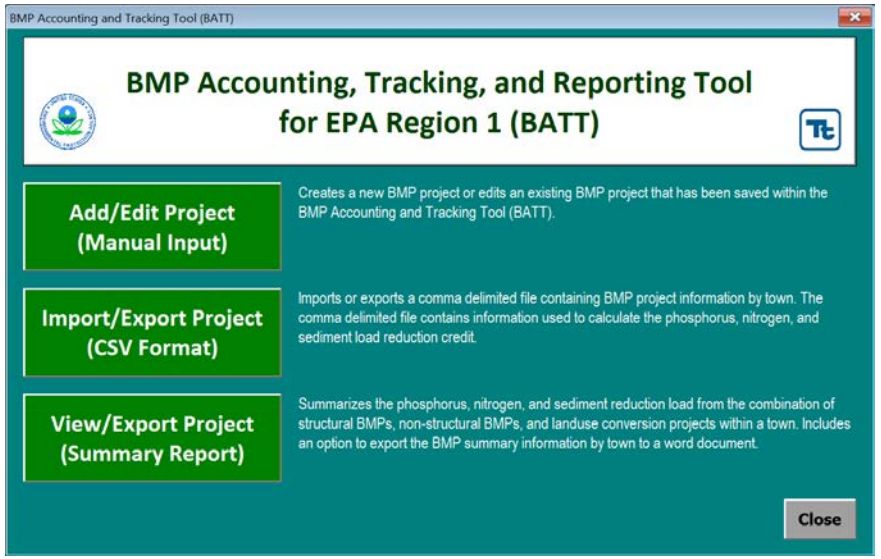

BATT: BMP Accounting & Tracking Tool

Overview of BMP tracking, BMP credits, and Reporting Options

Presenters

- Suzanne Warner
  Environmental Engineer
  US Environmental Protection Agency, Region 1
  Boston, Massachusetts

- Khalid Alvi
  Environmental Engineer
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  Fairfax, Virginia

Project Background

- Small MS4 General Permit for MA and NH
  - Phosphorus reduction requirement to meet the Waste Load Allocations for the impaired watershed
- Phosphorus Control Plan (PCP)
  - To measure compliance with its phosphorus reduction requirement under the permit
- BATT
  - A tool to facilitate storm water engineers to evaluate and track progress on Nutrient Management Practices described in PCP

BATT: An Overview

- A spreadsheet-based tool that facilitates watershed based nutrient accounting, tracking and reporting associated with nutrient load reduction requirements in the Massachusetts and New Hampshire MS4 permit
- Customized for EPA Region 1
- The tool provides three primary functions:
  - Accounting & Tracking of BMP Implementation
  - Accounting & Tracking Changes in Land Uses
  - Reporting

