



## MEMORANDUM

DATE: March 22, 2022

TO: Mayor Jeff Caggiano, Flood and Erosion Control Board  
Raymond Rogozinski, P.E., Public Works Director  
Nancy Levesque, P.E., City Engineer

FROM: Carol Noble, P.E., Environmental Engineer

RE: MS4 Program Summary for March 29, 2022 Flood and Erosion Control Board

This Memorandum is prepared to address summary information on the MS4 Program, as it relates to flooding and erosion control:

- The attached Powerpoint presentation summarizes the Municipal Separate Storm Sewer System (MS4), which is a federal program (unfunded), administered by the State of CT, to reduce non-point source pollution at a local level.
- The program requires participating municipalities/institutions to address stormwater management in a plan addressing 6 methods of control; Public Education & Outreach, Public Involvement & Participation, Illicit Discharge Detection & Elimination, Construction Site Stormwater Runoff Controls, Post Construction Stormwater Management, and Pollution Prevention/Good Housekeeping.
- The State of CT relates non-point source pollution to impervious area coverage, specifically Directly Connected Impervious Area (DCIA), i.e. impervious area (typically pavements or roofs) which drain directly to stormdrains and surface waters. The permit goal is a reduction of 2% of system-wide DCIA through retrofit projects.
- Erosion Control is primarily addressed in the Construction Site Stormwater Controls, Post Construction Runoff Controls, and Pollution Prevention sections; which address short-term and long-term controls to keep sediments from leaving a property.
- The Illicit Discharge Detection & Elimination (IDDE) section addresses communications, discovery and prohibition authority to keep non-stormwater discharge from storm drains. Bristol's Environmental Protection Tech is instrumental in administering this section.
- With respect to flooding, the post-development control section addresses development – related impacts. The addition of impervious area from development both increases runoff and decreases natural infiltration of soils. The program mandates provisions for Low Impact Development (LID), to incorporate natural processes into development by minimizing impervious areas, providing infiltration potential in the design, and providing stormwater management controls. LID practices promote healthy balances throughout the proposed development with controls, such as bioswales, porous pavements, infiltration islands, native plantings, and other “green” infrastructure, to mimic pre-development characteristics of a site

For more information, please feel free to contact me at 860-584-6111.

# MS4 - Municipal Separate Storm Sewer System

- MS4 Basics
- MS4 Permit Overview
- Stormwater Management Plan
- Bristol MS4 Highlights/Discussion



Bristol Flood and Erosion Control Board  
March 29, 2022

# MS4 Overview

**NPDES** - National Pollutant Discharge Elimination System

- Permits issued by EPA or authorized states

**MS4** - Municipal Separate Storm Sewer System

- A publicly owned stormwater runoff conveyance system
- Discharges to the waters of the U.S.

## Regulatory History

1972

- Clean Water Act
- NPDES developed to address point source pollution
- Sewage Treatment Plants and Industrial Wastewater

1990

- EPA regulates MS4 Phase I
- NPDES expanded to address non-point source pollution
- Towns/Cities with populations >100,000

1999

- MS4 Phase II
- Towns/Cities with populations <100,000 (Small MS4's)
- Non-Traditional MS4s (state and federal institutions)

2004

- CT DEEP issued Small MS4 General Permit
- 113 Towns/Cities

2017

- CT DEEP re-issued Small MS4 General Permit, added 8 towns and all institutions



Image from Bristol GIS, 2019 aerial, 75 Battisto Road (Bristol WPC)

## MS4 Basics



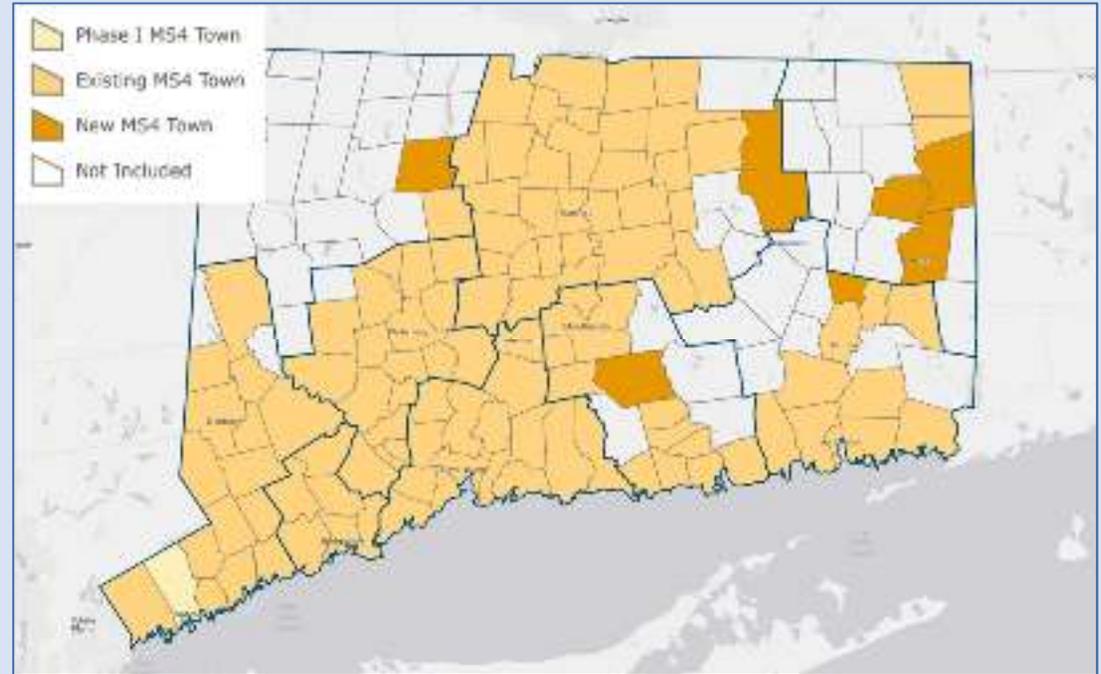
# Examples of Non-Point Source Pollution

