# Quinsigamond Community College
# 2016 MA Small MS4 Permit Overview


**Presenters:**

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@nitscheng


Date: April 6, 2022

Building better communities with you

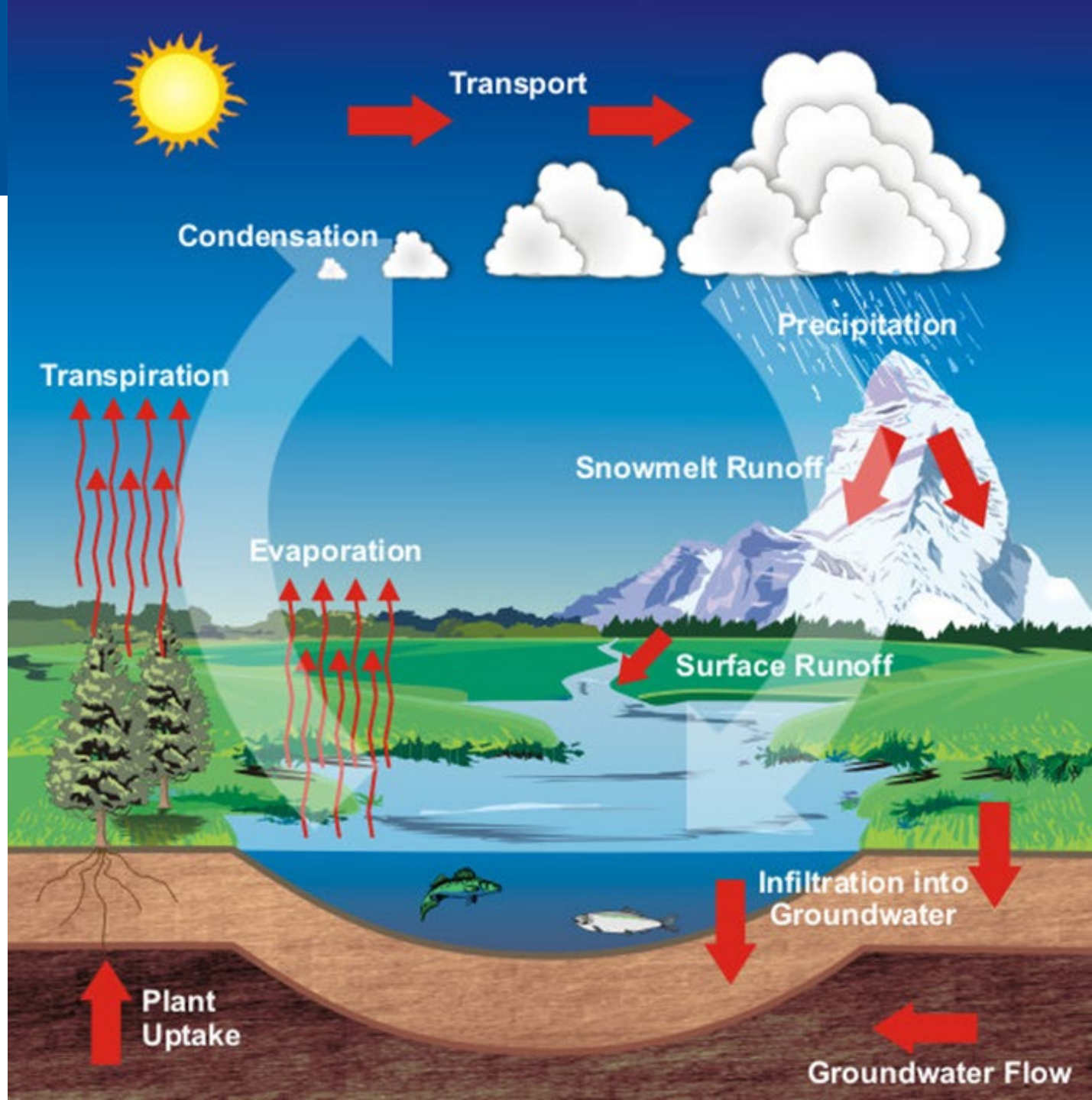
# Today's Presentation

- What is Stormwater?
- 2016 Small MS4 Permit Program Overview
- QCC Stormwater Management Program