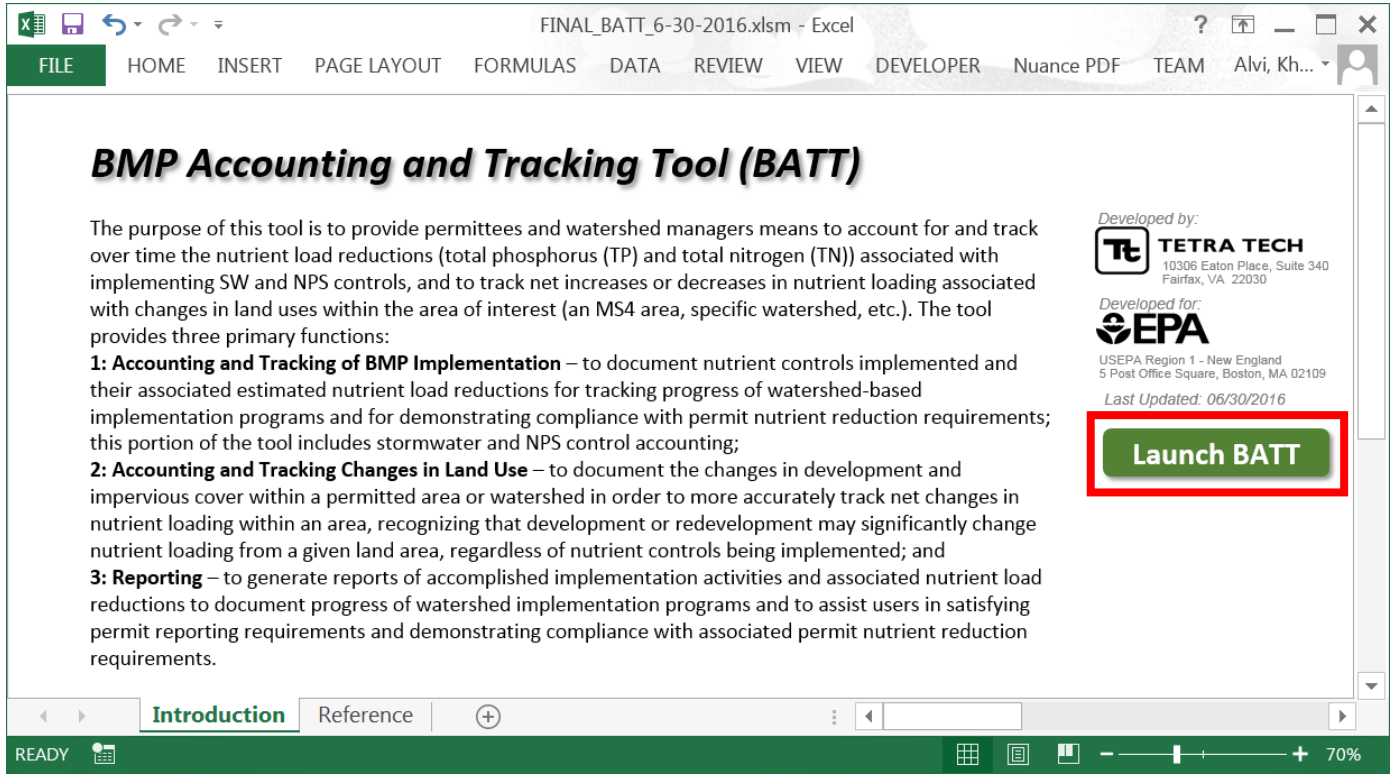
BATT: Software Requirements

- Microsoft Excel 2013
- Microsoft Word 2013
- Security settings should be changed to ‘enable macros’
  - Click the File Button and go to *Options.* On the left-hand menu select *Trust Center* and click the button for *Trust Center Settings*. On the left-hand menu select *Macro Settings*. Select the *Enable All Macros* option.
- Activate ‘MS Work 15.0 Object Library’