- Septic Systems
- Fertilizers
- Erosion
- Grass / Leaves
- Pet Waste
- Motor Oil
- Trash
- Detergents



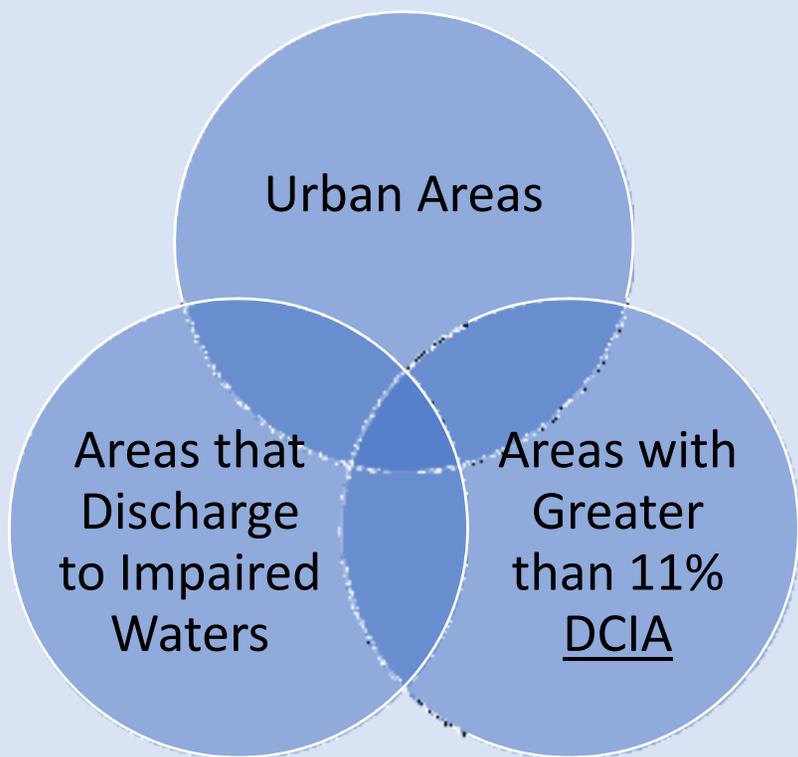
# MS4 Permit Overview in CT

- 121 municipalities are regulated under the Small MS4 General Permit
- 113 municipalities since 2004
- A general permit is issued by CT DEEP under the authority of Section 22a-430b of the CT General Statutes.  
[https://portal.ct.gov/-/media/DEEP/Permits\\_and\\_Licenses/Water\\_Discharge\\_General\\_Permits/MS4gpdf.pdf?la=en](https://portal.ct.gov/-/media/DEEP/Permits_and_Licenses/Water_Discharge_General_Permits/MS4gpdf.pdf?la=en)
- Operators of regulated MS4s are required to reduce the discharge of pollutants to the “maximum extent practicable” (MEP), protect water quality and satisfy the requirements of the Clean Water Act
- Registration and Stormwater Management Plan certifications are required for general permit authorization of MS4 discharges. Annual reports are required using the measurable goals for each minimum control measure as benchmarks for evaluating program effectiveness



CT MS4 Municipalities. University of Connecticut Center for Land Use Education and Research and CT Nonpoint Education for Municipal Officials. Retrieved from <https://nemo.uconn.edu/ms4/basics/towns-institutions.htm>

# MS4 Priority Areas



## Directly Conected Impervious Area (DCIA)



Retrieved from UCONN NEMO "What Type of Impervious Cover do you Have?"  
<https://nemo.uconn.edu/ic-guide/step2-type.htm>

## Non-Directly Connected Impervious Area (nDCIA)



Retrieved from UCONN NEMO "What Type of Impervious Cover do you Have?"  
<https://nemo.uconn.edu/ic-guide/step2-type.htm>

Priority areas include areas in the Unsewered Area and in catchments with more than 11% DCIA or catchments that discharge to an impaired waterbody. If any one of these conditions exists, it's part of the priority area.

# MS4 Assistance Program

## NEMO-Nonpoint Education for Municipal Officials

**Connecticut MS4 Guide**

Home Basics Topics Tools

Also: MS4 News NEMO C&S

This space was developed by NEMO program staff with the help of many local MS4 officials. It is a place for you to find information, training, and other resources to help you with your MS4 program. The content is updated regularly and will be added throughout the 5-year permit period (July 2016 – July 2021) based on the need for various MS4 topics and resources.

Public Education & Outreach

Public Involvement

Illicit Discharge Detection & Elimination

Construction Site Stormwater Runoff Control

Post-construction Stormwater Management

Pollution Prevention & Good Housekeeping

Monitoring

Mapping

Legal Authorities



**Stormwater System Mapping Template**

March 2016 Update

This template is designed to help MS4s create a comprehensive stormwater system map. It includes a list of required information and a checklist to ensure all necessary data is collected and documented.