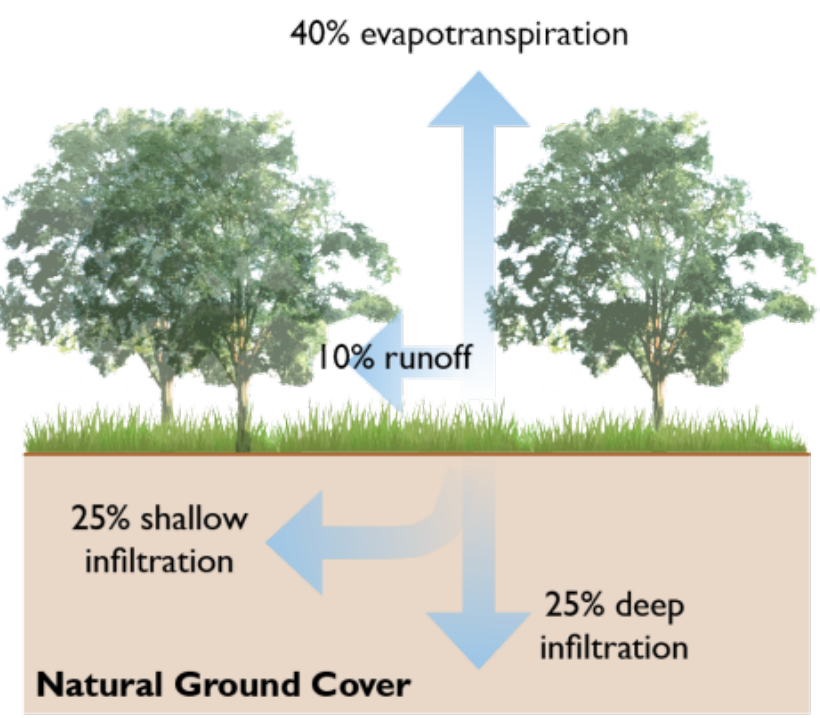

# What is Stormwater?

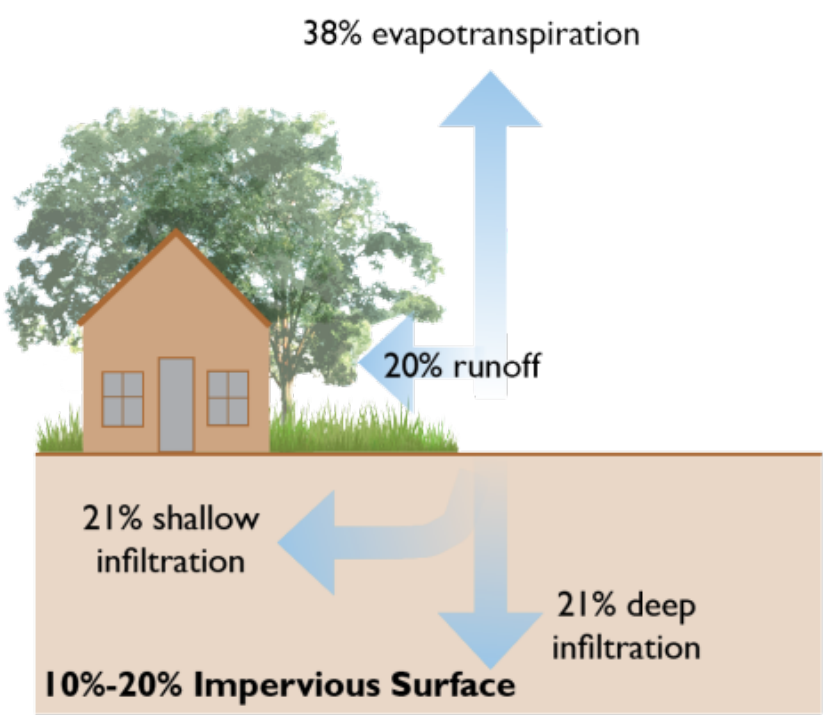
# The Water Cycle

**Stormwater = Surface Runoff**



# Water Balance and Development



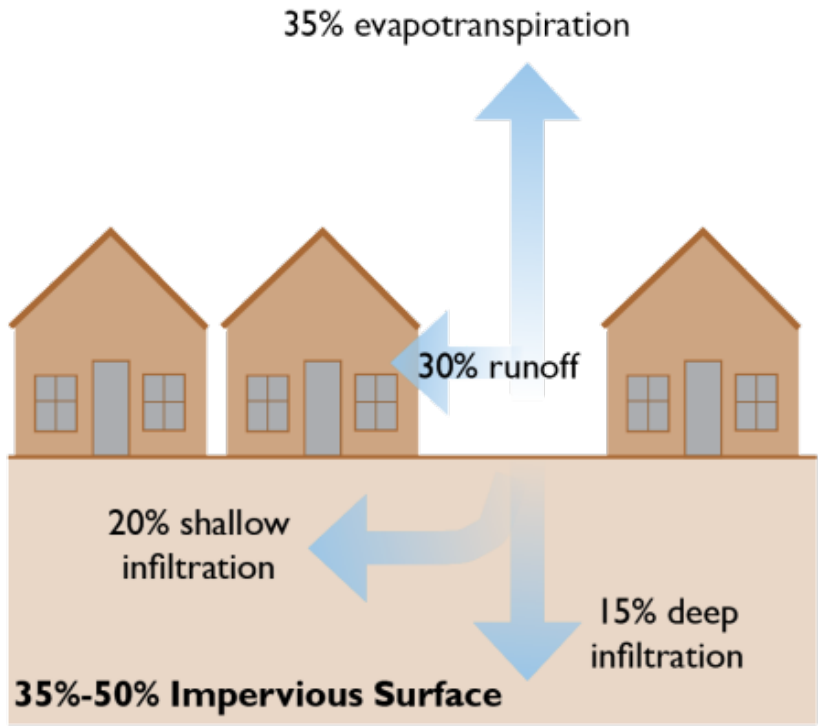
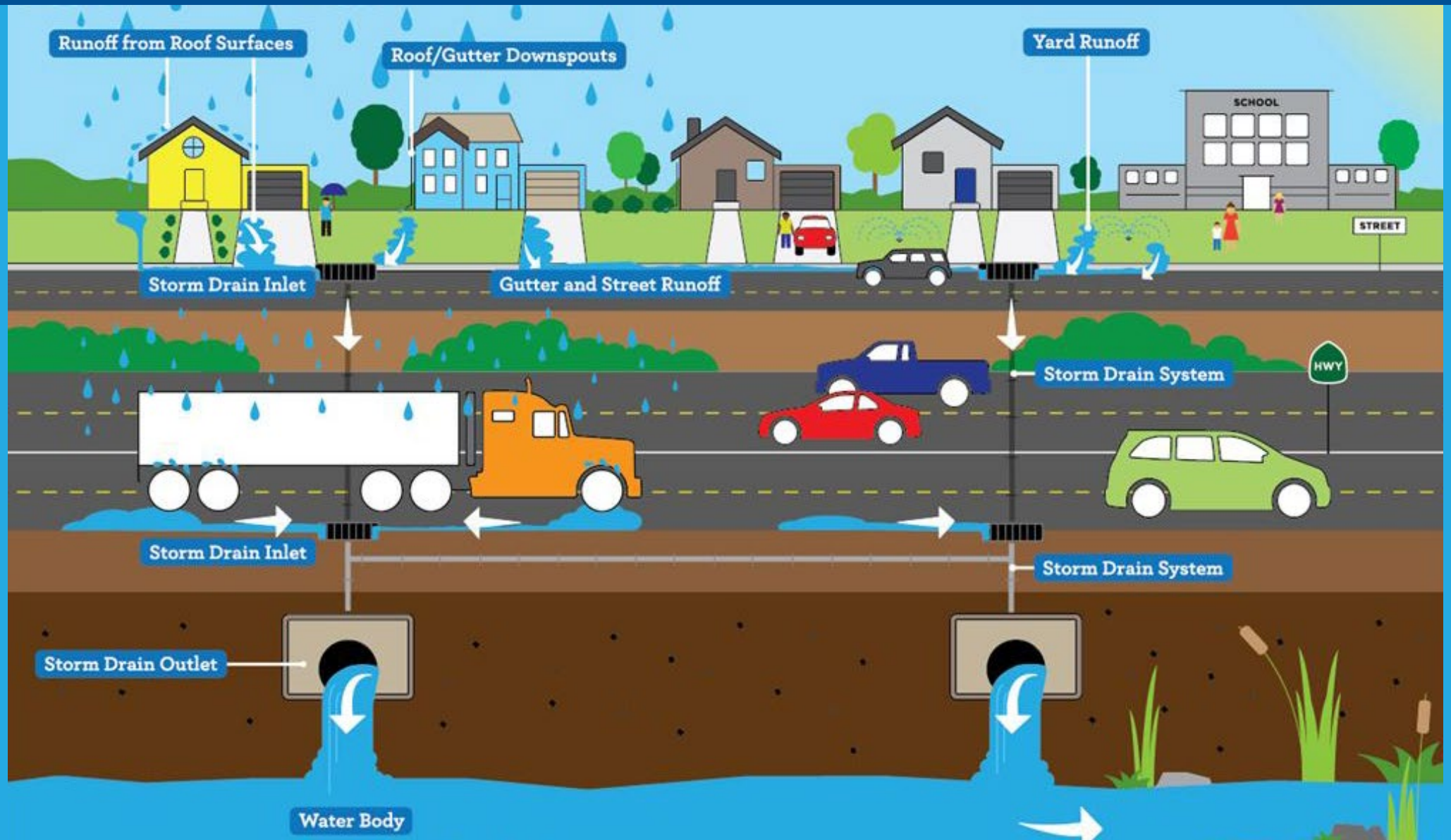




Diagram inspired by a graphic produced by the Federal Interagency Stream Restoration Working Group (FISRWG)

