FY22 MS4 Municipal Assistance Grant
Continued Phosphorous Control Planning and Initiation of Implementation

Workshop #2: Nonstructural Controls and Private BMPs – How to Get Credits



April 5, 2022
1:00 PM to 3:00 PM

Brown AND Caldwell

Charles River Watershed Association

Today's Agenda

1:00 PM Welcome & Introductions

1:10 PM Technical Presentation

- Nonstructural Controls
- Privately Owned Structural Controls

2:00 PM Panel Discussion and Open Forum

- Maria Rose, Newton
- Matt Shuman, Watertown
- Stephanie Carlisle and Bridget Graziano, Medway
- Kim Donovan, Needham

2:55 PM Next Steps

3:00 PM Adjourn

Feel free to use the chat during the
Technical Presentation

During the open discussion and Q&A please use the "**Raise Hand**" Feature and you will be called on

Welcome & Introductions

Project Team

Charles River Watershed Association

Julie Wood
DEPUTY DIRECTOR

Julia Hopkins
COMMUNICATIONS & OUTREACH MANAGER

Brown AND Caldwell

Matt Davis, PE
TECHNICAL LEAD
mdavis@brwncald.com

Stephanie Alimena, PE,
WATER RESOURCES ENGINEER
salimena@brwncald.com

Andrew Goldberg,
WATER RESOURCES PLANNER
agoldberg@brwncald.com

Workshop Overview

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Workshop Title	Date & Time	Key Goals
Workshop 1: All About the Loads – Baseline Loads, Impact from EPA's RDA	3/8 1-3pm	✔ Provide baseline load methodology ✔ Update and discuss RDA
Workshop 2: Non-structural Controls and Private BMPs – How to Get Credits	4/5 1-3pm	✔ Provide methodology for tracking non-structural BMPs ✔ Review data requirements for private BMP tracking ✔ Regulatory guidance ✔ Best-practices open forum
Workshop 3: Public BMPs – Maximizing the Cost-Benefit Equation	5/10 1-3pm	✔ Present updated BMP cost data ✔ Panel discussion on public BMP wins
Q&A	5/24 1-3pm	✔ Ask regulators questions about the Permit and Phosphorus Control Planning

Reminder before we begin

Data Request for Workshop #3 – Costs & Benefits of Public Stormwater BMPs

Three options for sharing information **extended until 4/8**:

- Populate an excel-based template
- Send us files which include information about BMP costs
- Participate in a phone interview with our team

Unable to participate? Let us know in the Zoom meeting chat or email.

Contact Julie Wood at jwood@crwa.org

Overview of Workshops

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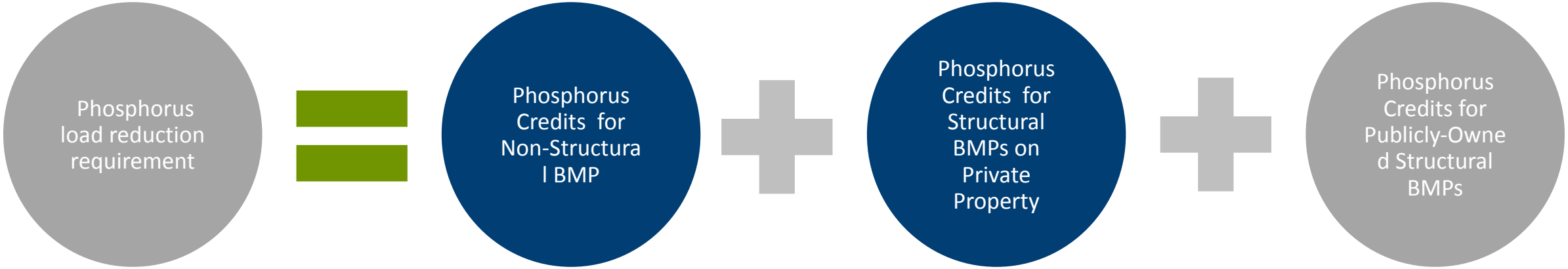
Workshop 1

Workshop 2

Workshop 3



https://www.crwa.org/phosphorus-control-planning-support.html

Non-Structural BMP Phosphorus Credits

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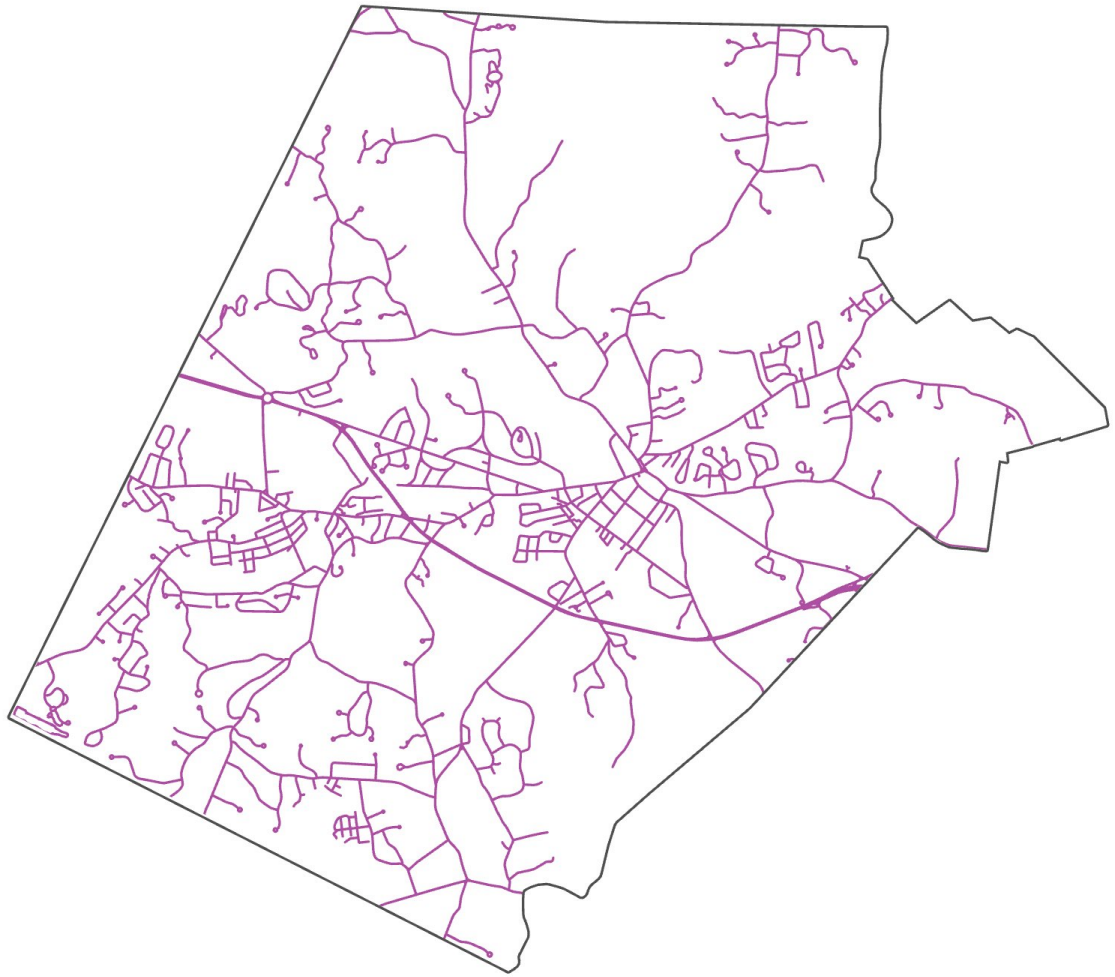
Opportunities and Limitations

- Nonstructural controls are typically most cost-effective strategy for meeting phosphorus reduction requirements
  - Street sweeping
  - Catch basin cleaning
  - Enhanced organic waste and leaf litter collection
- Credits are limited