1. The map should include the following information:
  - Catchment areas
  - Stormwater collection systems
  - Stormwater treatment systems
  - Stormwater discharge points
  - Stormwater storage facilities
  - Stormwater conveyance facilities
  - Stormwater management facilities
  - Stormwater monitoring facilities
  - Stormwater control facilities
  - Stormwater infrastructure
  - Stormwater assets
  - Stormwater liabilities
  - Stormwater risks
  - Stormwater opportunities
  - Stormwater challenges
  - Stormwater solutions
  - Stormwater goals
  - Stormwater objectives
  - Stormwater strategies
  - Stormwater actions
  - Stormwater responsibilities
  - Stormwater roles
  - Stormwater resources
  - Stormwater funding
  - Stormwater partnerships
  - Stormwater collaborations
  - Stormwater networks
  - Stormwater communities
  - Stormwater organizations
  - Stormwater institutions
  - Stormwater agencies
  - Stormwater departments
  - Stormwater divisions
  - Stormwater offices
  - Stormwater centers
  - Stormwater hubs
  - Stormwater nodes
  - Stormwater clusters
  - Stormwater networks
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  - Stormwater hubs
  - Stormwater nodes
  - Stormwater clusters
  - Stormwater networks
  - Stormwater systems
2. The map should be updated regularly to reflect changes in the stormwater system.
3. The map should be accessible to the public.
4. The map should be used to inform decision-making and planning.

**Rain Garden App**

A Mobile App for designing, installing, and maintaining a Rain Garden

UCONN

**Monitoring requirement for bacteria impaired waters**

Posted on February 26, 2020 by Amanda Ryan

First, a very quick summary of the impaired waters monitoring program:

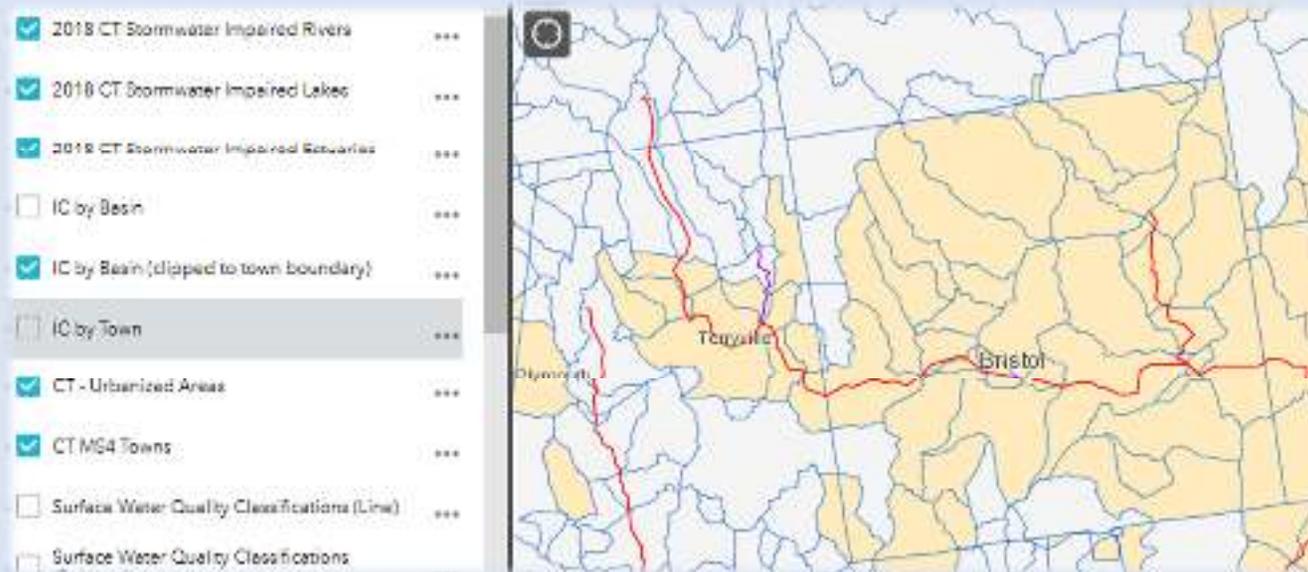
One MS4 monitoring requirement is that MS4s conduct wet weather monitoring of all outfalls that discharge directly to stormwater impaired waterbodies which can be impaired by bacteria, nitrogen, phosphorus, or other pollutant of concern. Impaired waterbodies can be seen on the MS4 map viewer. <https://nemo.uconn.edu/ms4tools/redmap.html>

The clarification: Total coliform only needs to be measured when the outfall discharges to an AA waterbody – which indicates is a potential source of drinking water.

