces within the same parking district: ***http://www.placer.ca.gov/Departments/Works/TahPkngStudy/DraftParkingFeeOrdinance.aspx***
- Minnesota's Urban Small Sites Best Management Practice Manual provides drawings, design guidelines and plant lists for impervious surface reduction in parking lot design: ***http://km.fao.org/uploads/media/Impervious_surface_reduction_parking_lot_desing.pdf***
- The retrofit of Our Lady Gate of Heaven Parish parking lot in Chicago, Illinois included a large swale that absorbs 100,000 gallons of runoff per year, reducing flooding in the parking lot and in nearby streets and properties. This U.S. EPA-funded project continues to be monitored for

5 Adopt Green Infrastructure Stormwater Management Provisions

5.A Green Infrastructure Practices

5.A.1

QUESTION: Are green infrastructure practices encouraged as legal and preferred for managing stormwater runoff?

GOAL: Make all types of green infrastructure allowed and legal and remove all impediments to using green infrastructure (including for stormwater requirements), such as limits on infiltration in rights-of-way, permit challenges for green roofs, safety issues with permeable pavements, restrictions on the use of cisterns and rain barrels, and other such unnecessary barriers.

WHY: Green infrastructure approaches are more effective and cost efficient than conventional stormwater management practices in many instances, and provide other substantial community benefits.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE			
Inform the public, through education and outreach programs, that green infrastructure practices can manage stormwater runoff on their property.	1	1	Stormwater Management Manual
Create a green infrastructure workshop or training program for internal and external reviewers to ensure that the stakeholders who use this tool will have the ability to understand and use it effectively.	1	0	
REMOVE BARRIERS			
Development and other codes encourage and allow property owners to adopt home-based green infrastructure practices, such as rain gardens, rain barrels, and other rainwater harvesting practices.	1	1	Stormwater Regs - Sec 2 / stormwater Management Manual
Review and change, where necessary, building codes or other local regulations to ensure that all local government departments/agencies have coordinated with one another to ensure that green infrastructure implementation is legal, e.g. remove restrictions on downspout disconnection.	1	0	
ADOPT INCENTIVES			
Credit green infrastructure practices towards required controls for stormwater runoff.	1	1	Stormwater Regs - Sec 2
Establish a "Green Tape" expedited review program for applications that include green infrastructure practices.	1	0	
Reduce stormwater utility rates based on the use of green infrastructure practices.	1	0	N/A
		3 PAGE TOTAL	◀ CARRY THIS SUBTOTAL TO NEXT PAGE = 3

5A.2

QUESTION: Do stormwater management plan reviews take place early in the development review process?

GOAL: Incorporate stormwater plan comments and review into the early stages of development review/site plan review and approval, preferably at pre-application meetings with developers.

WHY: Pre-site plan review is an effective tool for discussing with developers alternative approaches for meeting stormwater requirements. This will incorporate green infrastructure techniques into new projects at early design stages, well before construction begins.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE			
Encourage/require a pre-site plan meeting with developers to discuss stormwater management and green infrastructure approaches. · Voluntary = 1 point · Mandatory = 2 points	1 to 2	2	Zoning Ord.
Include landscape architects in design and review of stormwater management plans.	1	1.	Stormwater Regs - Sec 6
ADOPT INCENTIVES			
Provide accelerated review of projects where developer attended a pre-application meeting.	1	0	
ENACT REGULATIONS			
Preliminary stormwater plan review occurs contemporaneously with preliminary site plan review and before any development approvals.	1	1	
Development applications must include preliminary/conceptual stormwater management plans that incorporate green infrastructure elements and describe how stormwater management standards will be met.	1	0	

PAGE TOTAL 4 + SUBTOTAL FROM PREVIOUS PAGE 7 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 11

5.A.4

QUESTION: Are provisions available to meet stormwater requirements in other ways, such as off-site management within the same sewershed or "payment in lieu" of programs, to the extent that on-site alternatives are not technically feasible?

GOAL: Allow off-site management of runoff while still holding developers responsible for meeting stormwater management goals.