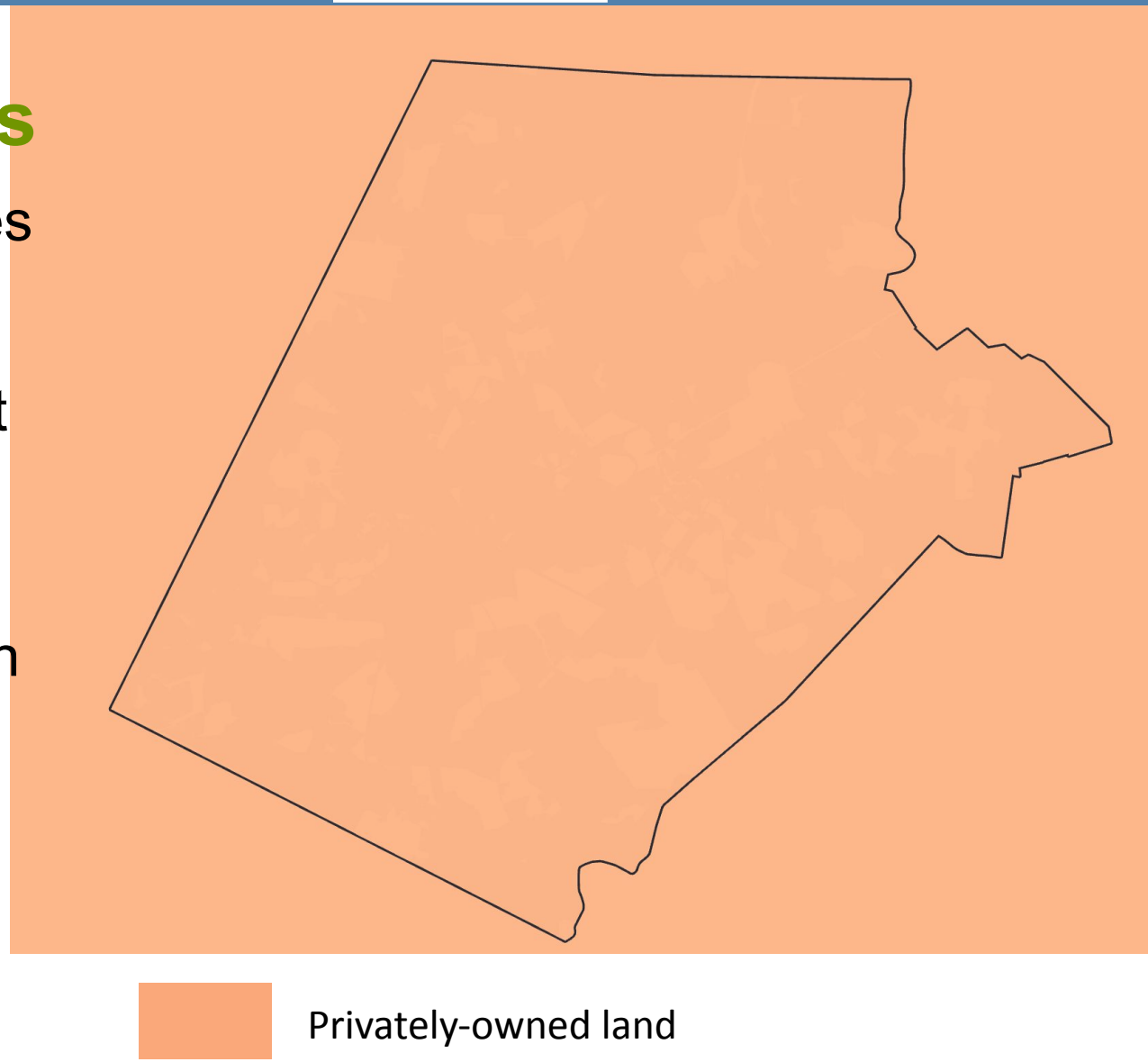


Public Right of Way / Parking Lots

BMPs on Private Properties

Opportunities and Limitations

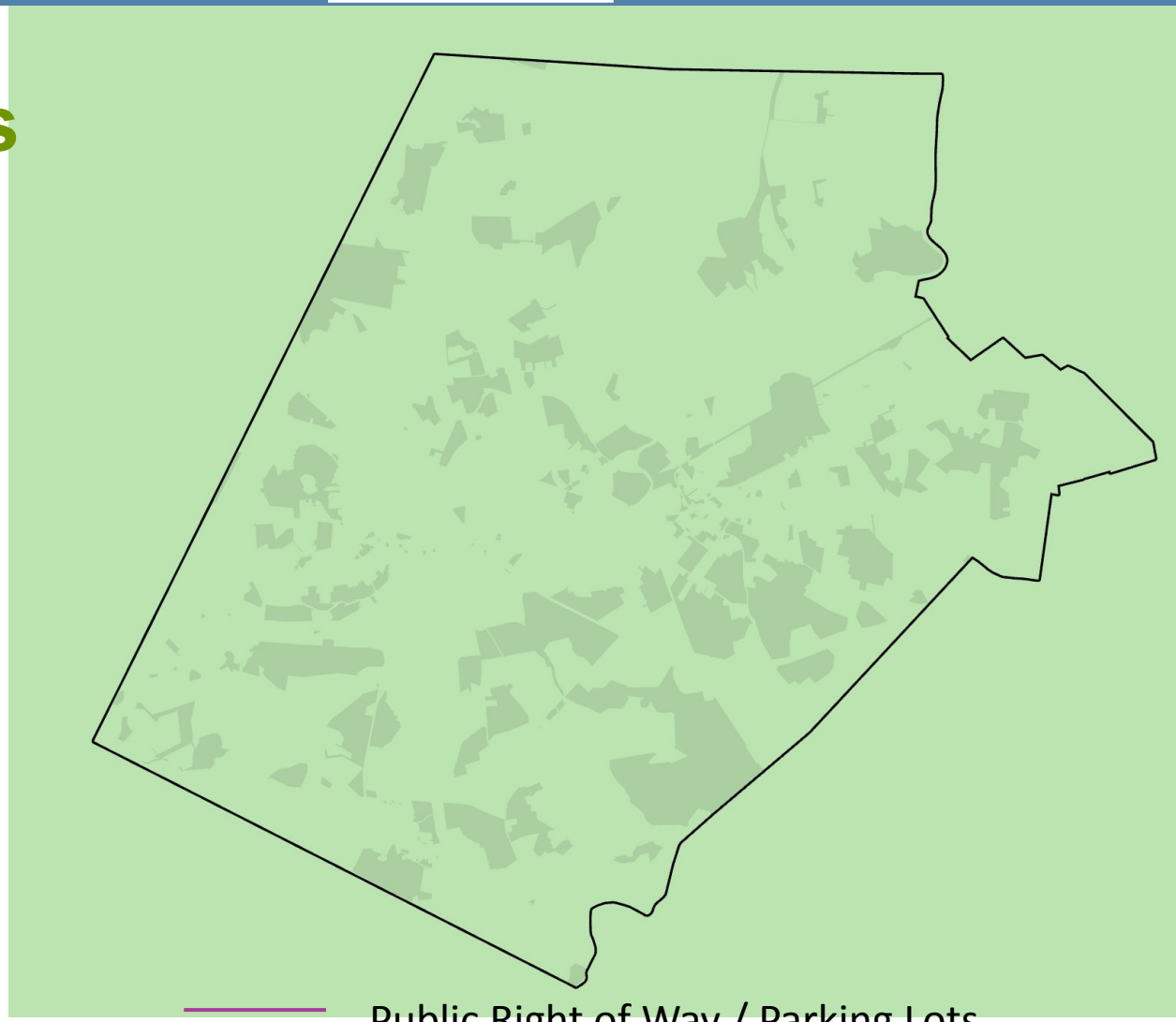
- Stormwater BMPs on private properties can count towards phosphorus reduction requirements
- Requirements for new/re-development provides an opportunity to increase these credits
- Additional incentives can be used to encourage implementation of BMPs on private properties
- BMP costs are not directly incurred by permittee (tracking is required)