# Stormwater Runoff

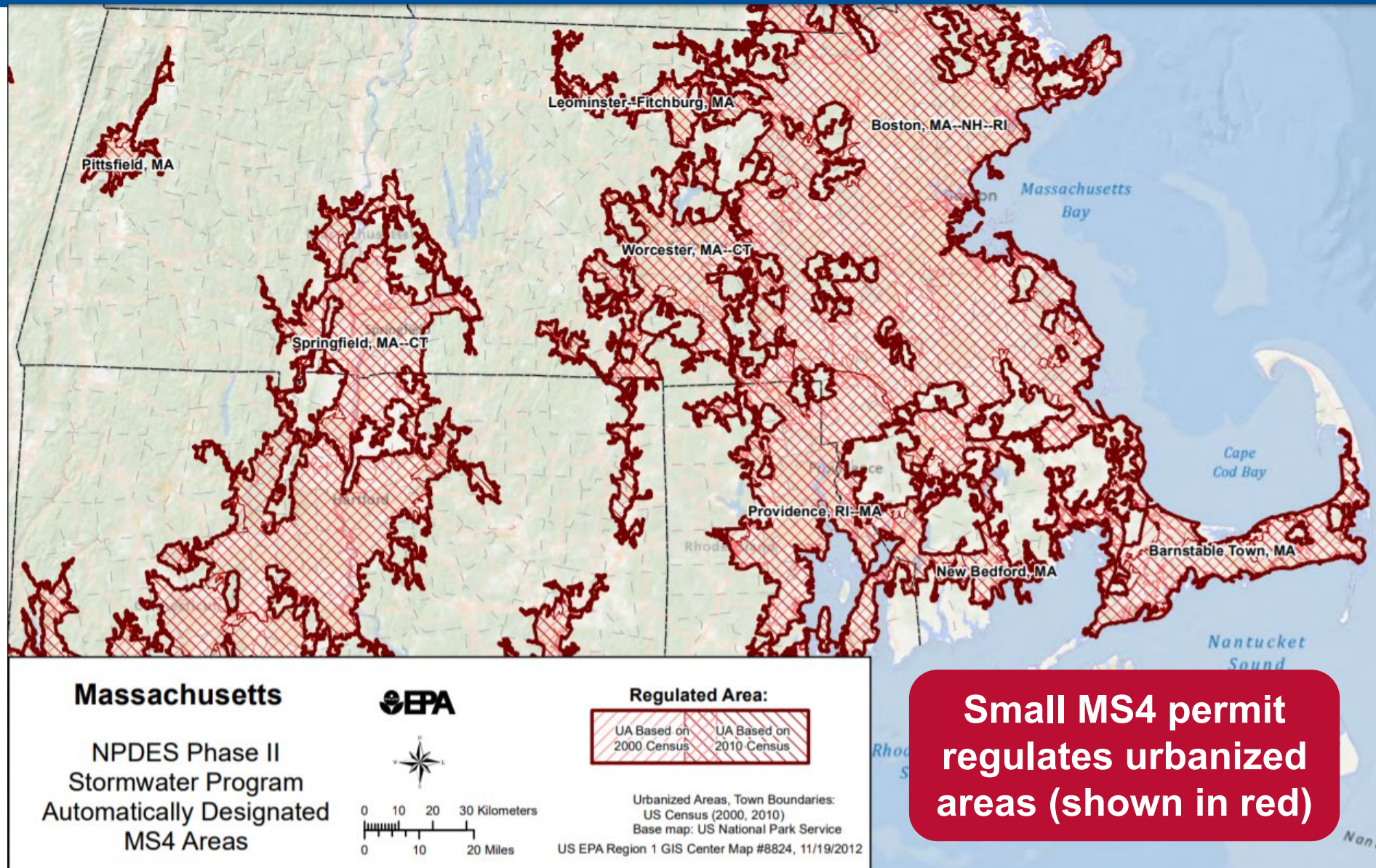


# 2016 MA Small MS4 Permit Program Overview


# What is an MS4?

**MS4 = Municipal Separate Storm Sewer System**

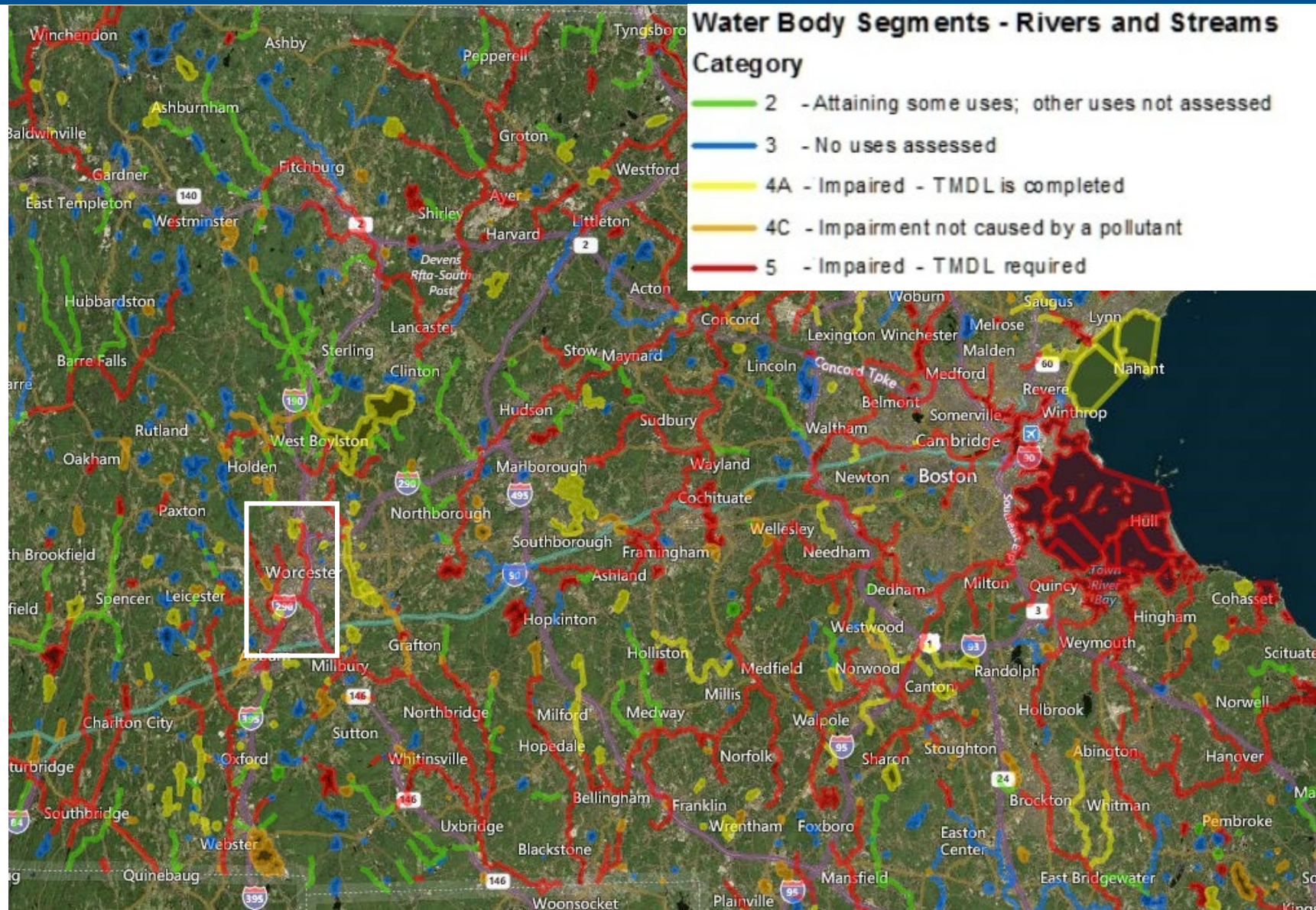
**An MS4 is a system of stormwater conveyances that discharges to waters of the United States.**




**Small MS4 permit regulates urbanized areas (shown in red)**

# Why is an MS4 permit needed?

**Even with the progress over the last 30 years, stormwater discharges are causing or contributing to at least 55% of the impairments in MA.**



# QCC isn't a municipality…

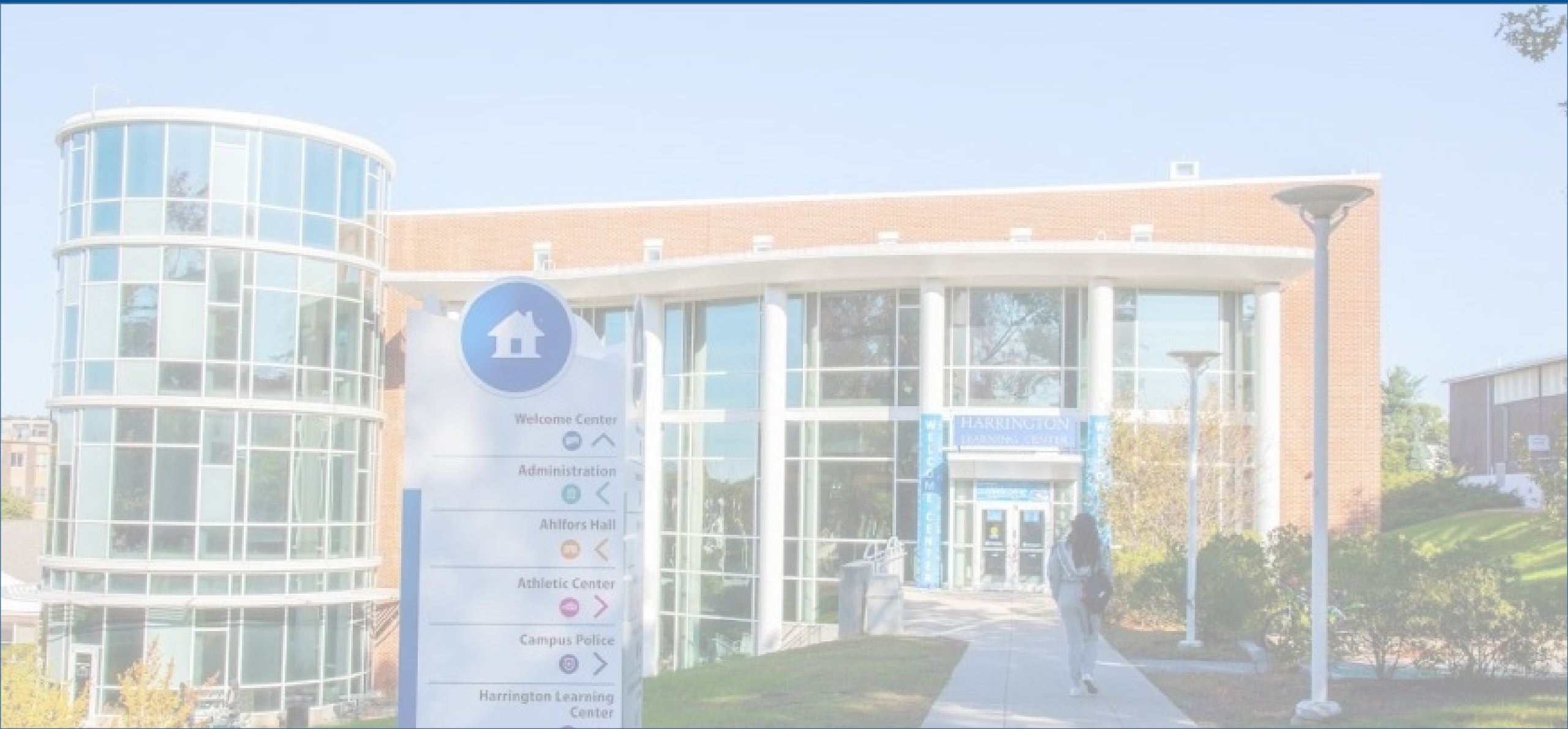
***Why does it need a permit?***

**Non-Traditional MS4**:

Any state facility in an urban area with a separate stormwater system

- Public Colleges
- State Hospitals
- Prisons
- State Parks
- Airports
- Highway Facilities
- **QUINSIGAMOND COMMUNITY COLLEGE**