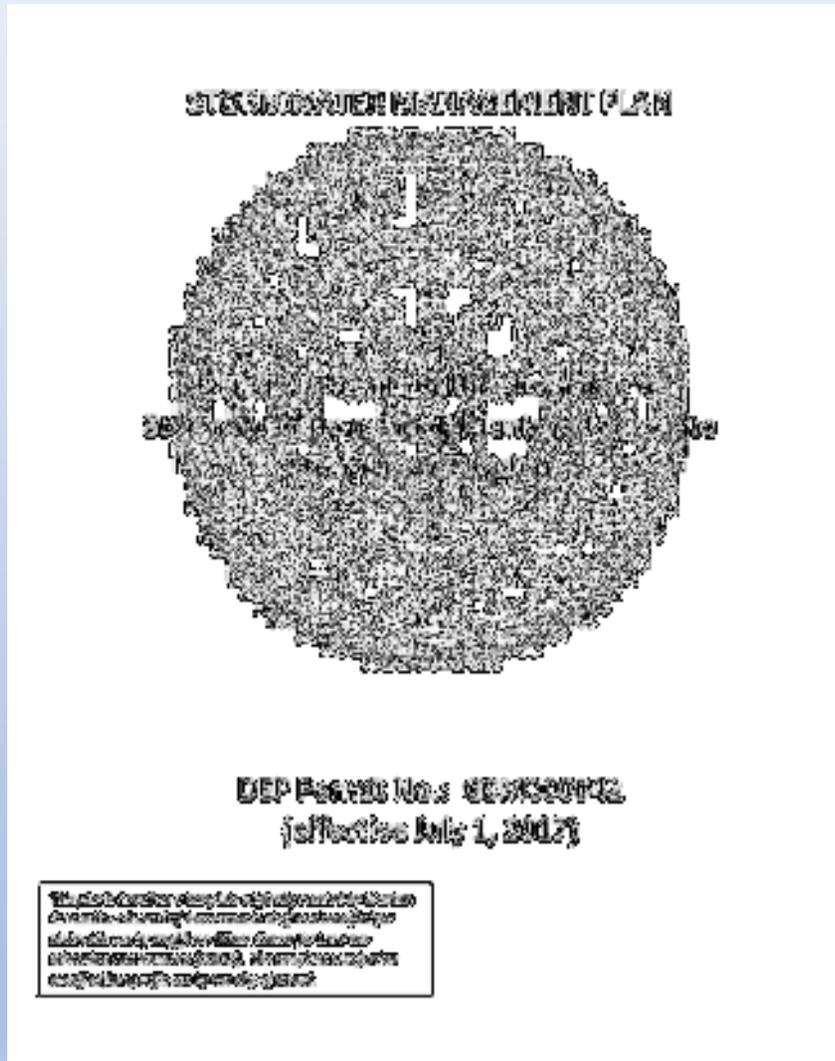
## MS4 Permit Overview

# Bristol on the MS4 Map

Impervious Cover by Town: Bristol	
Town Number	17
Town Name	Bristol
Town Area (sqmi)	17,166.40
Imperv Area (Sq. Mi)	26.80
Total Impervious Cover (sqmi)	3,830.39
Total Impervious Cover (%)	22
Buildings IC (sqmi)	1,119.06
Other IC (sqmi)	1,726.43
All Roads IC (sqmi)	954.03
Street Roads IC (sqmi)	105.97
Non-Street Roads IC (sqmi)	878.11
IC Buildings (%)	7
IC Other (%)	10



# Bristol's Stormwater Management Plan (SMP)



- Bristol's plan on implementing its MS4 Program

- Plan can be found here:  
<http://www.bristolct.gov/226/Informational-Links>

## Six Minimum Control Measures (MCMs)

- MCM 1 -Public Outreach & Education
- MCM 2 - Public Involvement / Participation
- MCM 3 - Illicit Discharge Detection & Elimination
- MCM 4 - Construction Site Stormwater Runoff Control
- MCM 5 - Post Construction Stormwater Management
- MCM 6 - Pollution Prevention / Good Housekeeping

Plus, outfall monitoring

# MCM 1 – Public Outreach & Education

This minimum control measure outlines a program to communicate common sources of stormwater pollution and the impacts of polluted stormwater to the public. This can be accomplished through distributing educational materials to the community and conducting outreach activities. The following BMPs and implementation schedule serve as Bristol's MS4 Public Education Program.

## Goals:

- Raise public awareness that polluted stormwater runoff is the most significant source of water quality problems;
- Motivate residents to use Best Management Practices (BMPs) that reduce polluted stormwater runoff; and
- Reduce polluted stormwater runoff in town as a result of increased awareness and utilization of BMPs.

BMP	Lead department / individual	Months / year of implementation	Measurable goal
BMP 1-1 Implement public education program	Department of Public Works Engineering/BMPW long/Environmental Engineer (BMPW long)	By June 2018 and continue until permit expires	By June 2018 and at least once per year, update the public works community page to include additional links with information on impacts of stormwater discharges on water bodies and impacts of stormwater discharges to reduce pollutants in stormwater runoff.
BMP 1-2 Address violations/ non-point for pollutants of concern	BMPW long/BMPW long	By June 2018 and continue until permit expires	By June 2018, update the public works community page additional links to include information on the management of pet waste, application of fertilizers, herbicides and pesticides, impervious cover and impacts of fuel discharges and improper disposal of waste into the MS4 and discharges associated with stormwater pollutants of concern

FRWA Fall 2019 Events	
September 26	Regalade Tour (Middletown) and Fall Presentation (Middletown, Bristol Public Library)
September 28	FRWA Special Interest Group (SIG) workshop (Part 1) (Lodge parking), Bristol
September 28	FRWA Special Interest Group (SIG) workshop (Part 2) (Lodge parking), Bristol
September 28	FRWA Special Interest Group (SIG) workshop (Part 3) (Lodge parking), Bristol
September 28	FRWA Special Interest Group (SIG) workshop (Part 4) (Lodge parking), Bristol
October 5	FRWA Special Interest Group (SIG) workshop (Part 5) (Lodge parking), Bristol
October 14	FRWA Special Interest Group (SIG) workshop (Part 6) (Lodge parking), Bristol
October 14	FRWA Special Interest Group (SIG) workshop (Part 7) (Lodge parking), Bristol
November 2	FRWA Special Interest Group (SIG) workshop (Part 8) (Lodge parking), Bristol



Permit tasks for MCM 1:

Update and implement public education and outreach program

# MCM 2 – Public Involvement & Participation

This minimum control measure identifies the process for public involvement and participation in the town's stormwater management efforts.

## Goals:

- Involve the community in planning and implementing the town's stormwater management activities.
- Provide a minimum 30 day notice to the public for this plan and annual reports.