BMPs on Municipally-Owned Properties

Opportunities and Limitations

- Limited public property to implement structural BMPs
- Costs incurred by permittees
- Currently gathering data about costs to implement BMPs
  - Please complete the data request. We will discuss cost effective strategies at Workshop 3



Non-Structural BMP Phosphorus Credits

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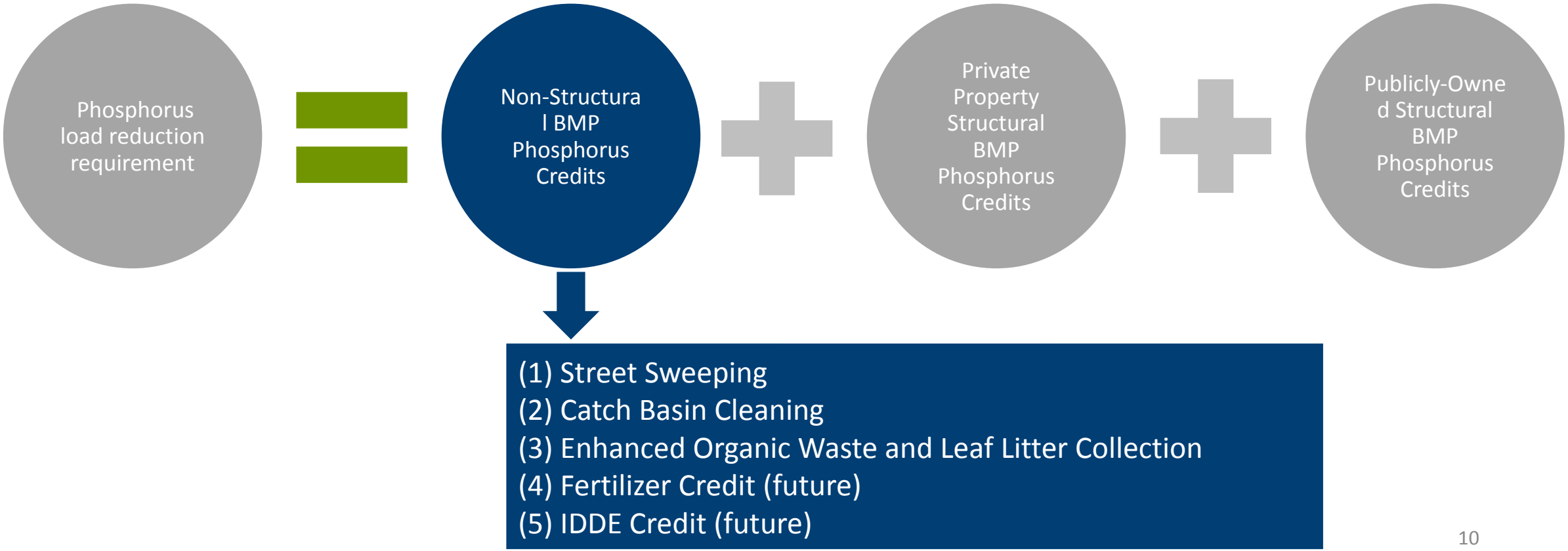
Section 1.6 of the Phosphorus Control Plan Template



Non-Structural BMP Credits – Street Sweeping

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$$\text{Phosphorus Credit}_{P\ sweeping} = IA_{swept} \times PLER_{IC\text{-}land\ use} \times PRF_{sweeping} \times AF$$

Where:

$\text{Credit}_{sweeping}$	=	Amount of nutrient load removed by enhanced sweeping program (lb/year)
IA_{swept}	=	Area of impervious surface that is swept under the enhanced sweeping program (acres)
$PLER_{IC\text{-}land\ use}$	=	Phosphorus Load Export Rate for impervious cover and specified land use (lb/acre/yr) (see Table 2-1)
$PRF_{sweeping}$	=	Phosphorus Reduction Factor for sweeping based on sweeper type and frequency (see Table 2-4).
AF	=	Annual Frequency of sweeping. For example, if sweeping does not occur in Dec/Jan/Feb, the AF would be 9 mo./12 mo. = 0.75. For year-round sweeping, AF=1.0[1]

Table 2-4: Nutrient reduction efficiency factors for sweeping impervious areas

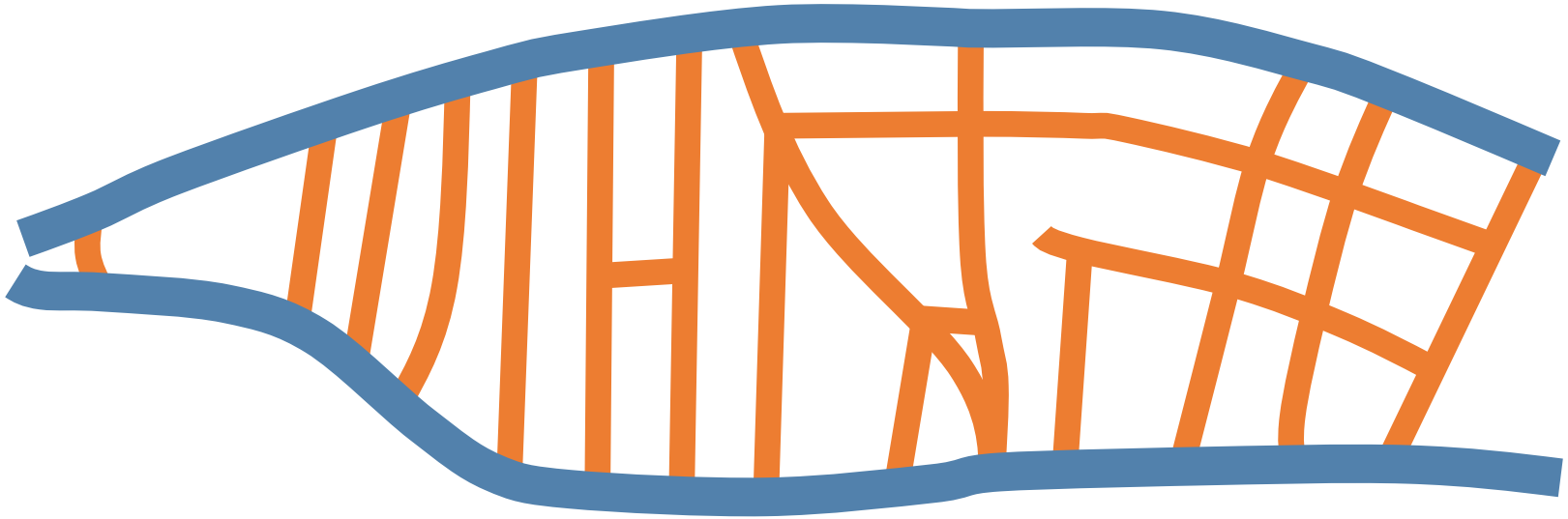
Frequency[1]	Sweeper Technology	$PRF_{sweeping}$
2/year (spring and fall)[2]	Mechanical Broom	0.01
2/year (spring and fall)[2]	Vacuum Assisted	0.02
2/year (spring and fall)[2]	High-Efficiency Regenerative Air-Vacuum	0.02
Monthly	Mechanical Broom	0.03
Monthly	Vacuum Assisted	0.04
Monthly	High Efficiency Regenerative Air-Vacuum	0.08
Weekly	Mechanical Broom	0.05
Weekly	Vacuum Assisted	0.08
Weekly	High Efficiency Regenerative Air-Vacuum	0.10

Source: 2016 MS4 Permit, Appendix F, Attachment 2

Performing Street Cleaning Credit Calcs

- Streets ‘edge of pavement’ GIS layer (need polygons, not polylines)
- Break into segments with the same equipment type and sweep frequency (each segment should have a PRF and AF value)