  - Activate the Visual Basic Editor window (*Alt F11*). Select the current project in the Project Explorer window, and choose *Tools | References*. In the References dialog box, choose the *MS Word 15.0 Object Library* in the Available References list box. Scroll down in the Available References list box to locate this object library and click the check box next to this object library. Click *OK* to close the Reference dialog box.

BATT: Interface

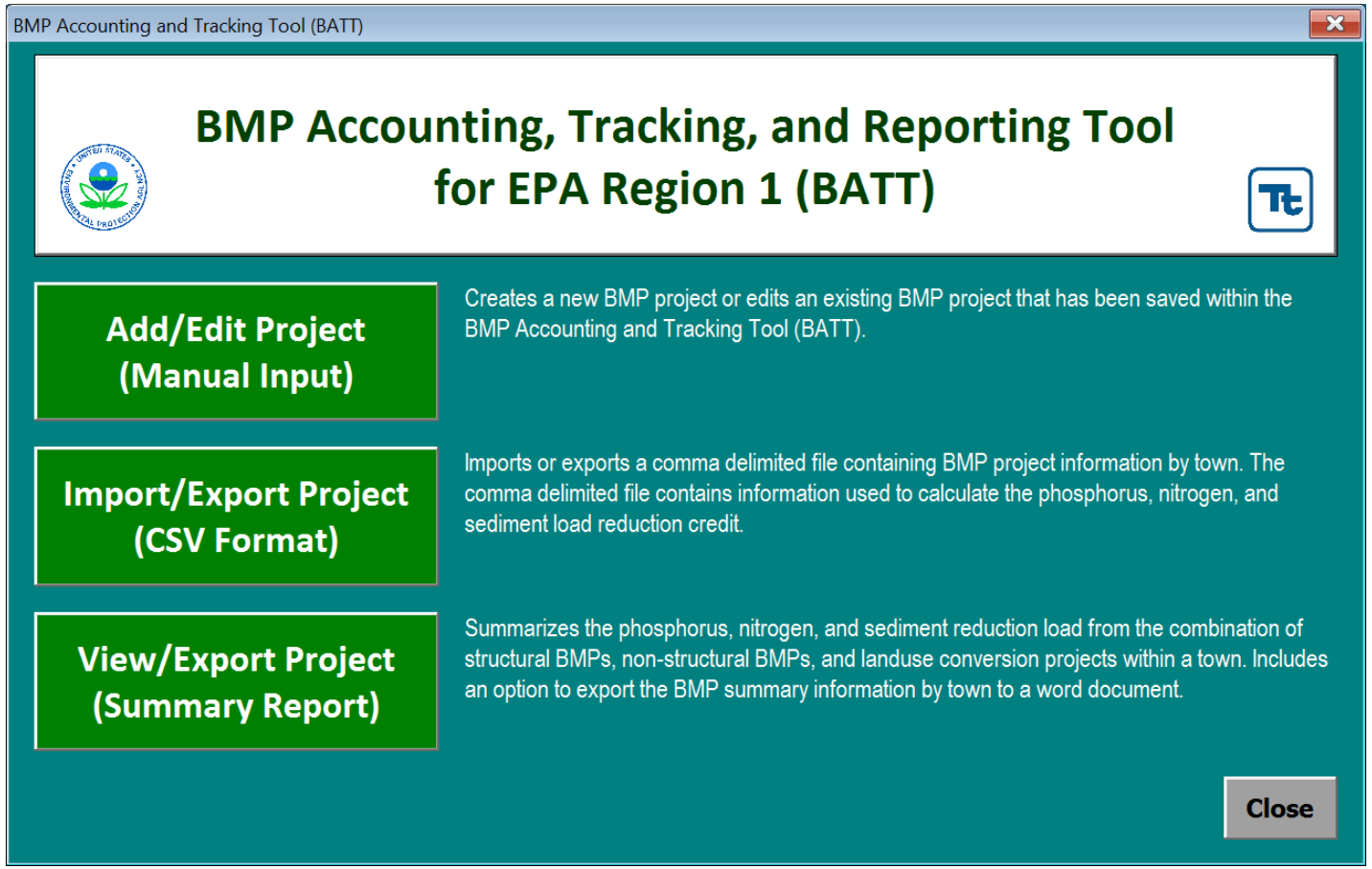
- BATT is launched from the 'Launch BATT' button on the *Introduction* Screen