# QCC Stormwater Management Program



# QCC Stormwater Management Committee

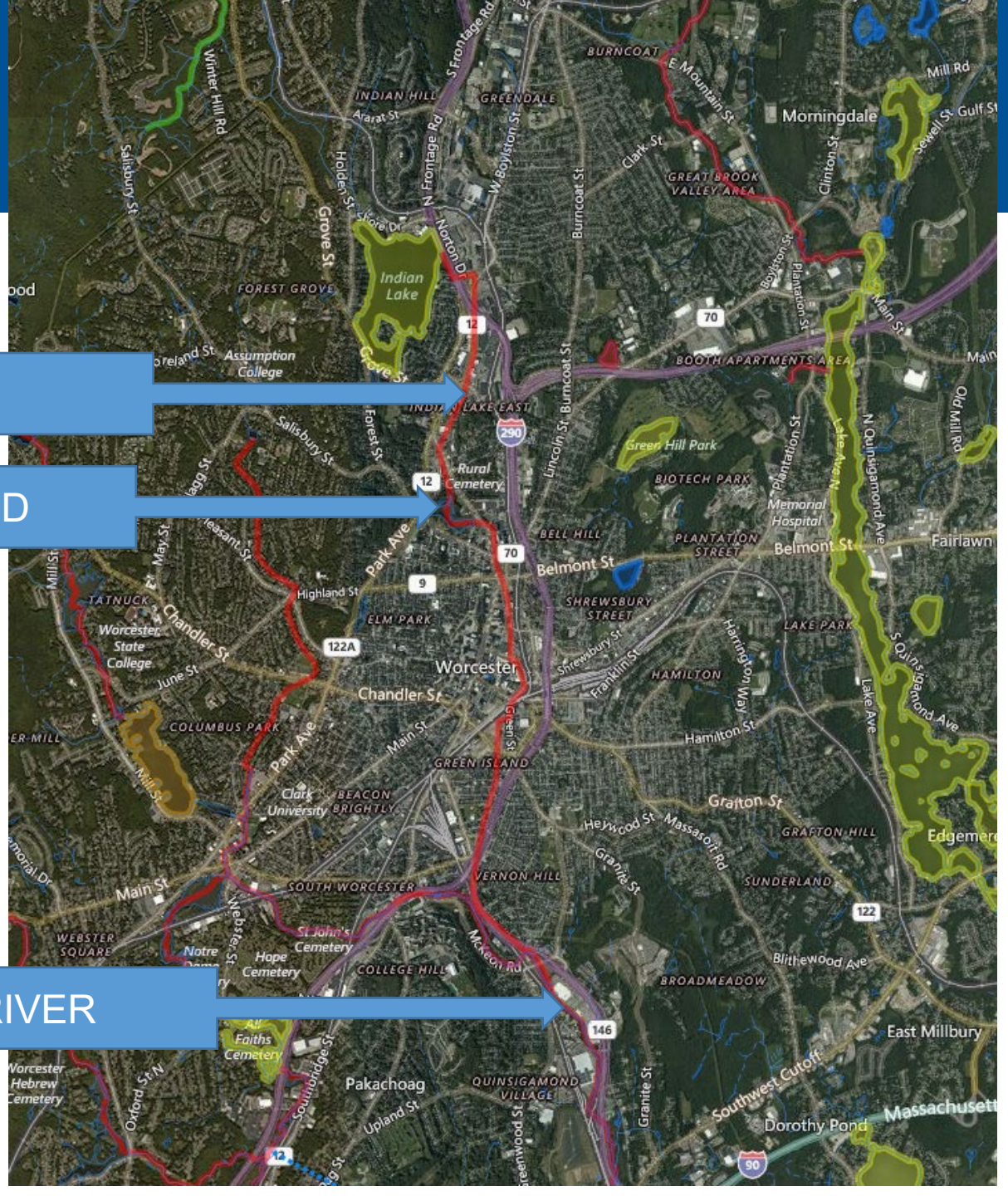
- **Stephen Marini,** COO/CFO & VP of Administrative Services
  smarini@qcc.mass.edu
- **Deb LaFlash,** Assistant Vice President of Finance/Comptroller
  DLaFlash@qcc.mass.edu
- **Jim Racki,** Executive Director of Facilities Operations
  jracki@qcc.mass.edu
- **Steve Zisk,** Director of Engineering, Energy, Environment, & Extension Campus Facilities
  szisk@qcc.mass.edu
- **Brian O'Neil,** Facilities Manager
  boneil@qcc.mass.edu

# Regional Watershed Context

# Impaired Waters

Downstream impairments include:

- Harmful algae blooms,
- Nutrients,
- Ammonia, and
- Fecal coliform



# Six Minimum Control Measures

The MS4 Permit requires Permittees to meet specific requirements under the six minimum control measures:

1. Public Education and Outreach
2. Public Participation
3. Illicit Discharge Detection and Elimination
4. Management of Construction Site Runoff
5. Management of Post-Construction Site Runoff
6. Good Housekeeping in Municipal Operations

# QCC Stormwater Management Program: Year 3 Highlights

Focused on writing & adopting new stormwater policies, SOPs and system mapping

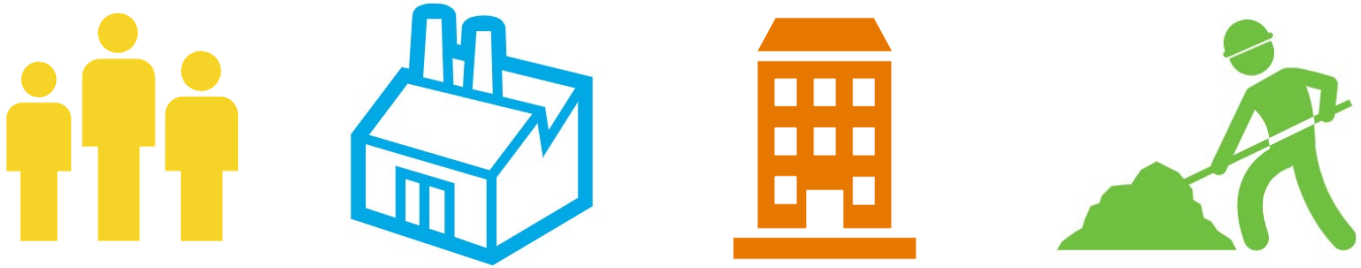
Submitted Year 3 Annual Report

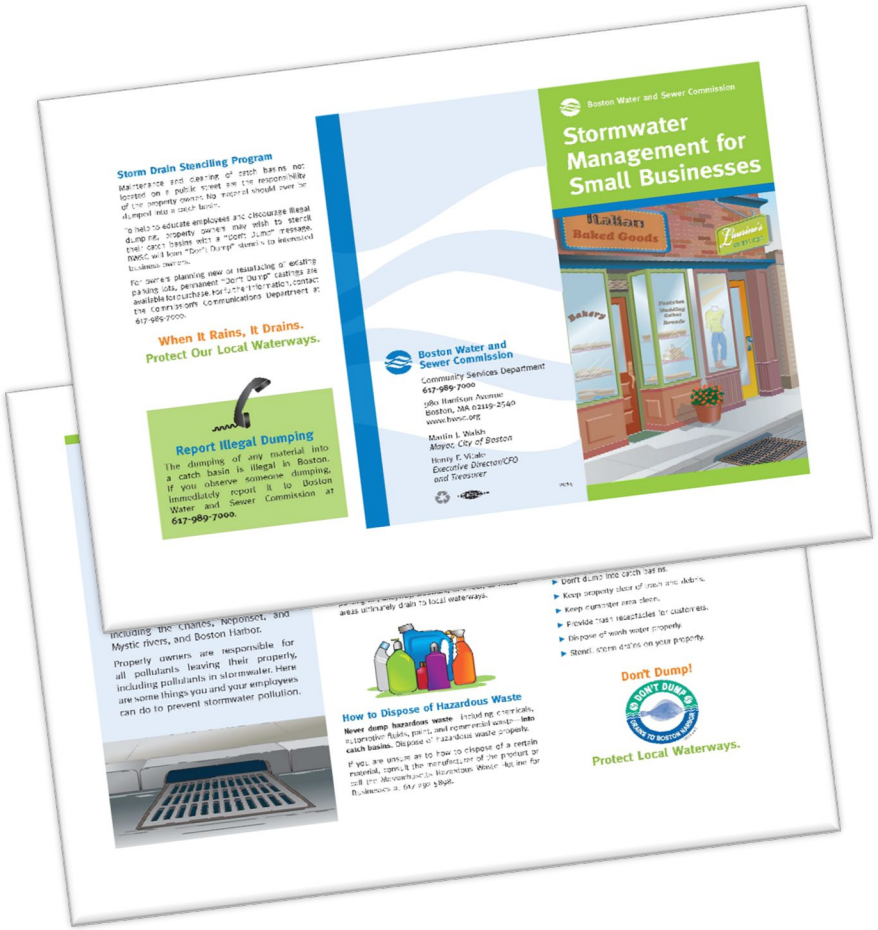
- QCC Stormwater website went live! (https://www.qcc.edu/stormwater) Flier sent to QCC family. — MCM 1
- Public meeting held virtually in Spring 2021 — MCM 2
- Continued Phase 1 system mapping & IDDE (Illicit Discharge Detection and Elimination) Policy adopted — MCM 3
- Construction Site Inspection & Erosion and Sediment Control (ESC) Policies adopted — MCM 4
- Developed post-construction Stormwater Policy — MCM 5
- Developed a series of written “good housekeeping” Standard Operating Procedures (SOPs) for catch basin cleaning, street sweeping, and snow/ice removal — MCM 6

# Public Education and Outreach

## Provide educational material about stormwater to four audiences:

*Visitors* *Faculty/Staff* *Students* *Contractors*






Provide the targeted audience information about stormwater and how their actions may impact it

***2 messages for each audience during the five-year permit term***

https://www.mass.gov/guides/stormwater-outreach-materials-to-help-towns-comply-with-the-ms4-permit

# Public Education and Outreach

Flier distributed April 2021

# Public Education and Outreach

Stormwater management is included as a topic in QCC class curricula and/or worked into a class field or research-related assignment. These classes include:

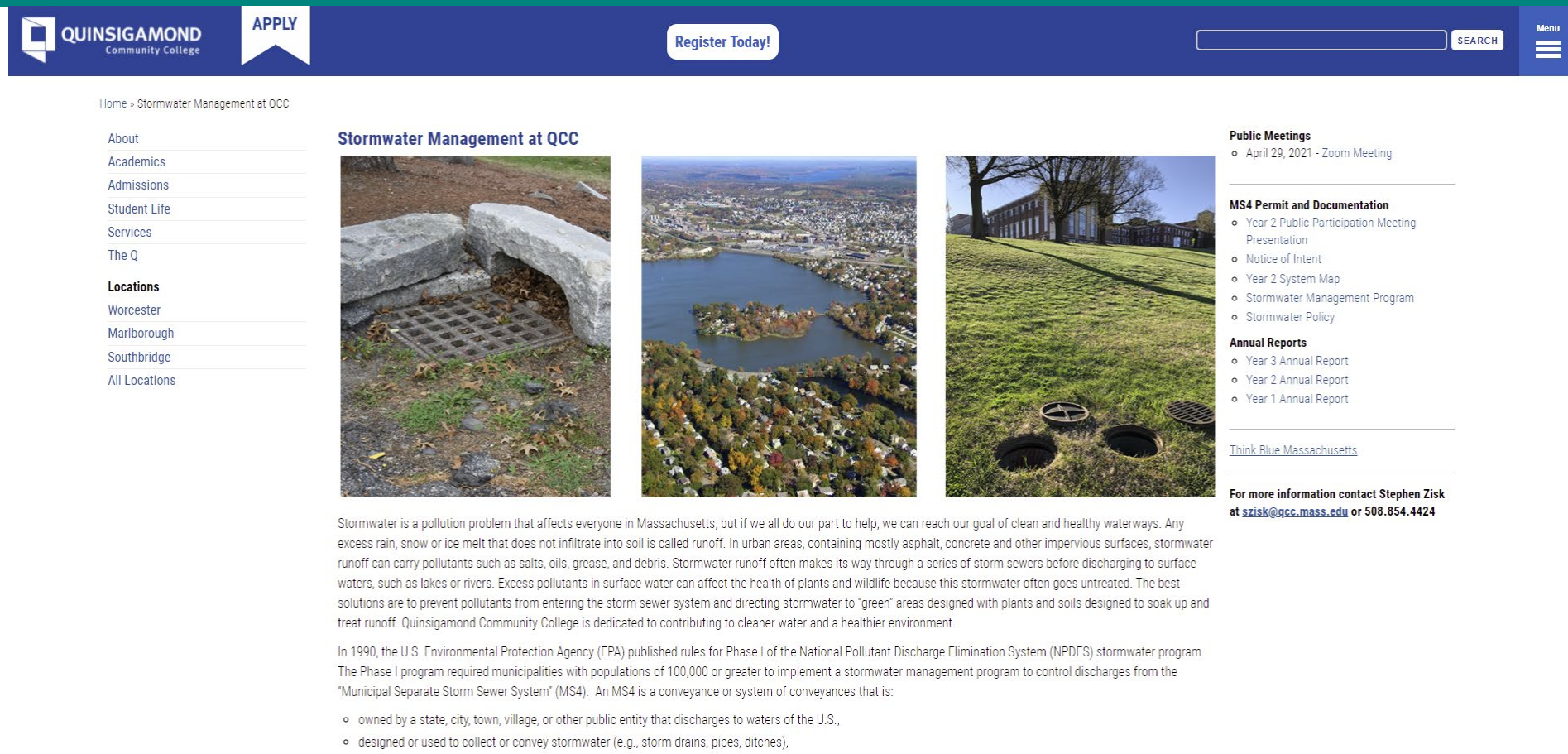
- SCI 104 – Climate and Weather: Causes and Effects (Fall/Spring/Summer)
- SCI 110 – Sustaining Earth's Environment (Fall/Spring)

*Photo credit: Indian Lake Watershed Association, Inc.*

# Public Education and Outreach

QCC Stormwater Management website updates:

- Annual Reports & links to public meetings
- Systems maps & policies




Visit: https://www.qcc.edu/stormwater

# 2 Public Participation

Permittees are required to at least annually **provide an opportunity for the public to participate in the development/ implementation of their Stormwater Management Program (SWMP).**

Notices must comply with state public notice requirements.

# 3 Illicit Discharge Detection and Elimination

**Illicit Discharge** = Any discharge to an MS4 that is not comprised entirely of stormwater is an illicit discharge (ID).

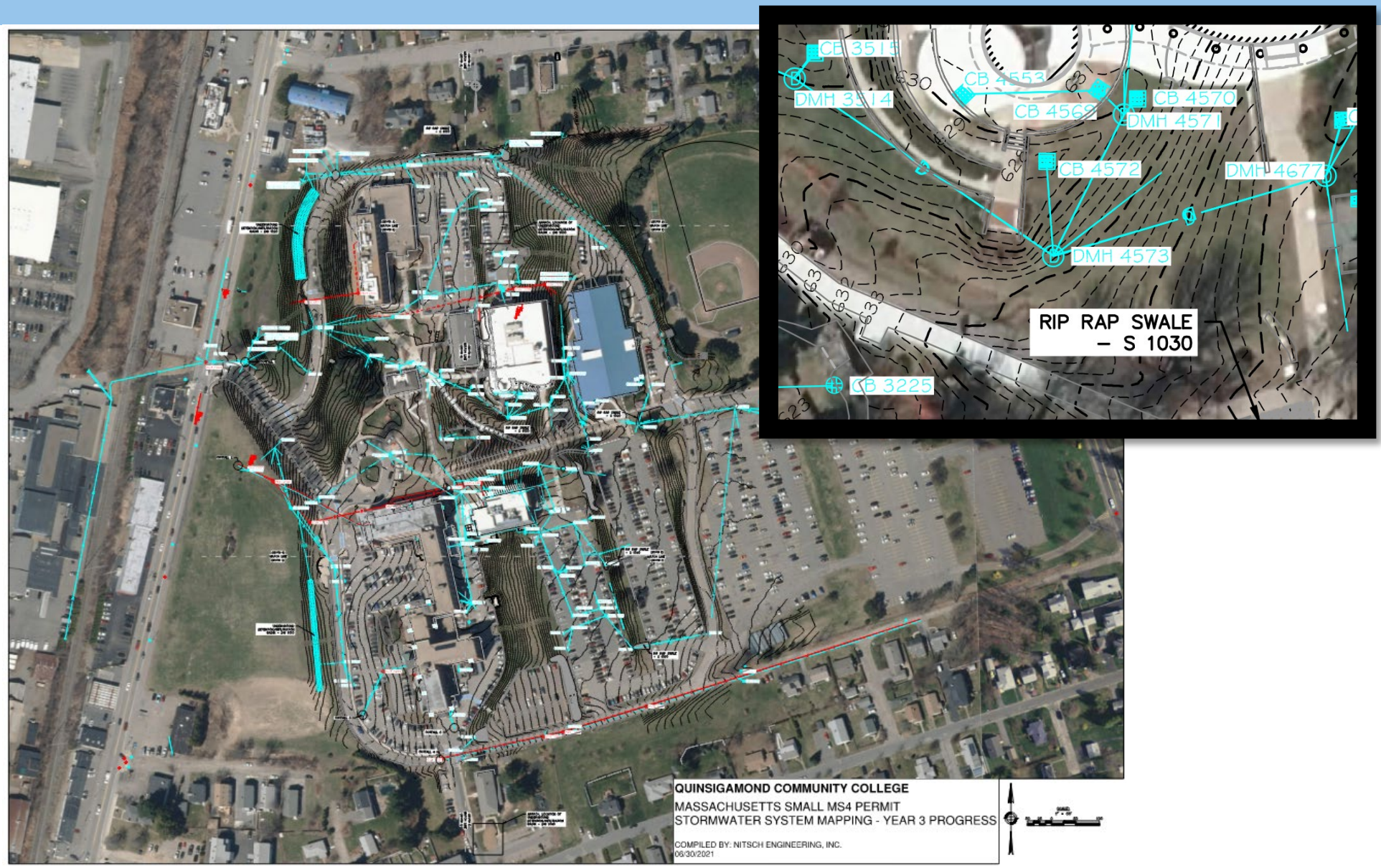
IDs can be caused by a variety of sources:

- Leaking sanitary sewers or water mains;
- Illegal sewage connections;
- Illegal floor drain connections;
- Seasonal draining of swimming pools; breakout from failing septic systems; and
- Spills and dumping.