MSP	Lead Department / Individual	Month / Year of Implementation	Intensified Goal
Goal 2: Comply with public notice requirements for the proposed Annual Report	DEP/Engineering	July 1, 2019 and continue until permit expires	Publicly available notices on CD's public website website with contact information for public input and information on the draft Annual Report.
Goal 3: Public Information/Participation	DEP/Engineering	June 2019 and continue until permit expires	Grant agency meetings
Pequabuck River Watershed Plan	DEP/Engineering	By June 2019 and continuing for plan implementation	Stakeholder meetings for participation

**Thursday & Friday May 30 & 31 2 PM- 7 PM**  
**Bristol Eastern High School (west side of parking area)**  
 Arrive when you can; this is during any of the days and hours listed. Bring your own grass. If you've got it, but we'll have it, too.  
 More information, Mary Ruppelward pep@bristolct.gov or 860.420.4251

**What is a Rain Garden?**  
 A rain garden is a shallow depression in the landscape that collects and filters runoff from roofs, driveways, and parking areas. It is designed to absorb and filter pollutants before they reach the ground water or nearby water bodies.



## Bristol Green Team

Permit tasks for MCM 2:

Post draft Annual Report

Submit final Annual Report to DEEP

**Pequabuck River Watershed Association**  
 Meet between 8 – 11:15 AM in Washburn Parking lot, Foxonville Center or contact Solene Dutkiewicz at [solutk@yahoo.com] for the Terryville location. You'll see the PRWA sign!

**Saturday April 27**  
**8:00 AM-12:30 PM**

**FREE EVENT**

**Best Management Practices Tour of the Pequabuck River Watershed**

Join us as we tour locations throughout the watershed and discuss with experts the value of land use designed to improve the health of our river and our drinking water. This tour is designed to inform land use choices and other practices that can be implemented to protect and improve water quality. Subject matter experts on our tour include: Laura A. Wilman, P.E., Director, New England Regional Office, Fitchburg-Waterbury and Planning Division; Ray Ruppel, P.E., Director of Public Works, City of Bristol; Scott Hays, Executive Director, Environmental Learning Center of CT; Anne Patrick, Farmington River Watershed Association; and William, Executive Director, Farmington Valley Trout Unlimited.

**Saturday, October 5 10:00 AM-12:30 PM**

# MCM 3 – IDDE (Illicit Discharge Detection & Elimination)

**Goal:**

Find the source of any illicit discharges; eliminate those illicit discharges; and ensure ongoing screening and tracking to prevent and eliminate future illicit discharges.

SNIP	Responsible Agency	Month / year of implementation	Item number goal
EMM 3.1.1 Develop an IDDE program	EMM Engineering	July 2020	Develop written IDDE program
EMM 3.1.2 Identify and map all MS4 outfalls within the permit area	EMM Engineering	June 2020	Complete MS4 outfall mapping (MS4 3.1.4)
EMM 3.1.3 Identify Outfalls that discharge to the MS4	EMM Engineering	July 2020	MS4 outfall mapping and identify all outfalls that discharge to the MS4
EMM 3.1.4 Identify all illegal discharges to the MS4	EMM Engineering	June 2020	MS4 outfall mapping and identify all illegal discharges to the MS4
EMM 3.1.5 Identify all illegal discharges to the MS4	EMM Engineering	July 2020	MS4 outfall mapping and identify all illegal discharges to the MS4
EMM 3.1.6 Identify all illegal discharges to the MS4	EMM Engineering	July 2020	MS4 outfall mapping and identify all illegal discharges to the MS4
EMM 3.1.7 Identify all illegal discharges to the MS4	EMM Engineering	July 2020	MS4 outfall mapping and identify all illegal discharges to the MS4
EMM 3.1.8 Identify all illegal discharges to the MS4	EMM Engineering	July 2020	MS4 outfall mapping and identify all illegal discharges to the MS4
EMM 3.1.9 Identify all illegal discharges to the MS4	EMM Engineering	July 2020	MS4 outfall mapping and identify all illegal discharges to the MS4
EMM 3.1.10 Identify all illegal discharges to the MS4	EMM Engineering	July 2020	MS4 outfall mapping and identify all illegal discharges to the MS4



Re: Notice of Violation – Debris along the edge of the tributary – Avenue

An inspection of the above mentioned property was conducted on June 12, 2020. It was noted that you own both sides of the brook. It appears that it runs within the river.

You are required to take the following actions and repairs:

- Immediately remove all trash/debris along the sides of the river that fall into the river.
- Keep all dumpsters closed and all trash contained within a dumpster.

**Permit tasks for MCM 3:**

Citizen reporting program
Record illicit discharge abatement activities
Maintain inventory of known SSOs (5 year look back)
Develop written IDDE program
Establish IDDE legal authority
Map all MS4 outfalls
Complete dry weather outfall sampling (for high & low priority catchments)
Detailed MS4 mapping

# MCM 4 – Construction Runoff Controls

Your minimum control measure outlines procedures for minimizing polluted construction runoff from construction activities.

## Goals

Minimize polluted stormwater runoff from construction sites and prevent it from entering collection infrastructure (BMS and catchpans).