Example Street Network



Mechanical broom, weekly (PRF=0.05), Sweeping 12 months of the year AF = 1.0

Mechanical broom, monthly (PRF=0.03), Sweeping 9 months of the year AF = 0.75

Determining PLER for Streets

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$$\text{Phosphorus Credit}_{\text{P sweeping}} = \text{IA}_{\text{swept}} \times \text{PLER}_{\text{IC-land use}} \times \text{PRF}_{\text{sweeping}} \times \text{AF}$$

- Phosphorus loading export rate (PLER) **depends upon Land Use Data source**
- 2016 MassGIS Land Use data (or your own)
  - PLER = 1.95 lb/ac/yr
    - This value is not in the Permit
      - https://www.mass.gov/doc/2016-massachusetts-small-ms4-permit-pollutant-loading-export-rates/download
    - Composite value calculated for impervious areas in Charles River watershed
- 2005 MassGIS Land Use GIS data
  - Streets do not have their own land use code (except for highways)
  - Don't use the PLER for 'Highways' unless your street is a highway
  - Intersect land uses with street segments to create new set of polygons
  - Determine PLER for each polygon using land-use crosswalk table (2016 MS4 Permit, Appendix F, Attachment 1, Table 1-3) and PLER table (2016 MS4 Permit, Appendix F, Attachment 1, Table 1-2)

Non-Structural BMP Credits – Catch Basin Cleaning

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- To be eligible for credit, minimum sump storage capacity of 50% must be maintained through the year
- Impervious area = streets

$$\text{Credit}_{P\,CB} = IA_{CB} \times PLER_{IC\text{-land use}} \times PRF_{CB}$$

Where:

Credit_{CB}	=	Amount of nutrient load removed by catch basin cleaning (lb/year)
IA_{CB}	=	Impervious drainage area to catch basins (acres)
$PLER_{IC\text{-and use}}$	=	Phosphorus Load Export Rate for impervious cover and specified land use (lb/acre/yr) (see Table 2-1)
PRF_{CB}	=	Phosphorus Reduction Factor for catch basin cleaning equals 0.02

Source: 2016 MS4 Permit, Appendix F, Attachment 2

Non-Structural BMP Credits – Enhanced Organic Waste and Leaf Litter Collection

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Weekly sweeping from September 1 – December 1

- Roadways and parking lots
- Gather and remove landscaping wastes, organic debris and leaf litter
- Sweep promptly after landscaping activities

$$\text{Credit}_{\text{P leaf litter}} = (\text{IA}_{\text{leaf litter}}) \times (\text{PLER}_{\text{IC-land use}}) \times (0.05) \qquad \textbf{(Equation 2-5)}$$

Where:

$\text{Credit}_{\text{leaf litter}}$ = Amount of nutrient load reduction credit for organicwaste and leaf litter collection program (lb/year)

$\text{IA}_{\text{leaf litter}}$ = Impervious area (acre) in applicable watersheds that are subject to enhanced organic waste and leaf litter collection program

$\text{PLER}_{\text{IC-land use}}$ = Phosphorus Load Export Rate for impervious cover and specified land use (lbs./acre/yr.) (see Table 2-1)

Source: 2016 MS4 Permit, Appendix F, Attachment 2

Non-Structural BMP Credits – Fertilizer Credit

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- In 2012 Massachusetts enacted law limiting usage of phosphorus fertilizers
- Phosphorus Credit
  - Included in draft 2014 MS4 Permit
  - Not included in 2016 MS4 Permit
  - Will likely be included in next MS4 Permit

Table 2-5 from Draft 2014 MS4 Permit
Calculated weighted export rates and fertilizer credits for Charles River Watershed small MS4 Permittees

Town	WPLER (lb/acre/yr)	$Credit_{fertilizer}$ (lb/yr)	Town	WPLER (lb/acre/yr)	$Credit_{fertilizer}$ (lb/yr)
Arlington	0.261	1.2	Mendon	0.119	0.3
Ashland	0.207	1.7	Milford	0.205	34.0
Bellingham	0.152	10.8	Millis	0.130	16.0
Belmont	0.227	8.0	Natick	0.240	37.6
Brookline	0.273	53.9	Needham	0.221	44.8
Cambridge	0.261	9.0	Newton	0.252	113.1
Dedham	0.290	23.7	Norfolk	0.096	15.8
Dover	0.216	16.7	Sherborn	0.162	13.3
Foxborough	0.139	0.1	Somerville	0.291	8.2
Franklin	0.236	58.8	Walpole	0.156	3.7
Holliston	0.164	33.2	Waltham	0.255	45.4
Hopedale	0.162	2.0	Watertown	0.283	21.1
Hopkinton	0.136	9.5	Wayland	0.209	1.4
Lexington	0.206	16.3	Wellesley	0.220	56.7
Lincoln	0.238	9.9	Weston	0.159	40.9
Medfield	0.148	21.6	Westwood	0.248	18.8
Medway	0.159	28.8	Wrentham	0.076	6.0

Non-Structural BMP Credits – IDDE Credit

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Statement of Basis for Proposed Permit Modification: NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) to Certain Waters in the Commonwealth of Massachusetts

EPA is proposing to update the required phosphorus reductions contained in Table F-2 and Table F-3 of Appendix F Part I. The proposed increase in required phosphorus reduction target represents the removal of the presumptive watershed-wide IDDE phosphorus reduction applied to each permittee's required phosphorus reduction target. EPA would recalculate the watershed wide phosphorus reduction due to IDDE implementation by all permittees following completion of each permittee's IDDE program (10 years after the permit effective date). The watershed wide phosphorus reduction realized through IDDE implementation would then be distributed among the permittees to reduce each permittee specific required phosphorus reduction target following IDDE program completion. This proposed approach would more accurately reflect the phosphorus load reduced watershed wide from removal of illicit discharges.

Excerpted from Page 16

Private BMPs

Section 1.7 of the Phosphorus Control Plan Template

Workshop 2

Phosphorus load reduction requirement

=

Non-Structural BMP Phosphorus Credits

+

Private Property Structural BMP Phosphorus Credits

+

Publicly-Owned Structural BMP Phosphorus Credits

- Subsurface infiltration
- Infiltration or water quality swales
- Rain gardens
- Bioretention
- Biofiltration - filter media, tree box filters, etc.
- Gravel wetland

- Enhanced biofiltration with internal storage reservoir

Types of Structural BMPs

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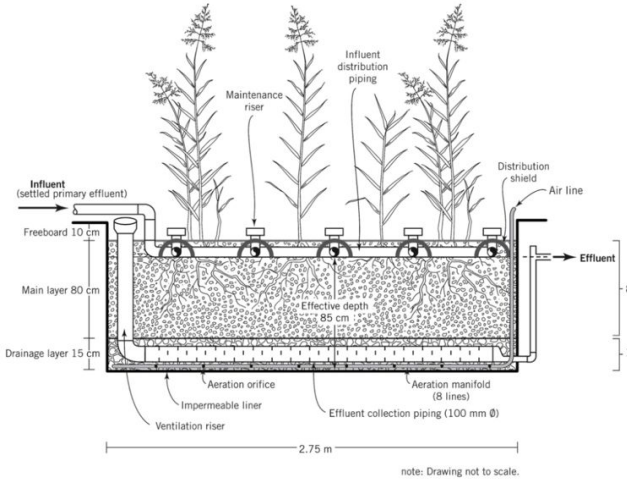
What BMPs are Eligible?

- Subsurface infiltration
- Infiltration or water quality swales
- Rain gardens
- Bioretention
- Biofiltration - filter media, tree box filters, etc.
- Gravel wetland
- Enhanced biofiltration with internal storage reservoir
- Sand filter
- Porous pavement
- Wet pond
- Dry pond
- Impervious area disconnection using storage - rain barrels, cisterns, etc.