# 3 Illicit Discharge Detection and Elimination

Permittees are required to proactively and systematically **find and eliminate sources of non-stormwater from their storm sewer system.**

Part of this requirement includes development of **system wide storm sewer system map.**



# 3 IDDE: QCC Mapping

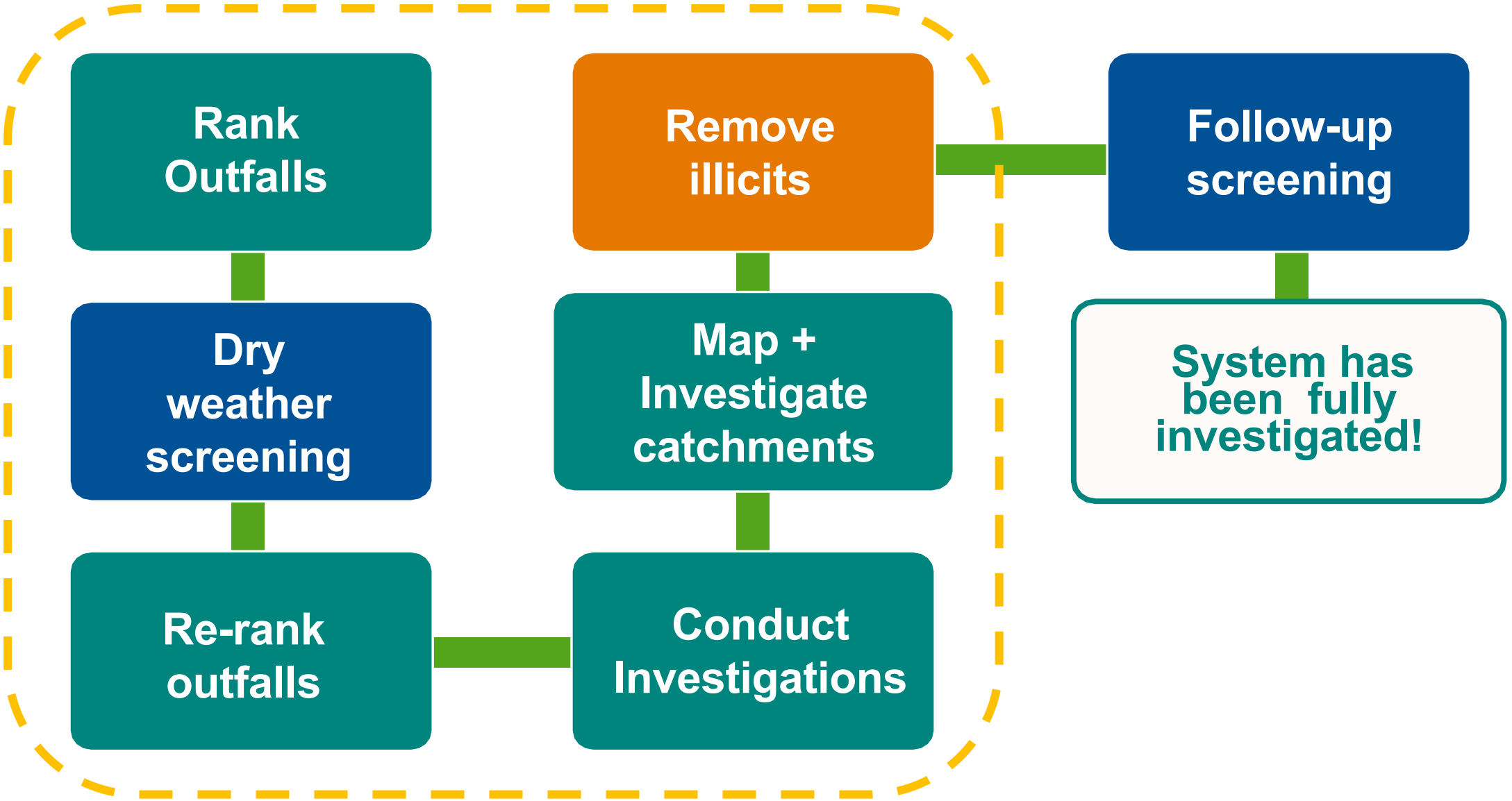
The mapping was updated to include stormwater best management practices (BMPs), including:

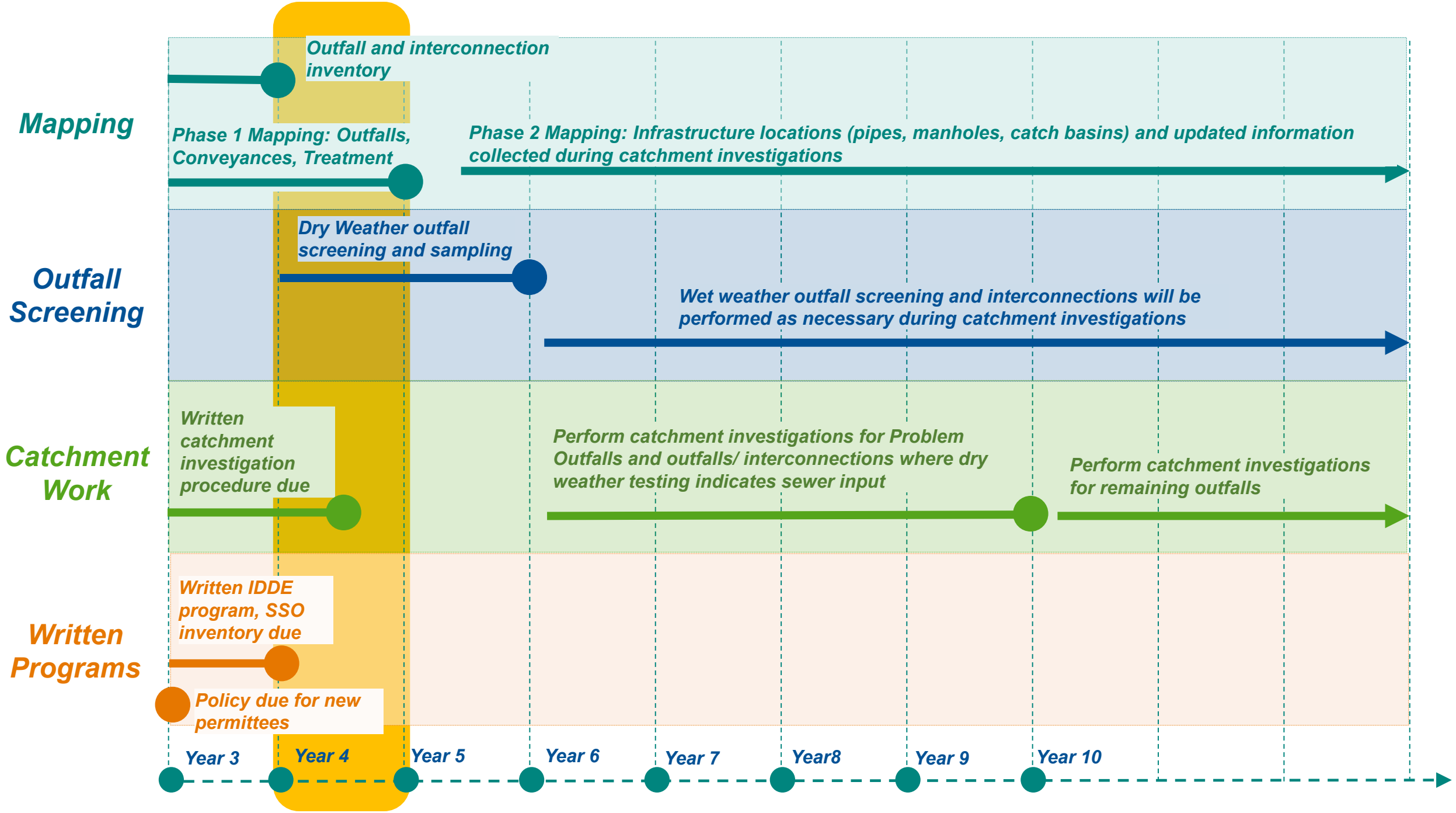
- Swales
- Stormwater Ponds
- Constructed Wetlands
- Bioretention Areas
- Stormwater Treatment Structures

# 3 Illicit Discharge Detection and Elimination

| | |
|---|---|
| Legal Authority (2.3.4.a and 2.3.4.6.a) | An ordinance, bylaw or other regulatory mechanism which provides the MS4 operator the legal authority to: prohibit IDs, investigate suspected IDs, eliminate IDs, and enforce the IDDE program (already required under the 2003 Small MS4 Permit). |
| Protocol & Responsibilities (2.3.4.6.c) | Identifies who is responsible for eliminating known IDs or other problems.<br><br>Establishes protocols to: eliminate illicit connections or other problems, document and verify the removal of IDs and track progress towards overall program goals. |
| Assessment and Priority Ranking of Outfalls (2.3.4.7) | Assesses the ID and SSO potential of all outfalls and priority rank them as problem, high priority, low priority, or excluded based on a number of criteria. |
| Catchment Investigations (2.3.4.8) | Requires a written systematic procedure to investigate each catchment with an outfall within 18 months of the permit effective date. Also must identify maps, historic plans, and records; include a manhole inspection methodology; and establish procedures to isolate, confirm, and remove sources of IDs. |
| Indicators of IDDE Program Progress (2.3.4.9) | Describes the indicators to be used to track progress of the program and gauge its success. |
| Ongoing Screening (2.3.4.10) | Consists of dry weather screening and sampling and wet weather screening and sampling once every five years upon completion of all catchment investigations. |
| Employee Training (2.3.4.11) | Creates a program of training on how to recognize IDs and SSOs. Training frequency and type must be documented in the annual report. |

# 3 Illicit Discharge Detection and Elimination




Mapping
Outfall and interconnection inventory
Phase 1 Mapping: Outfalls, Conveyances, Treatment
Phase 2 Mapping: Infrastructure locations (pipes, manholes, catch basins) and updated information collected during catchment investigations
Outfall Screening
Dry Weather outfall screening and sampling
Wet weather outfall screening and interconnections will be performed as necessary during catchment investigations
Catchment Work
Written catchment investigation procedure due
Perform catchment investigations for Problem Outfalls and outfalls/ interconnections where dry weather testing indicates sewer input
Perform catchment investigations for remaining outfalls
Written Programs
Written IDDE program, SSO inventory due
Policy due for new permittees
Year 3
Year 4
Year 5
Year 6
Year 7
Year8
Year 9
Year 10

# 4 Management of Construction Site Runoff

Permittees are required to have an **ordinance from management of stormwater discharges from construction sites** that disturb one or more acres of land.