DEP	Local Department / Ordinance	Effective Date of Implementation	Relevant Code
DEP-41: Construction, requires the construction site to be covered with a clean hay or straw mat to prevent erosion	DEP-41/Ordinance 201-001	April 2009	Regulation 19a requires a site to be covered with a clean hay or straw mat to prevent erosion
DEP-42: Construction, requires the construction site to be covered with a clean hay or straw mat to prevent erosion	DEP-42/Ordinance 201-001	April 2009	Regulation 19a requires a site to be covered with a clean hay or straw mat to prevent erosion
DEP-43: Construction, requires the construction site to be covered with a clean hay or straw mat to prevent erosion	DEP-43/Ordinance 201-001	April 2009	Regulation 19a requires a site to be covered with a clean hay or straw mat to prevent erosion
DEP-44: Construction, requires the construction site to be covered with a clean hay or straw mat to prevent erosion	DEP-44/Ordinance 201-001	April 2009	Regulation 19a requires a site to be covered with a clean hay or straw mat to prevent erosion
DEP-45: Construction, requires the construction site to be covered with a clean hay or straw mat to prevent erosion	DEP-45/Ordinance 201-001	April 2009	Regulation 19a requires a site to be covered with a clean hay or straw mat to prevent erosion
DEP-46: Construction, requires the construction site to be covered with a clean hay or straw mat to prevent erosion	DEP-46/Ordinance 201-001	April 2009	Regulation 19a requires a site to be covered with a clean hay or straw mat to prevent erosion

## Stormwater Permit Information for Developers and Contractors

If your project disturbs more than one acre of land, regardless of planing, you are responsible for the requirements of the Connecticut Department of Energy & Environmental Protection (DEEP) General Permit for the Control of Stormwater and Sediment from Construction Activities ("Construction Stormwater General Permit").

If your project is greater than 6 acres, you are required to submit a registration for the Construction Stormwater General Permit, at least 60 days prior to the planned commencement of the construction activity. A copy of your Stormwater Pollution Control Plan shall be provided to the City upon request.

If your project is between one and five acres, you must adhere to the erosion and sediment control and best management practices of the City of Bristol which can be found in the Code of Ordinances, Zoning Regulations and Inland Wetland and Watercourse Regulations, as well as the Connecticut Guidelines for Soil Erosion and Sediment Control and the Connecticut Stormwater Quality Manual. No registration or plan review and certification is required for such construction activity provided a City of Bristol land use commission (i.e. Planning, Zoning, or Inland Wetland) reviews and issues a written approval of the proposed erosion and sediment control measures, pursuant to the requirements of section 22a-323 of the Connecticut General Statutes.



## Stormwater Management Plan

### Permit tasks for MCM 4:

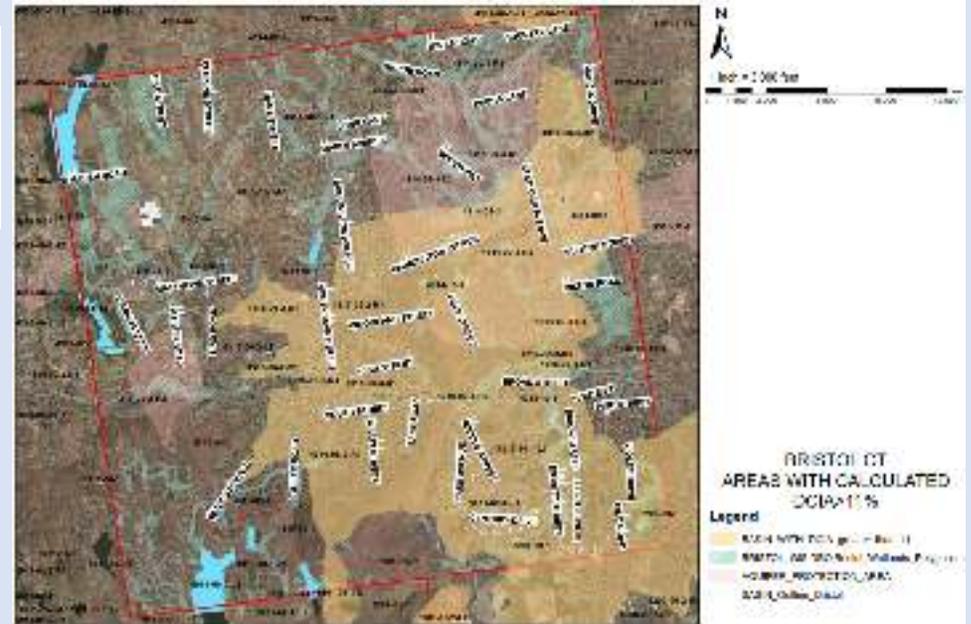
- Interdepartmental Coordination plan
- Site plan review for stormwater practices
- Site inspections for stormwater practices
- Receive public input to development projects
- Notify developers of DEEP construction general permit

# MCM 5 – Post-Construction Stormwater

The water use control measure outlines Bristol's program to address stormwater runoff from new or re-developed areas.

**Goal:**  
 mitigate the long-term impacts of stormwater development projects on water quality through proper use of low impact development and stormwater management practices.

MCM	Level of program / technical	Required year of implementation	Measurable goal
MCM 5.1: Develop a water use control program regarding LID and construction in the development industry.	OPW Eng and Land Use/Plan Dept and City Council	April 2014	Update the water use control program after planning and development department.
MCM 5.2: Inform all LID and LID related projects for LID and LID related projects.	OPW Eng and Land Use/Plan Dept and City Council	April 2014	Update the water use control program after planning and development department.
MCM 5.3: Implement LID and LID related projects for LID and LID related projects.	OPW Eng/Land Use/Plan Dept and City Council	April 2014	Establish the water use control program after planning and development department.
MCM 5.4: Implement LID and LID related projects for LID and LID related projects.	OPW Eng/Land Use/Plan Dept and City Council	April 2014 and June 2014	Establish the water use control program after planning and development department.
MCM 5.5: Implement LID and LID related projects for LID and LID related projects.	OPW Eng/Land Use/Plan Dept and City Council	April 2014	Establish the water use control program after planning and development department.