Caution: Once any form is opened in BATT, Microsoft Excel will be locked. However, Microsoft Word is still accessible. In order to access data while BATT is open, move data to a word document.



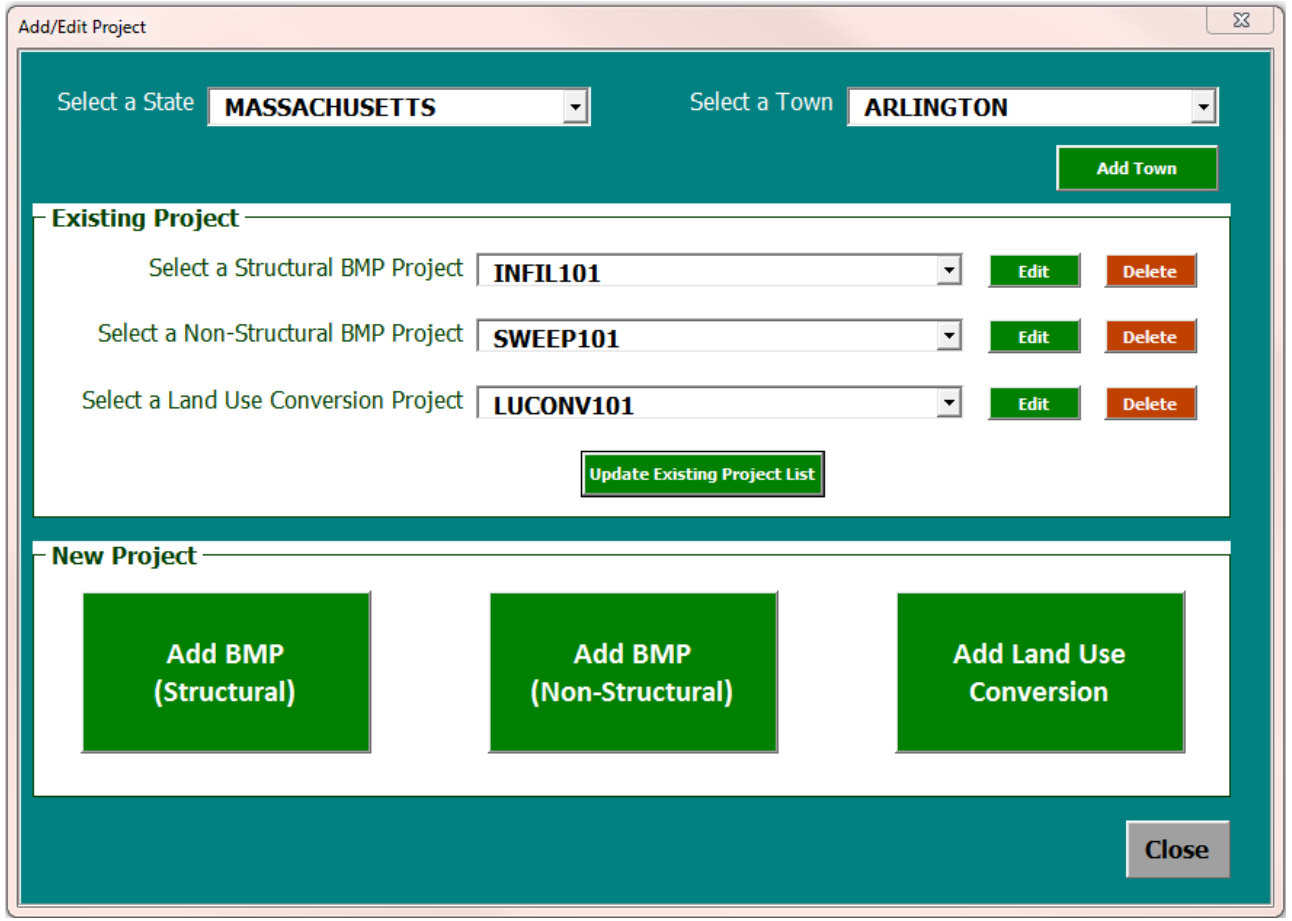
BATT: Home Screen

- The *Home* form offers three option:
  - Add/Edit Project (Manual Input)
  - Import/Export Project (CSV Format)
  - View/Export Project (Summary Report)