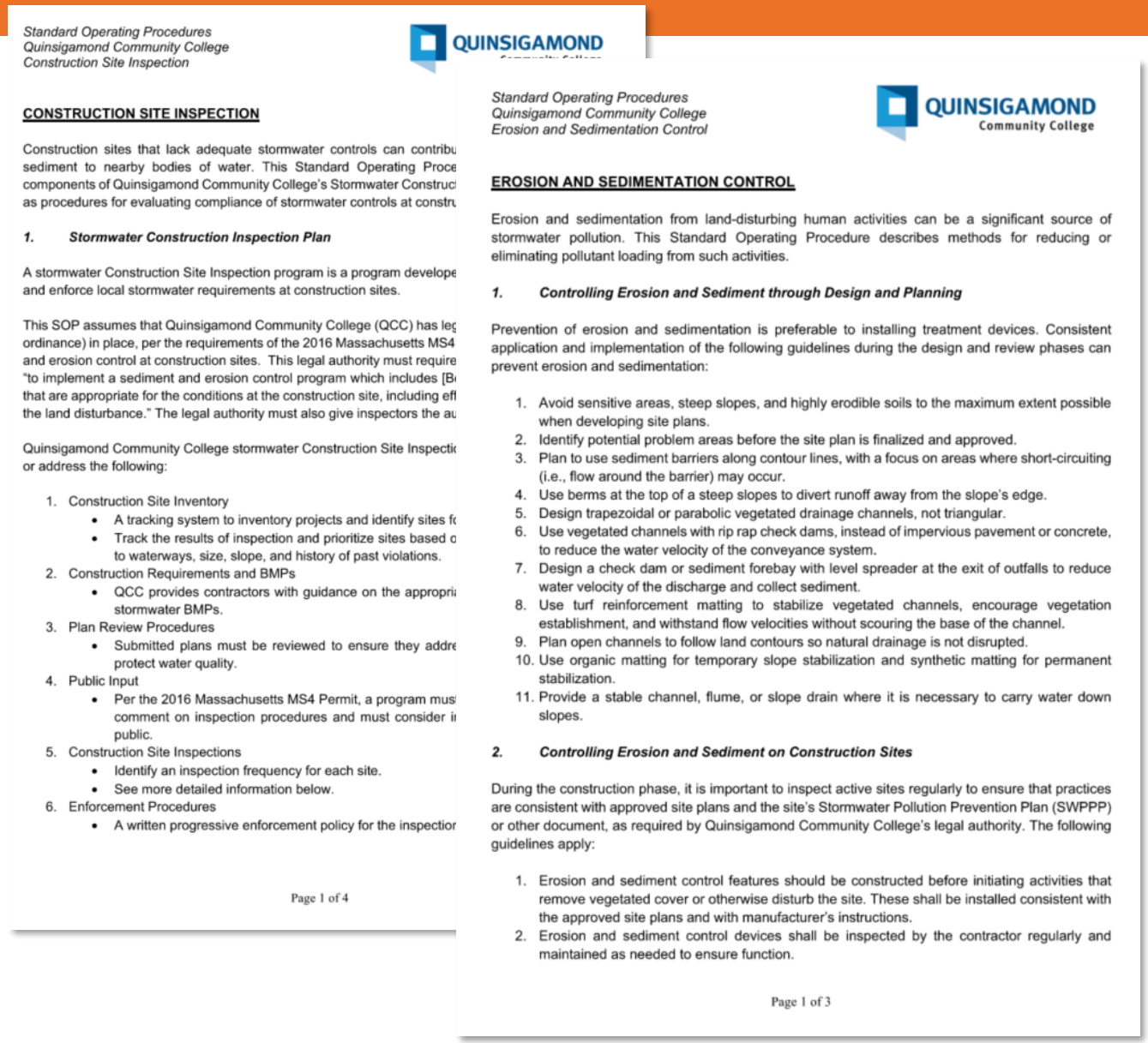
**Requirements**

- Policy
- Site Inspection Procedures
- Sediment Control Requirements
- Requirements To Control  Waste
- Site Plan Review

# 4 Management of Construction Site Runoff

**New Policies:**

- Construction Site Inspection
- Erosion & Sedimentation Control



*Standard Operating Procedures*
*Quinsigamond Community College*
*Construction Site Inspection*

QUINSIGAMOND

**CONSTRUCTION SITE INSPECTION**

Construction sites that lack adequate stormwater controls can contribu
sediment to nearby bodies of water. This Standard Operating Proce
components of Quinsigamond Community College's Stormwater Construct
as procedures for evaluating compliance of stormwater controls at constru

***1. Stormwater Construction Inspection Plan***

A stormwater Construction Site Inspection program is a program develope
and enforce local stormwater requirements at construction sites.

This SOP assumes that Quinsigamond Community College (QCC) has leg
ordinance) in place, per the requirements of the 2016 Massachusetts MS4
and erosion control at construction sites. This legal authority must require
"to implement a sediment and erosion control program which includes [B
that are appropriate for the conditions at the construction site, including eff
the land disturbance." The legal authority must also give inspectors the au

Quinsigamond Community College stormwater Construction Site Inspecti
or address the following:

1. Construction Site Inventory
   - A tracking system to inventory projects and identify sites fo
   - Track the results of inspection and prioritize sites based o to waterways, size, slope, and history of past violations.
2. Construction Requirements and BMPs
   - QCC provides contractors with guidance on the appropri stormwater BMPs.
3. Plan Review Procedures
   - Submitted plans must be reviewed to ensure they addre protect water quality.
4. Public Input
   - Per the 2016 Massachusetts MS4 Permit, a program mus comment on inspection procedures and must consider i public.
5. Construction Site Inspections
   - Identify an inspection frequency for each site.
   - See more detailed information below.
6. Enforcement Procedures
   - A written progressive enforcement policy for the inspectio

Page 1 of 4

*Standard Operating Procedures*
*Quinsigamond Community College*
*Erosion and Sedimentation Control*

QUINSIGAMOND Community College

**EROSION AND SEDIMENTATION CONTROL**

Erosion and sedimentation from land-disturbing human activities can be a significant source of stormwater pollution. This Standard Operating Procedure describes methods for reducing or eliminating pollutant loading from such activities.

***1. Controlling Erosion and Sediment through Design and Planning***

Prevention of erosion and sedimentation is preferable to installing treatment devices. Consistent application and implementation of the following guidelines during the design and review phases can prevent erosion and sedimentation:

1. Avoid sensitive areas, steep slopes, and highly erodible soils to the maximum extent possible when developing site plans.
2. Identify potential problem areas before the site plan is finalized and approved.
3. Plan to use sediment barriers along contour lines, with a focus on areas where short-circuiting (i.e., flow around the barrier) may occur.
4. Use berms at the top of a steep slopes to divert runoff away from the slope's edge.
5. Design trapezoidal or parabolic vegetated drainage channels, not triangular.
6. Use vegetated channels with rip rap check dams, instead of impervious pavement or concrete, to reduce the water velocity of the conveyance system.
7. Design a check dam or sediment forebay with level spreader at the exit of outfalls to reduce water velocity of the discharge and collect sediment.
8. Use turf reinforcement matting to stabilize vegetated channels, encourage vegetation establishment, and withstand flow velocities without scouring the base of the channel.
9. Plan open channels to follow land contours so natural drainage is not disrupted.
10. Use organic matting for temporary slope stabilization and synthetic matting for permanent stabilization.
11. Provide a stable channel, flume, or slope drain where it is necessary to carry water down slopes.

***2. Controlling Erosion and Sediment on Construction Sites***

During the construction phase, it is important to inspect active sites regularly to ensure that practices are consistent with approved site plans and the site's Stormwater Pollution Prevention Plan (SWPPP) or other document, as required by Quinsigamond Community College's legal authority. The following guidelines apply:

1. Erosion and sediment control features should be constructed before initiating activities that remove vegetated cover or otherwise disturb the site. These shall be installed consistent with the approved site plans and with manufacturer's instructions.
2. Erosion and sediment control devices shall be inspected by the contractor regularly and maintained as needed to ensure function.