1. Update the water use control program after planning and development department.

2. Update the water use control program after planning and development department.

3. Update the water use control program after planning and development department.



Stormwater Management Plan

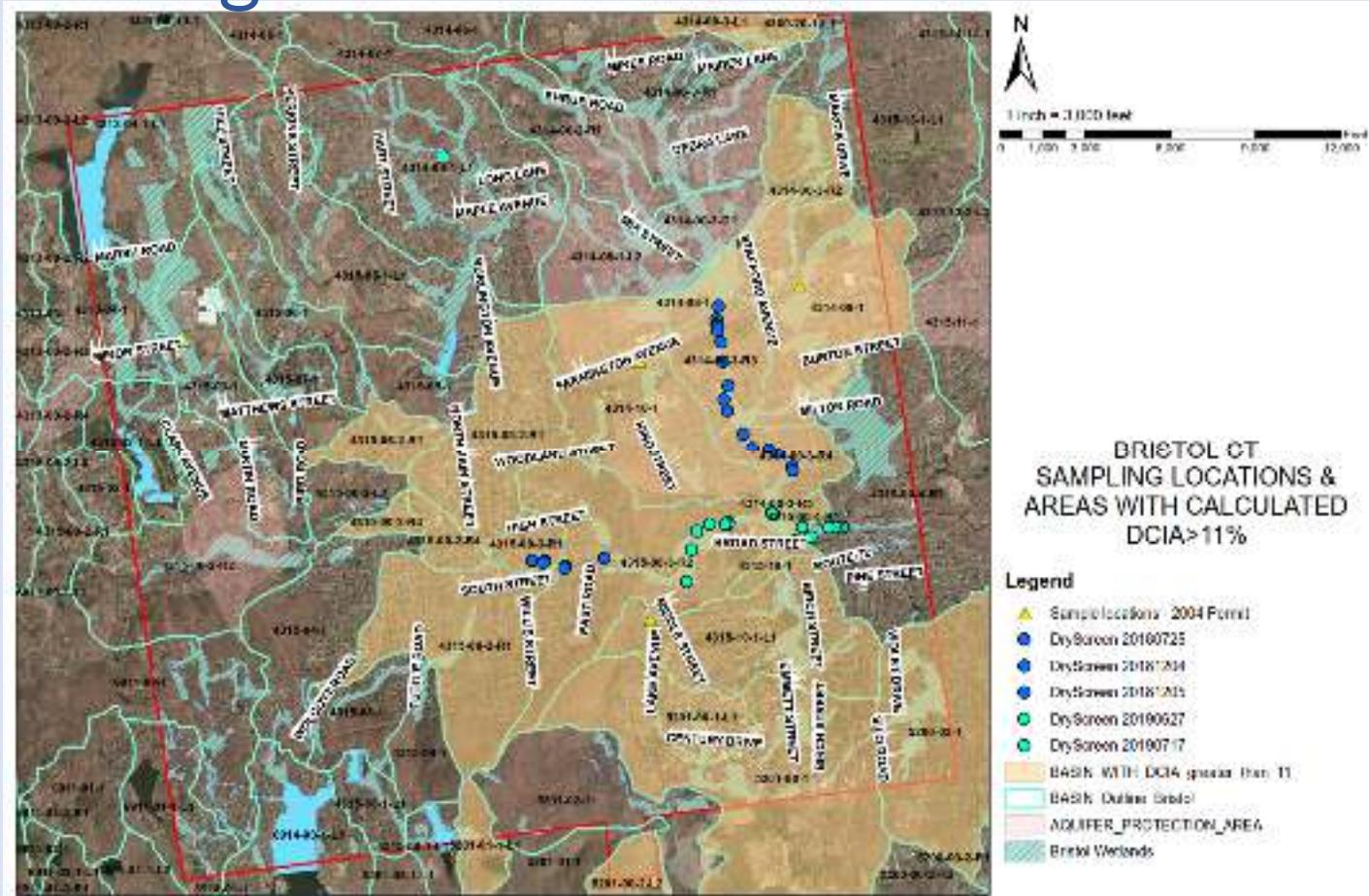


## Permit tasks for MCM 5:

- Maintenance plan for SW ponds & treatment structures
- Determine baseline DCIA
- Review regulations for LID barriers
- Legal authority for SW retention standards



# Outfall Monitoring



Two parts of permit:

1. All outfalls to impaired waters (wet weather) for listed pollutants of concern (nitrogen, phosphorus, bacteria, other (turbidity))
2. IDDE – categorize and rank outfalls, dry weather sampling for high or low priority outfalls, catchment investigations for problem outfalls and screened outfalls exhibiting illicit discharge/SSOs, with follow-up to isolate source of illicit discharge

Permit tasks for Monitoring:

- Monitor 6 'worst' outfalls to impaired waters annually
- Screen all outfalls to impaired waters