To learn more about individual types of BMPs see:
Massachusetts Stormwater Handbook and Stormwater Standards

Four Components of Private BMPs

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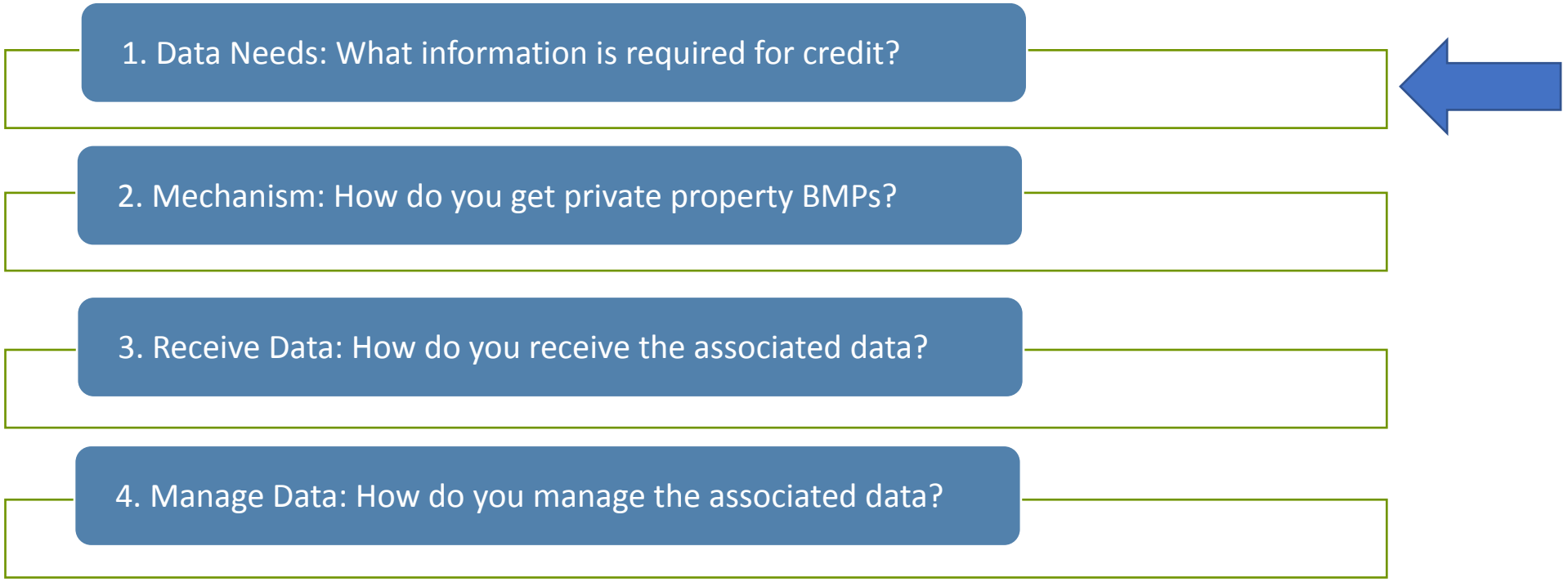
1. Data Needs: What information is required for credit?
2. Mechanism: How do you get private property BMPs?
3. Receive Data: How do you receive the associated data?
4. Manage Data: How do you manage the associated data?

Part 1: Data Needs for Private BMPs



Part 1: Data Needs for Private BMPs

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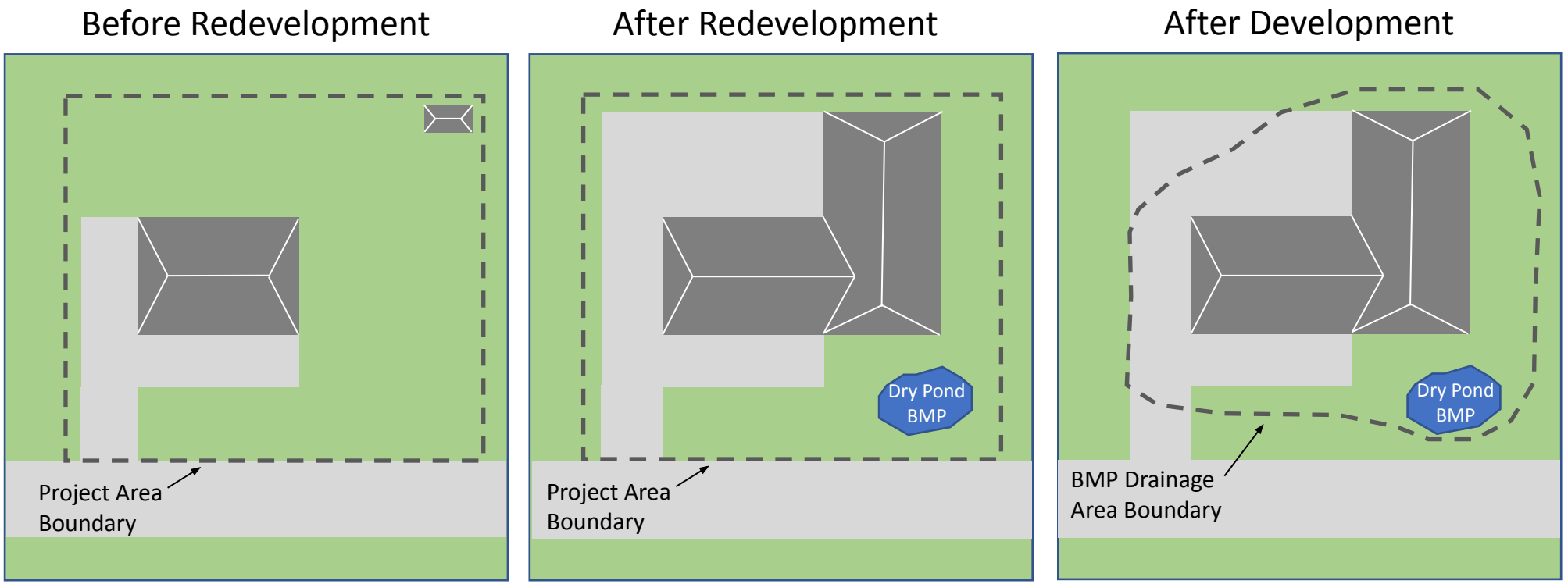
1. Data Needs
2. Mechanism
3. Receive Data
4. Manage Data

Private BMP Credit Components

P-Load Reduction Design Information

O&M Certification

Part 1: Data Needs for Private BMPs



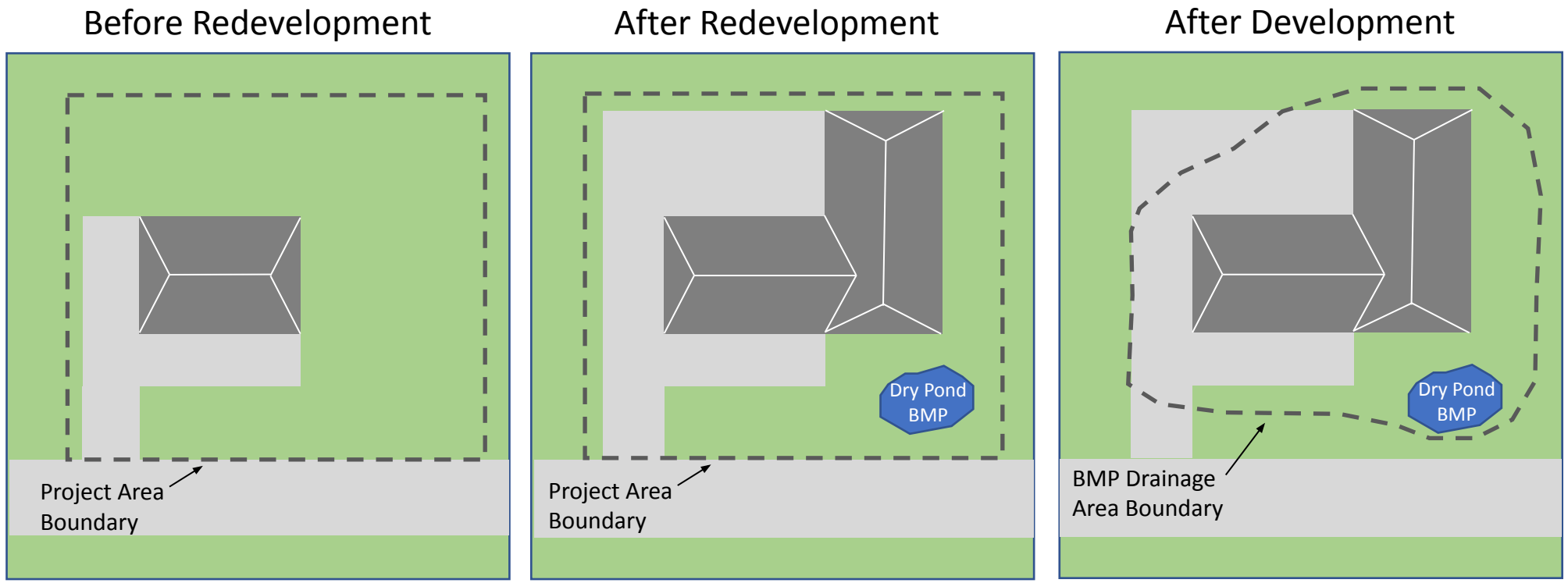
Within each of these boundaries need the following values:

- Directly connected impervious area by land use type
- Disconnected impervious area (i.e., impervious surfaces that drain to pervious land)
- Pervious area for each combination of land use type and hydrologic soil group

Also need to know BMP Type and BMP Capacity

- Some types of BMPs require additional info (e.g., infiltration trenches require infiltration rate)

Why is this Data Needed?



- **Project Areas Before and After Redevelopment** are used to calculate changes in the annual phosphorus export rate from the site
- **BMP drainage area and BMP** information is used to calculate phosphorus credit

Part 1: Data Needs for Private BMPs

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1. Data Needs
2. Mechanism
3. Receive Data
4. Manage Data

Data Required to Maintain Credits

O&M Certification

- Proof of inspection/date of last maintenance
- Confirm operating as BMP was originally designed
- In accordance with manufacturer/design specification
- O&M Plans

City of Topeka Property Owner's Guide to Stormwater BMP Maintenance

Part 2: Mechanism to Obtain Data

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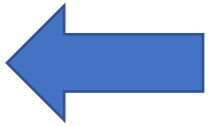
1. Data Needs: What information is required for credit?
2. Mechanism: How do you get data for private BMPs?
3. Receive Data: How do you receive the associated data?
4. Manage Data: How do you manage the associated data?



Existing Regulatory Drivers/Requirements

- Enforcement authority
- Rules & Regulations vs. ordinances vs. plan review process
- Development and Re-development Standards and review thresholds
  - MS4 Permit threshold – 1 acre
  - Options for a more stringent (smaller size) trigger
  - Tradeoff for size constraints
- Resources for updated regulatory language
  - CRWA – Recommended Additions to Enhance Stormwater Regulations (April 2021)
    - Private entities completing and submitting calculations in a standardized format
  - Northern Middlesex Stormwater Collaborative Bylaw/Ordinance & Regulations
  - Neponset Stormwater Partnership Model Bylaw (May 2019)

Incentivizing BMPs on Private Properties

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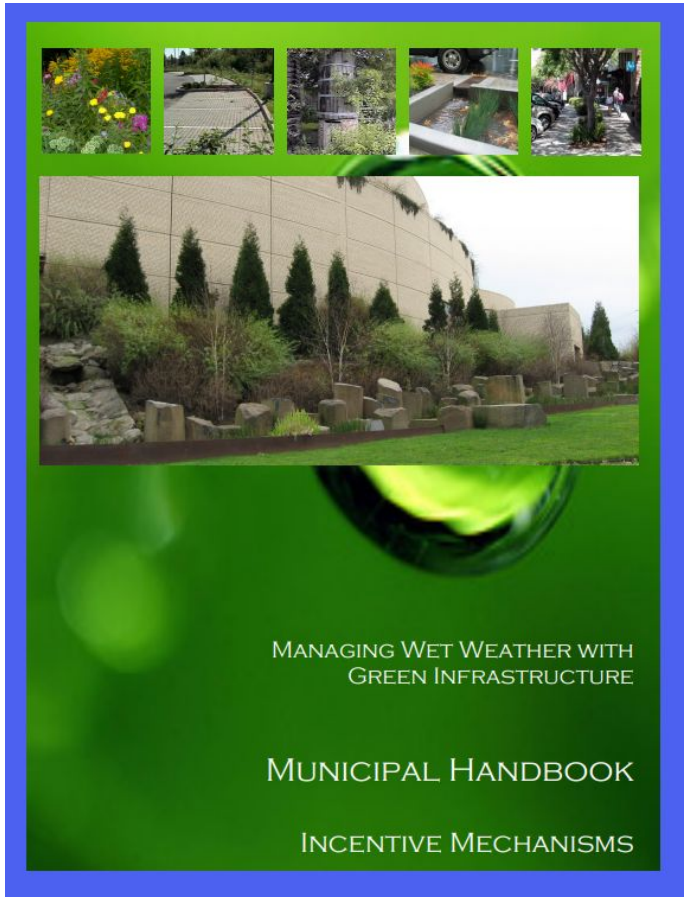
1. Data Needs
2. Mechanism
3. Receive Data
4. Manage Data

Incentivizing private BMPs

- Stormwater Utility
- Development Incentives
- Grants
- Rebates and Installation Financing
- Awards and Recognition Programs

Equity and resiliency considerations

- Incentivize projects within disadvantaged communities
- Address climate resiliency or flood mitigation co-benefits



Managing Wet Weather with Green Infrastructure Municipal Handbook. EPA 2009

Case Study: Stormwater Utility

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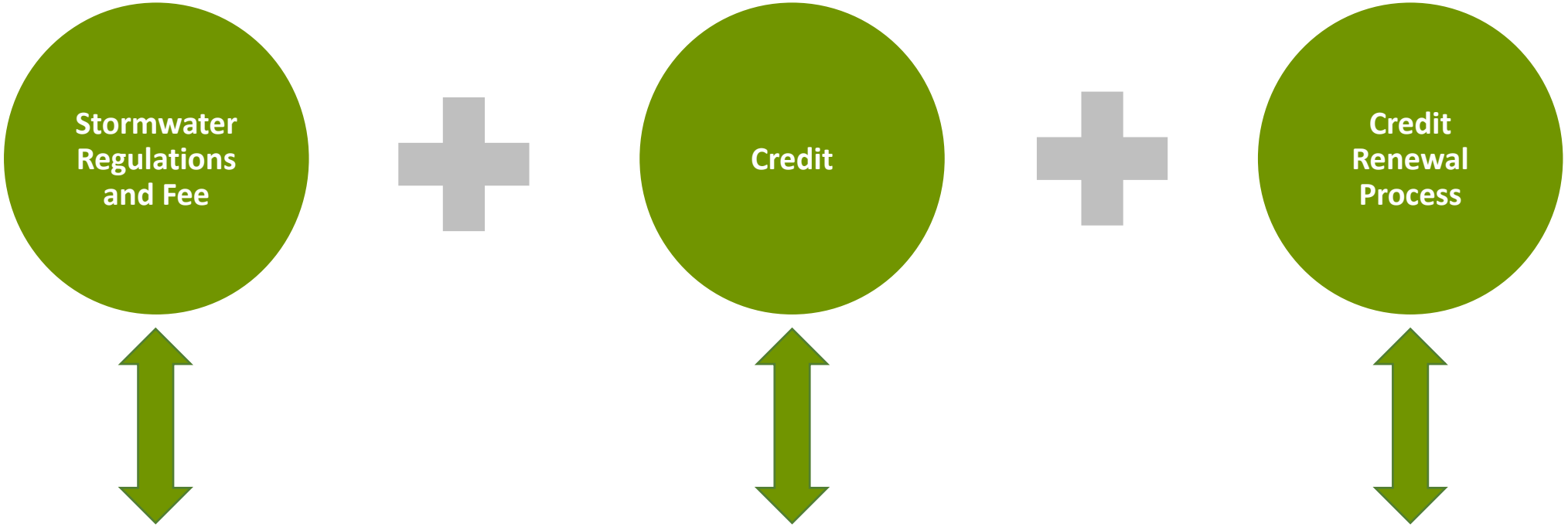
Using a Stormwater Utility to encourage private BMPs and increase credits



Mechanism to collect information on existing and new BMPs

Incentivizes property owners to install new BMPs and maintain existing BMPs, providing Permittees with low-cost credits

Provides an on-going mechanism for tracking O&M is adequate

Part 3: Receiving Data

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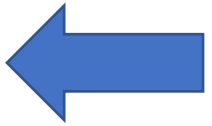
1. Data Needs: What information is required for credit?
2. Mechanism: How do you get data for private BMPs?
3. Receive Data: How do you receive the associated data?
4. Manage Data: How do you manage the associated data?