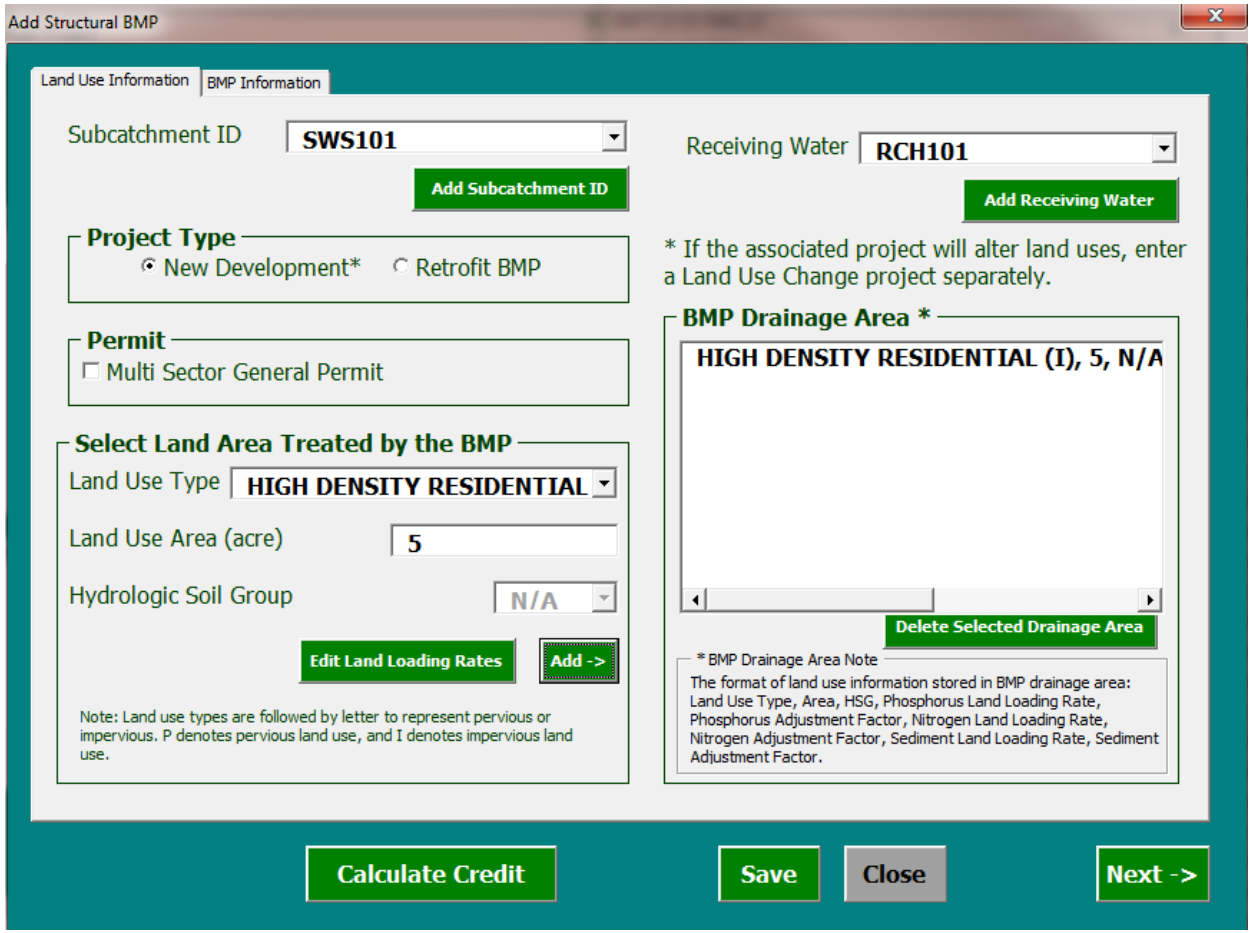
BATT: Add/Edit Project

- The user is **required** to select a state and town before proceeding
- *Edit* option launches a project form containing the existing BMP project and land use information
- *Delete* option removes the selected project from the project database
- *Update Existing Project List* updated the structural, non-structural, and land use conversion project list after a project is edited, deleted or added
- *Add BMP (Structural)*, *Add BMP (Non-Structural)*, and *Add Land Use Conversion* launches a project form depending on the project type



BATT: Add New BMP Project

- *Add BMP (Structural/Non-Structural)* option launches a project form asking the new BMP project and land use information
- If a subcatchment ID or receiving water is saved via the *Add Subcatchment* form or *Add Receiving Water* form, then the added option will become available in corresponding option boxes



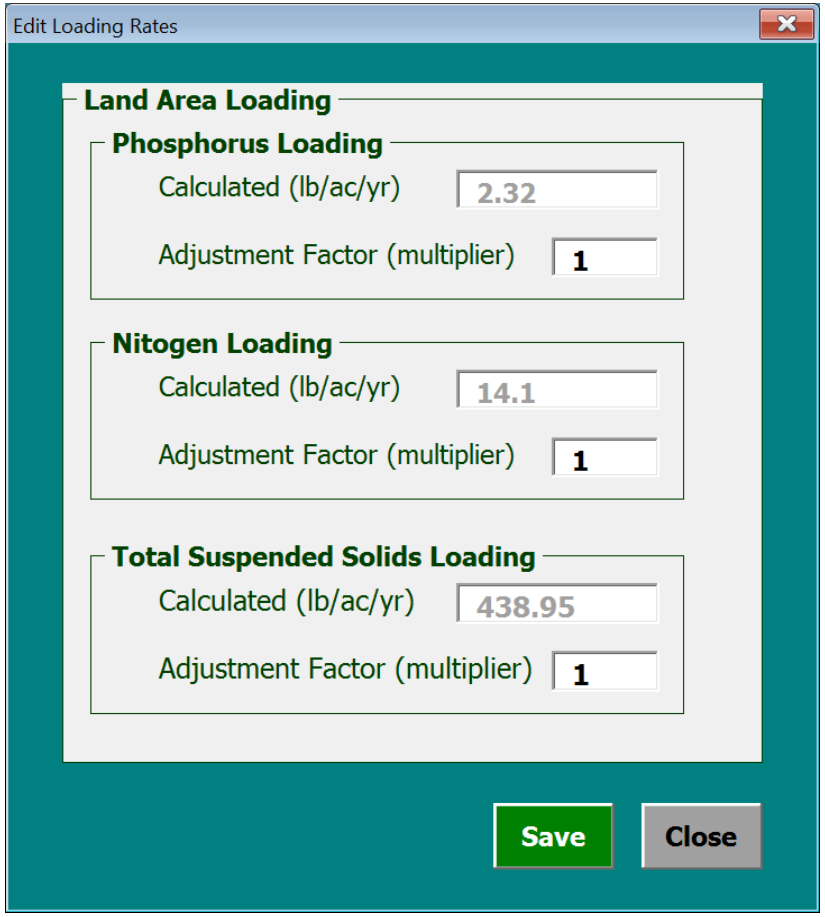
BATT: Add New BMP Project – cont.

- The selection of land use type is limited to the number of land use type available in the Opti-Tool
- The letter at the end of the land use type denotes if the land use is impervious (I) or pervious (P)
- Hydrologic Soil Group (HSG) Options: A, B, C, C/D, D
- To add land use information, the user must select the land use type and the hydrologic soil group for pervious land, and provide the land use area

Land Use List
AGRICULTURE (I)
AGRICULTURE (P)
COMMERCIAL (I)
COMMERCIAL (P)
FOREST (I)
FOREST (P)
HIGH DENSITY RESIDENTIAL (I)
HIGH DENSITY RESIDENTIAL (P)
HIGHWAY (I)
HIGHWAY (P)
INDUSTRIAL (I)
INDUSTRIAL (P)
LOW DENSITY RESIDENTIAL (I)
LOW DENSITY RESIDENTIAL (P)
MEDIUM DENSITY RESIDENTIAL (I)
MEDIUM DENSITY RESIDENTIAL (P)
OPEN LAND (I)
OPEN LAND (P)

BATT: Add New BMP Project – cont.