# SMP – Bristol Watershed Characteristics

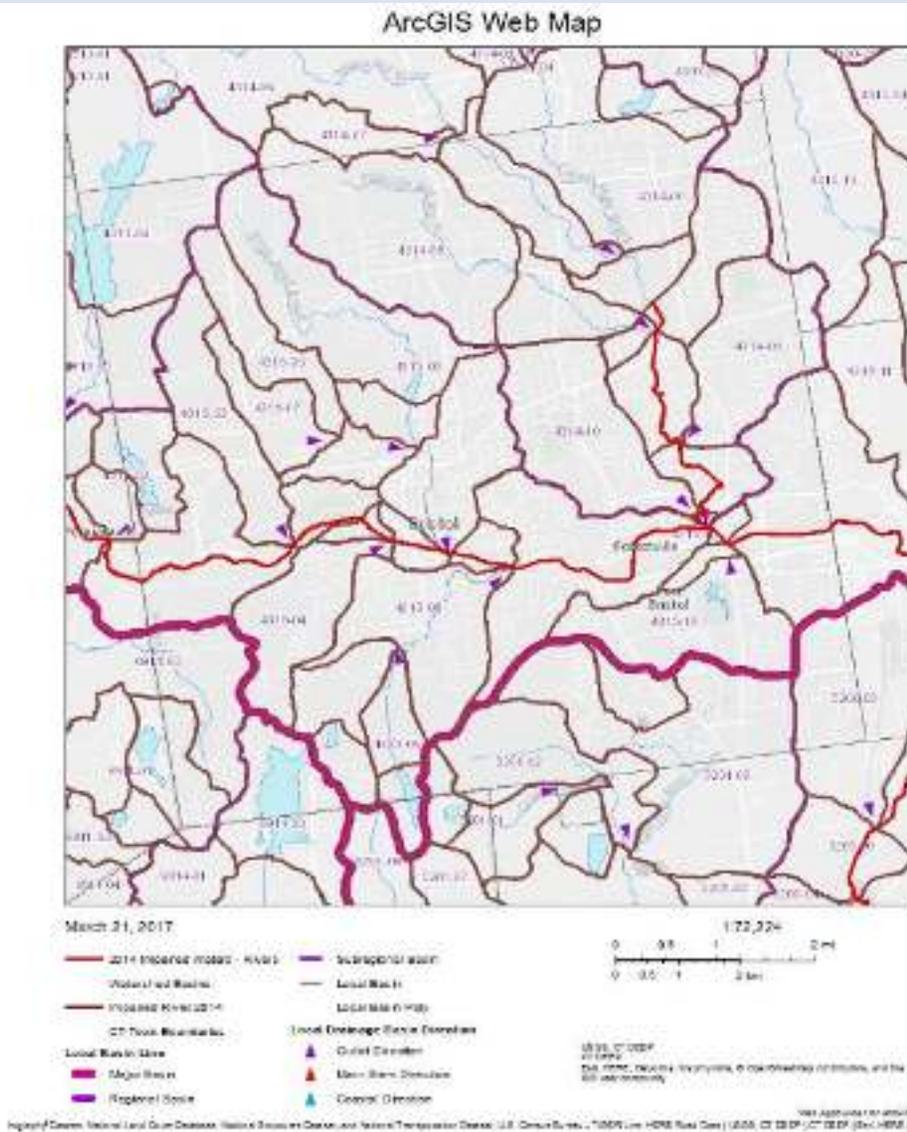


Figure 1 City of Bristol Local Watershed Map

Drainage Basin Number	% Impaired Land Area in Basin	Name	Surface Water Quality	Impaired per Water Quality Standards
4615	42.0	Pigeonback Brook	B	Yes
4714	29.8	Copperline Brook	A	Yes
1207	0.7	Night Mole River	B	-
4614	4.0	Poland Brook	A	-
4613	3.0	Hartford Brook	A	-
4614	3.8	Med Brook	A	-
1200	1.7	Quinton River	B	Yes

Water Basin ID	Water Quality Classification	Year	Impaired Area	Water Use	Causes/Contributors
<b>Poland Brook - Surface Water Quality Classification = B</b>					
4614-01-01	Classified as impaired due to sediment, nutrients, and herbicides.	2001	1.00	Residential, Commercial, Industrial	Industrial, Agricultural, Residential, Commercial, and other sources.
4614-01-02	Classified as impaired due to sediment, nutrients, and herbicides.	2001	1.00	Residential, Commercial, Industrial	Industrial, Agricultural, Residential, Commercial, and other sources.
4614-01-03	Classified as impaired due to sediment, nutrients, and herbicides.	2001	1.00	Residential, Commercial, Industrial	Industrial, Agricultural, Residential, Commercial, and other sources.
<b>Copperline Brook - Surface Water Quality Classification = A</b>					
4613-01-01	Classified as impaired due to sediment, nutrients, and herbicides.	2001	1.00	Residential, Commercial, Industrial	Industrial, Agricultural, Residential, Commercial, and other sources.

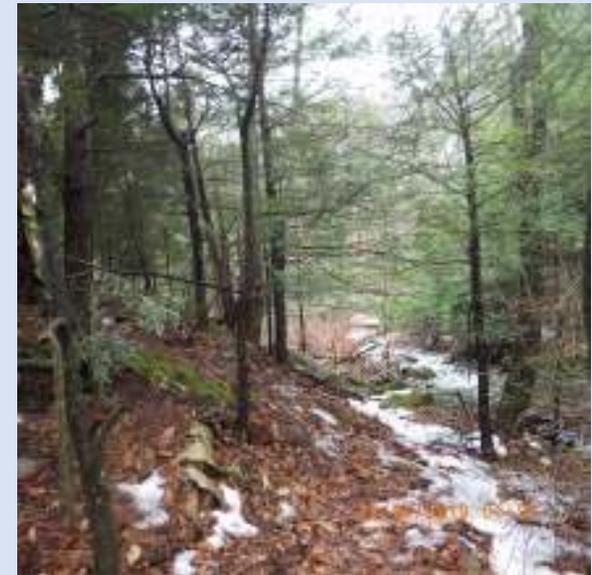
Quinton River (Basin ID 1200) is not included in Table 1, as it is not a MS4.

## MS4s

The City of Bristol has 10 MS4s that are responsible for collecting and conveying stormwater. These MS4s are: Pigeonback Brook, Copperline Brook, Night Mole River, Poland Brook, Hartford Brook, Med Brook, and Quinton River. The City of Bristol is responsible for maintaining these MS4s and ensuring that they meet the requirements of the Clean Water Act.

## MS4s

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QUESTIONS?