Part 3: Receiving Data – Two Components

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1. Data Needs
2. Mechanism
3. Receive Data
4. Manage Data

Private BMP Credit Components

P-Load Reduction Design Information

O&M Certification

How to Receive BMP Design Data

- How does data get reported to a municipality?
  - To what department, and in what format?
  - Through plan review process or other process?
- How are calculations reported and stored?

Pre-Project Site				Post-Project Site Characteristics				BMP Drainage Area (for Post-Project Conditions)			
Category	Land Area (ac)	PLER (lb/ac/yr)	Annual P Export	Category	Land Area (ac)	PLER (lb/ac/yr)	Annual P Export	Category	Land Area (ac)	PLER (lb/ac/yr)	Annual P Export
Directly Connected Impervious Area				**Directly Connected Impervious Area**				**Directly Connected Impervious Area**			
Commercial	0	1.78	0	Commercial	0	1.78	0	Commercial	0	1.78	0
Industrial	0	1.78	0	Industrial	0	1.78	0	Industrial	0	1.78	0
High-density residential	0	2.32	0	High-density residential	0	2.32	0	High-density residential	0	2.32	0
Medium-density residential	0	1.96	0	Medium-density residential	0	1.96	0	Medium-density residential	0	1.96	0
Low-density residential	0	1.52	0	Low-density residential	0	1.52	0	Low-density residential	0	1.52	0
Highway	0	1.34	0	Highway	0	1.34	0	Highway	0	1.34	0
Forest	0	1.52	0	Forest	0	1.52	0	Forest	0	1.52	0
Open land	0	1.52	0	Open land	0	1.52	0	Open land	0	1.52	0
Agriculture	0	1.52	0	Agriculture	0	1.52	0	Agriculture	0	1.52	0
Pervious Area				**Pervious Area**				**Pervious Area**			
Forest				**Forest**				**Forest**			

Site Condition	Annual P Export
Pre-Project	0
Post-Project	0
Change	0

BMP Drainage Area	
Annual P Export before BMP (lb/yr)	0
BMP P Removal Efficiency	0%
P Credit (lb)	0

Credits for Existing BMPs

Difference in approach between planned BMPs and already installed BMPs

- Incorporate submitted plans from past reviews into the systems developed for BMP tracking
  - Extract and digitize data
  - Incorporate these BMPs into O&M certification program
- Example mechanisms: stormwater utility, plan reviews

Maintenance Information

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From Appendix F of the Permit:

"I certify under penalty of law that all source control and treatment Best Management Practices being claimed for phosphorus reduction credit have been ***inspected, maintained and repaired in accordance with manufacturer or design specification****. I certify that, to the best of my knowledge, all Best Management Practices being claimed for a phosphorus reduction credit are* ***performing as originally designed****"*

Annual Maintenance Information

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1. Data Needs
2. Mechanism
3. Receive Data
4. Manage Data

EPA Self-Certification Program

- O&M Plans submitted during permit process
- Certification submission frequency
- Audit and enforcement

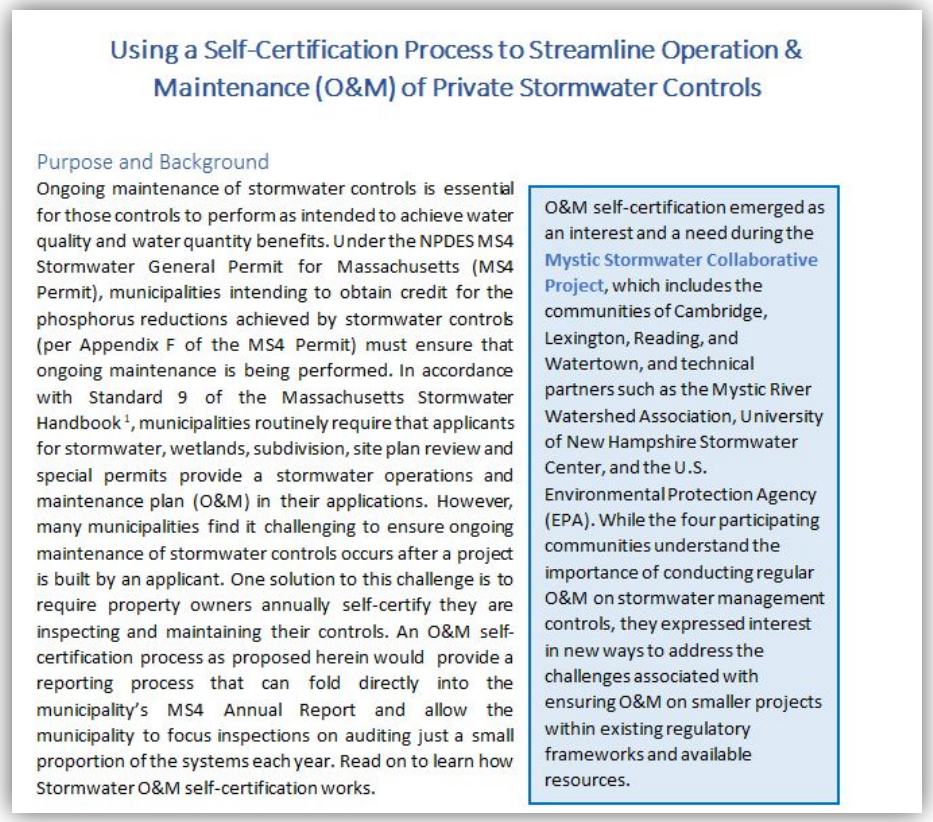
Stormwater Control Operation and Maintenance
Annual Self-Certification Form
Calendar Year: _____

Owner (required)	Operator (if applicable)
Name:	Name:
Phone:	Phone:
Email address:	Email address:
Street Address of Stormwater Control Location:	
Name and Date of Operations and Maintenance Plan:	

(Note: If your property received or was a part of property that received any of the permits listed on the back of this form since 2020, your permit included a Stormwater O&M Plan that you should be following. Please see the back of this form for more information.)

Name/ Type of Stormwater Control	Description and Date of Maintenance performed since July 1 of last year

Certification Statement



Using a Self-Certification Process to Streamline Operation & Maintenance (O&M) of Private Stormwater Controls

Purpose and Background

Ongoing maintenance of stormwater controls is essential for those controls to perform as intended to achieve water quality and water quantity benefits. Under the NPDES MS4 Stormwater General Permit for Massachusetts (MS4 Permit), municipalities intending to obtain credit for the phosphorus reductions achieved by stormwater controls (per Appendix F of the MS4 Permit) must ensure that ongoing maintenance is being performed. In accordance with Standard 9 of the Massachusetts Stormwater Handbook [1], municipalities routinely require that applicants for stormwater, wetlands, subdivision, site plan review and special permits provide a stormwater operations and maintenance plan (O&M) in their applications. However, many municipalities find it challenging to ensure ongoing maintenance of stormwater controls occurs after a project is built by an applicant. One solution to this challenge is to require property owners annually self-certify they are inspecting and maintaining their controls. An O&M self-certification process as proposed herein would provide a reporting process that can fold directly into the municipality's MS4 Annual Report and allow the municipality to focus inspections on auditing just a small proportion of the systems each year. Read on to learn how Stormwater O&M self-certification works.