- The *Edit Land Loading Rates* form provides the land loading rates, and the user has the option to change the adjustment factor and save the changes
- The *Add* button assumes an adjustment factor of 1, unless the user edited the adjustment factor in *the Edit land Loading Rates* form, and then moves the land use information into the *BMP Drainage Area* box
- The *BMP Drainage Area Note* explains the format of the land use information in the *BMP Drainage Area* box



BATT: Structural BMP Information

- Required Information
  - Unique Project ID
  - BMP Type
  - Associated BMP Specifications
    - Storage Volume (ft^3)
    - Infiltration Rate (in/hr)

Infiltration Rate (in/hr)
0.17
0.27
0.52
1.02
2.41
8.27

Structural BMPs List
BIORETENTION
ENHANCED BIORETENTION
EXTENDED DRY DETENTION POND
GRASS SWALE (CONVEYANCE)
GRAVEL WETLAND
INFILTRATION BASIN
INFILTRATION TRENCH
POROUS PAVEMENT
WET POND/CREATED WETLAND

BATT: Non-Structural BMP Information

- Required Information
  - Unique Project ID
  - BMP Type
  - Associated BMP Specifications
    - Storage Volume (ft^3)
    - Release Rate for Impervious Area Disconnection Through Storage BMP (1, 2, or 3 days)
    - Enhanced Sweeping Program
      - Sweeper Technology
      - Sweeper Frequency

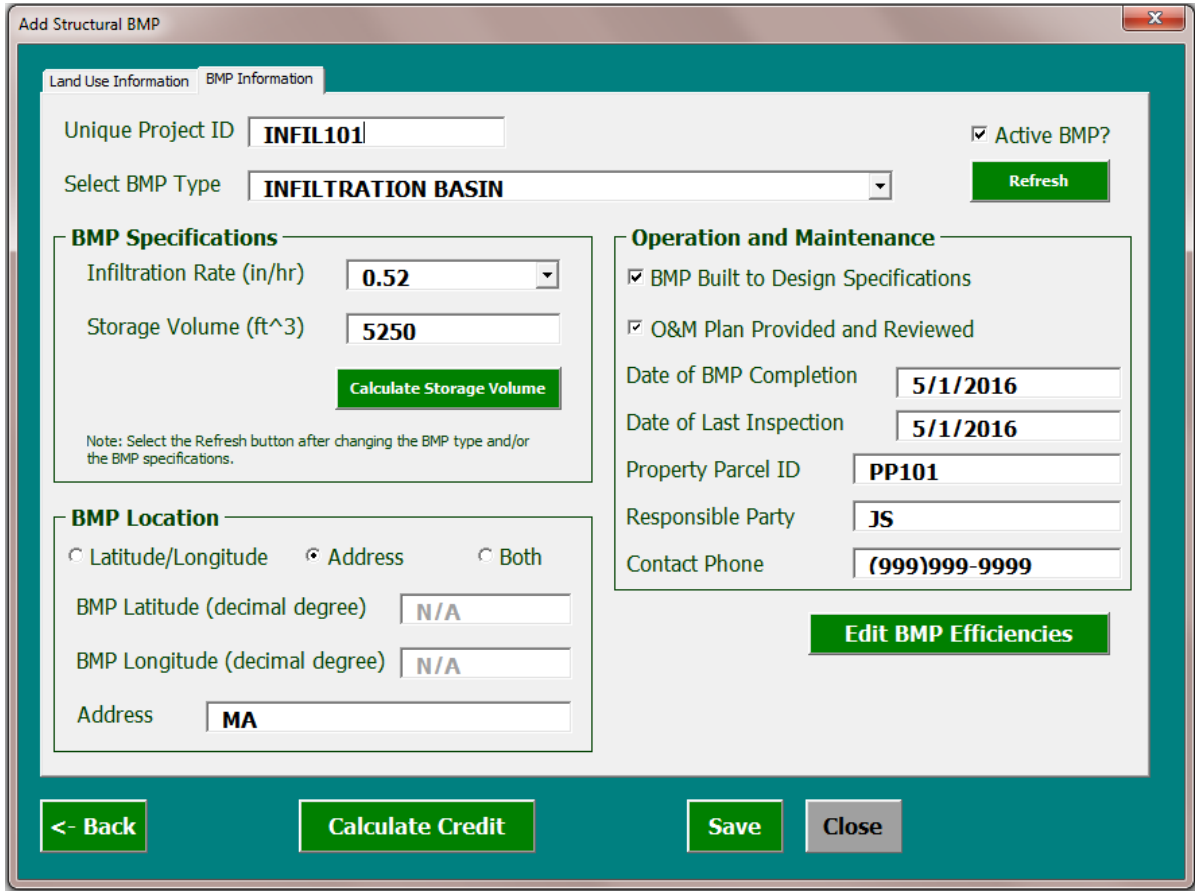
Sweeper Technology Choices
HIGH-EFFICIENCY REGENERATIVE AIR-VACUUM
MECHANICAL BROOM
VACUUM ASSISTED