WHY: In some cases, it is impracticable or infeasible to treat all or even some of the stormwater runoff on site. In such instances, alternative means should be provided through contribution to off-site mitigation projects or off-site stormwater management facilities (preferably green infrastructure facilities).

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	
For infill and redevelopment areas, off-site green stormwater management plans should be developed in cooperation between local government and landowners/developers. Allowing off-site management of stormwater runoff requires sewershed designation within the local government to ensure that true mitigation is possible and realize the equal stormwater management and water quality benefits through off-site management.	2	0	
Retrofit projects that will utilize green infrastructure stormwater management techniques should be identified and prioritized within the sewershed.	1	0	
Amend stormwater management regulations and development codes as necessary to allow off-site stormwater management, especially for infill and redevelopment areas.	1	1	Stormwater Res – sec 2
Establish system that allows/requires payment-in-lieu fees for off-site stormwater management facilities. Fees should be set sufficiently high as to cover the true cost of off-site management. Consider limitations on amount of off-site management allowed (more for infill areas, less for greenfield sites).	1	1	Stormwater Regs - Sec 2
		2 PAGE TOTAL	

SUBTOTAL FROM PREVIOUS PAGE + 11 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 13

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Inspections of construction sites occur at for at least 25% of permitted projects to ensure proper installation of approved practices.	1	1	Stormwater Regs - Sec. 7
Require conservation/green infrastructure bond/escrow in zoning/subdivision ordinances to ensure installation/maintenance of green infrastructure storm water management facilities.	1	1	Zoning Ord. - Art. 16

PAGE TOTAL 2

SUBTOTAL FROM PREVIOUS PAGE + 18 = 20 (TOTAL POINTS AVAILABLE: 39)

▼ **Total score for SECTION 5: GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS**

This section has been reviewed and scored by Michael Scott

Department name Engineering Signee Michael Scott

- Seattle, Washington's Green Factor is an amended landscape requirement that property owners meet via a scoring system that encourages green features such as large plants, permeable pavement, green roofs, vegetated walls and tree preservation: ***http://www.seattle.gov/dpd/permits/greenfactor/Overview/***
- San Jose, California's stormwater regulation requires that projects with 10,000 square feet or more of impervious surface area use landscape-based treatment and trees to meet quantity and quality standards: ***http://www.sanjoseca.gov/planning/stormwater/Policy_6-29_Memo_Revisions.pdf***
- Santa Monica, California's stormwater code requires that new development projects maximize permeable areas, maximize runoff to permeable areas, reuse stormwater, and reduce parking lot pollution: ***http://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Urban_Runoff/UR_Brochure.pdf***
- Chicago, Illinois's stormwater regulation requires that new developments manage 0.5" runoff from all impervious surfaces or reduce imperviousness by 15%: ***http://egov.cityofchicago.org/webportal/COCWebPortal/COC_EDITORIAL/StormwaterManagementOrdinance1206.pdf***
- Lenexa, Kansas's stormwater regulation requires new developments to manage 1.37" for water quality using a natural system treatment train approach and also charges a fee for water quantity management which pays for watershed-scale public projects managed by the City: ***http://www.ci.lenexa.ks.us/LenexaCode/viewXRef.asp?Index=2927***
- Fauquier County, Virginia's stormwater maintenance agreements state that if maintenance is neglected the County has the authority to perform the work and recover costs from the property owner: ***http://www.fauquiercounty.gov/documents/departments/commdev/pdf/SWMOrdinance.pdf*** (pages 12-13)
- Philadelphia, Pennsylvania's Stormwater Management Guidance Manual provides maintenance guidelines and schedules for a range of green infrastructure practices, from green roofs to pervious pavements and subsurface infiltration: ***http://www.phillyriverinfo.org/Programs/SubprogramMain.aspx?Id=StormwaterManual***

EPA
United States
Environmental Protection
Agency

Office of Research and Development (8101R)
1301 Constitution Ave. NW
Room 1408
Washington, DC 20004

EPA 231B09001
October 2009
http://www.epa.gov