O&M self-certification emerged as an interest and a need during the Mystic Stormwater Collaborative Project, which includes the communities of Cambridge, Lexington, Reading, and Watertown, and technical partners such as the Mystic River Watershed Association, University of New Hampshire Stormwater Center, and the U.S. Environmental Protection Agency (EPA). While the four participating communities understand the importance of conducting regular O&M on stormwater management controls, they expressed interest in new ways to address the challenges associated with ensuring O&M on smaller projects within existing regulatory frameworks and available resources.

Stormwater Tools in New England | US EPA

Annual Maintenance Information

Brown AND Caldwell

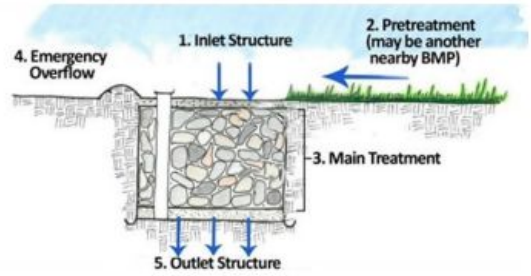
Charles River Watershed Association

1. Data Needs
2. Mechanism
3. Receive Data
4. Manage Data

Infiltration Trench Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with this BMP Operation & Maintenance Plan. This checklist details these frequency periods, and submittal of the form (every other year) is a certification that you have met these requirements. This inspection shall be done once in every six-year period by a professional engineer (PE) or a professional landscape architect (PLA).



Inspection Question	Answer Y	Answer N	Answer NA	Describe Problem(s) and Solution(s)
9. Are there signs of human or pet encroachment in the filter strip or the trench, such as compacted or displaced rocks, tire tracks, pet waste, etc.?				
Guidance: Repair or replace protection measures if damaged (e.g., fences, hedges, signs, etc.). Increase protection measures if this is a frequent problem. Repair damage to the filter strip by reestablishing grass. Repair damage to the trench by replacing pea gravel or topsoil /grass and filter fabric (when clogged). A sign specifically addressing pet waste can reduce dog waste. Also consider installation of a pet waste station (sign, pet waste bag dispenser and trash can) if the infiltration trench is in an area where dog walking is popular. **Schedule:** Monthly				
10. Is there any visual evidence of long-term ponding or standing water (stains, odors, etc.)?				
Guidance: Ponded water inside the trench (as visible from the observation well or on the surface) longer than 24 hours or several days after a storm event is an indication that the trench is clogged. Remove and replace all of the stone aggregate and filter fabric or media. **Schedule:** Monthly				
11. Notice another problem? Describe in comments.	**Your Comments:**			

Source: Topeka, KS Infiltration Trench Inspection Form, p. 7

Part 4: Managing the Data

Brown AND Caldwell

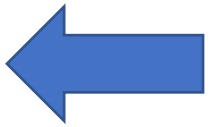
Charles River Watershed Association

1. Data Needs: What information is required for credit?

2. Mechanism: How do you get data for private BMPs?

3. Receive Data: How do you receive the associated data?

4. Manage Data: How do you manage the associated data?



Data Management

Brown AND Caldwell

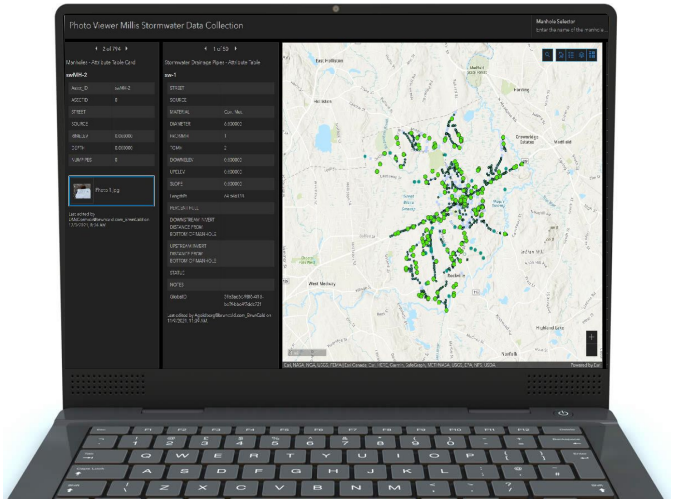
Charles River Watershed Association

1. Data Needs
2. Mechanism
3. Receive Data
4. Manage Data

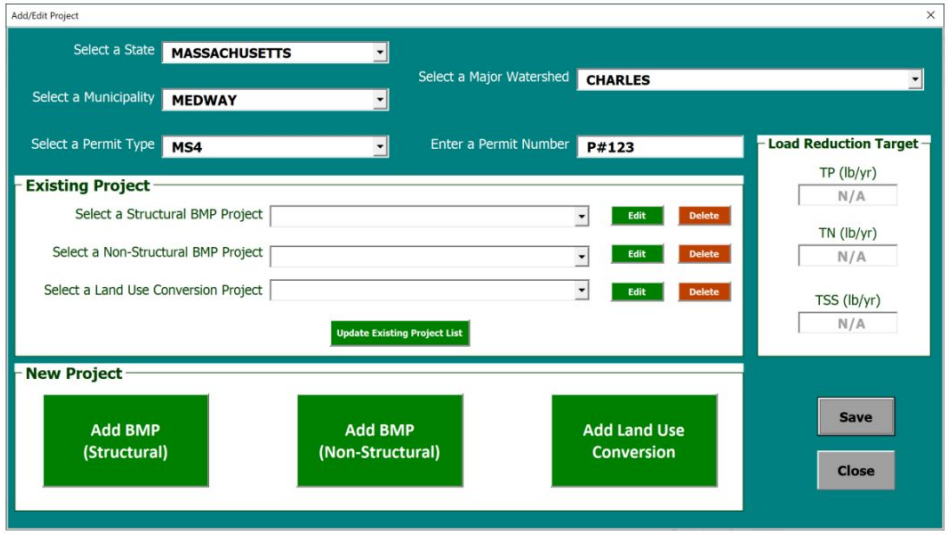
Where does the data go? What tracking tools are available?

- File Management Systems/Databases
- GIS/System Mapping
- Asset Management Software
- Data management for calculations (BATT)

File Storage / Document Linking



BMP Inventory: GIS / Databases / Asset Management Software



Logging and reporting BMP Data: BATT

Break for Questions

Panel Discussion followed by Open Discussion

Panelists:

- Maria Rose, Newton
- Matt Shuman, Watertown
- Stephanie Carlisle and Bridget Graziano, Medway
- Kim Donovan, Needham

Thank you for attending

Upcoming Workshops – Tuesdays from 1:00 to 3:00 PM

- May 10 Workshop #3: Public BMPs: Maximizing the Cost-Benefit Equation
- May 24 Question & Answer Session EPA, MassDEP, and Project Team

Data Request for Workshop #3 – Costs & Benefits of Public Stormwater BMPs

Three options for sharing information extended until **4/8**:

- Populate an excel-based template
- Send us files which include information about BMP costs
- Participate in a phone interview with our team

Questions? Contact Julie Wood at jwood@crwa.org

Thank you for attending

Website Resources

- https://www.crwa.org/phosphorus-control-planning-support.html
- More detail on each workshop
- Links to register
- PCP Templates & resources from FY21

Please submit your questions!

- Our team will work to address them in the remaining workshops & at the Q&A session

Scan QR code to get to website, register, and submit questions

Connect with Us!

Brown AND Caldwell

Charles River Watershed Association

email: charles@crwa.org
newsletter:
https://www.crwa.org/river-current.html

@charlesriverwatershed

@charlesriverwatershed

@charlesriver

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