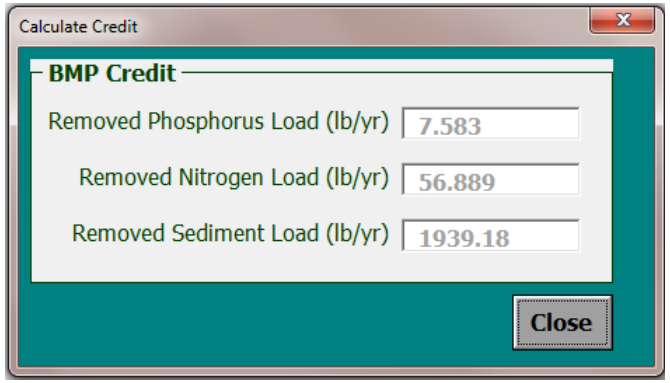
Sweeper Frequency Choices
MONTHLY
TWICE/YEAR (SPRING AND FALL)
WEEKLY

Non-Structural BMPs List
CATCH BASIN CLEANING
ENHANCED SWEEPING PROGRAM
IMPERVIOUS AREA DISCONNECTION
IMPERVIOUS AREA DISCONNECTION THROUGH STORAGE
NO APPLICATION OF FERTILIZERS CONTAINING PHOSPHORUS
ORGANIC WASTE/LEAF LITTER COLLECTION PROGRAM

BATT: Add New BMP Project – cont.

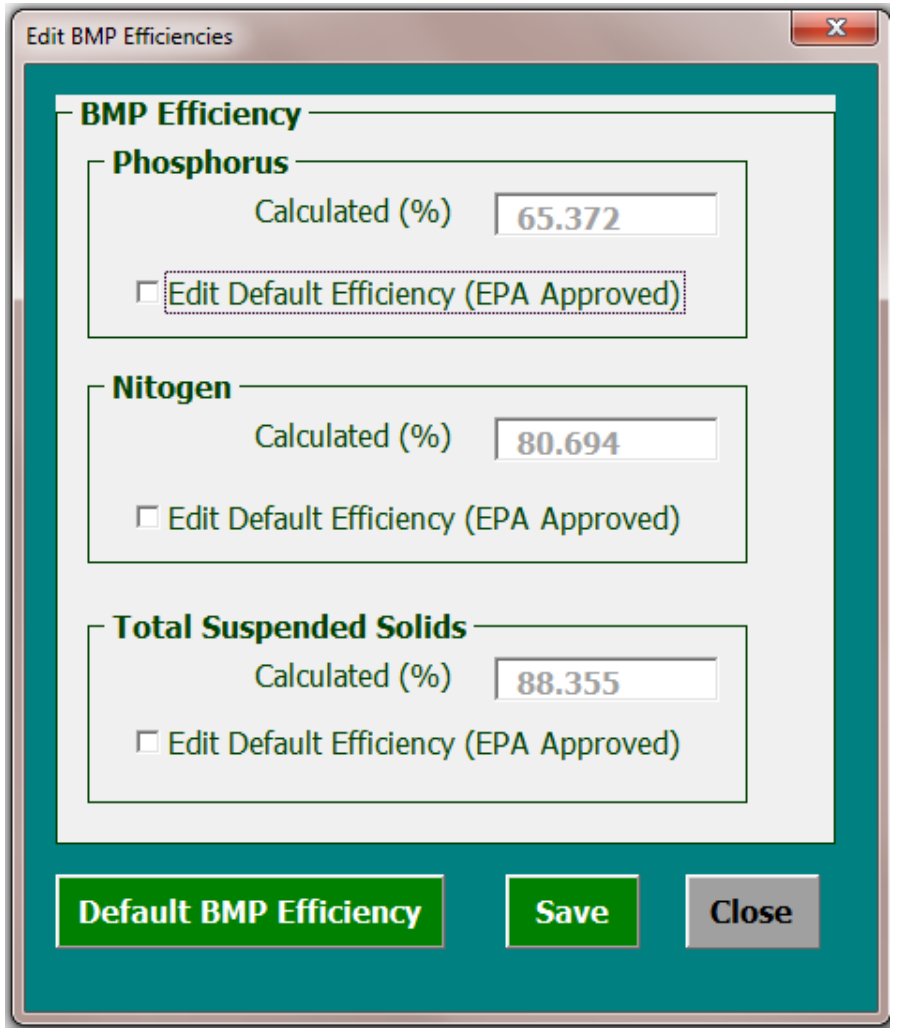
- The *Refresh* button re-calculates the default BMP efficiencies, if the user changed the BMP type or BMP specifications
- The Calculate Credit button calculates the change in load from the implemented BMP or from the land use conversion