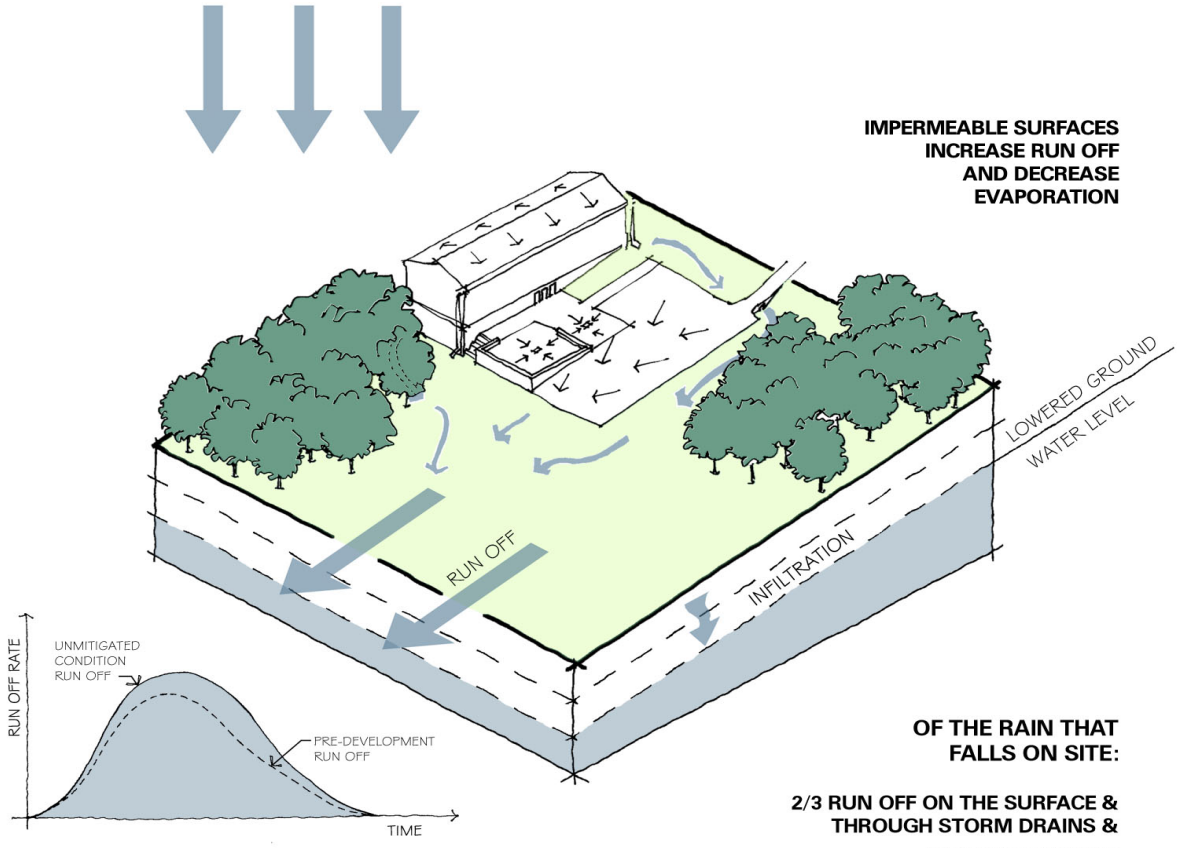
Page 1 of 3

# 5 Management of Post Construction Site Runoff
## (New Development and Redevelopment)

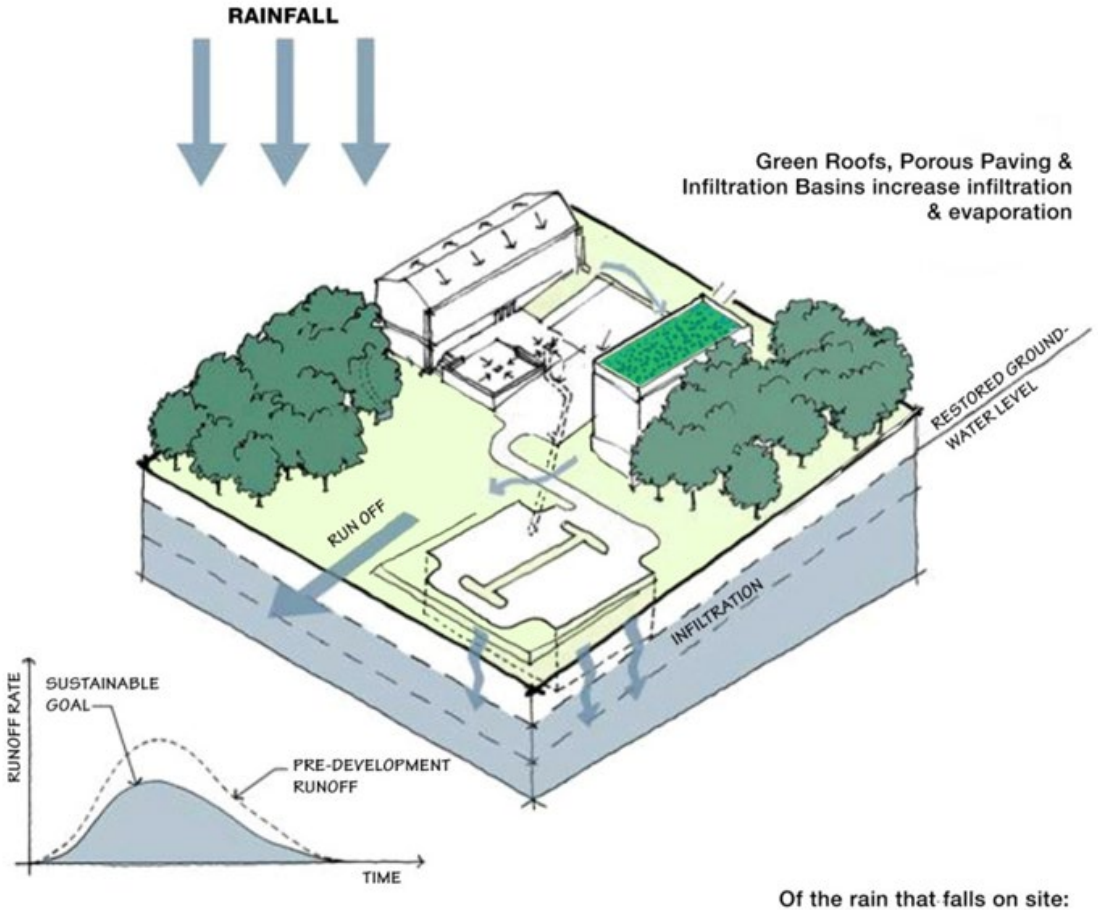
Permittees are required to address stormwater runoff from new development and redevelopment that disturb one or more acres of land.

**This control measure encourages the use of low impact design techniques and requires the retention or treatment of runoff on site using green infrastructure practices.**

# 5 Management of Post Construction Site Runoff




**UNMITIGATED CONDITION**




**SUSTAINABLE GOAL**

# 5 Management of Post Construction Site Runoff
## (New Development and Redevelopment)

### NEW DEVELOPMENT

- Comply with Massachusetts Stormwater Standards 1, 2, 3, 5, 6 and 9
- **Fully retain the first 1 inch of runoff from impervious area onsite OR** design treatment such that **90% of the average annual load of total suspended solids (TSS)** and **60% of the average annual load of total phosphorus** generated from the impervious area on the site is removed prior to discharge

### REDEVELOPMENT

- Comply with Massachusetts Stormwater Standards 1, 2, 3, 5, 6 and 9 to the maximum extent feasible
- **Retain the first 0.8 inch of runoff from impervious area onsite OR** design treatment such that **80% of the average annual load of total suspended solids (TSS) and 50% of the average annual load of total phosphorus** generated from the impervious area on the site is removed prior to discharge
- Offsite mitigation is allowed

# 6 Good Housekeeping in Municipal Operations

Permittees are required to implement **good housekeeping practices in campus operations** such as vehicle maintenance, open space, buildings and infrastructure.

**Requirements**

- O&M Procedures
- Catch Basin Cleaning
- Street Sweeping
- SWPPP


# 6 Good Housekeeping in Campus Operations

**QCC has developed standard operating procedures for the following:**

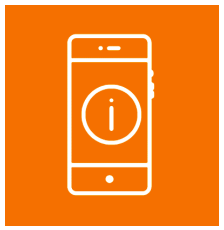
Catch Basin Inspection and Cleaning

Sweeping Streets and Parking Lots

Snow and Ice Removal

Inspecting Constructed Best Management Practices (BMPs)

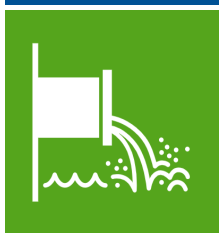
# So, what can you do?



**Review educational & informational stormwater notices send to QCC Students, Faculty, & Staff**

**Check out the QCC Stormwater Website**

**Continue to attend public outreach meetings and sign up for related courses**



**Report evidence of potential illicit discharges, spills, and illegal dumping – If you see something, please say something!**

**Be a good stormwater steward**

Participate in clean-ups, manage pet waste, handle waste carefully, practice good car maintenance, and recycle or dispose of waste appropriately

# Questions?

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Nitsch Engineering