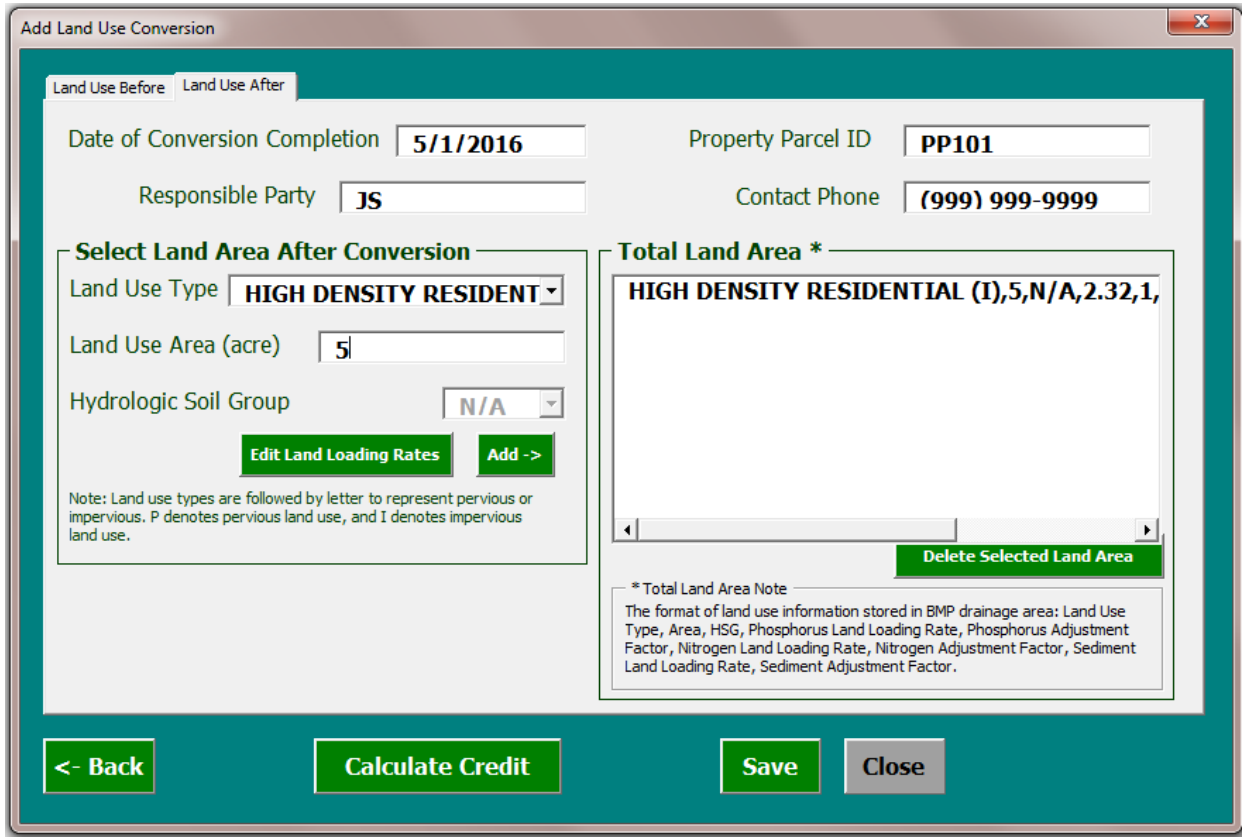
BATT: Add New BMP Project – cont.

- The Edit BMP Efficiencies calculates the selected BMP efficiency for phosphorus, nitrogen, and total suspended solids
- The Edit Default Efficiency (EPA Approved) option box provides the option to edit the calculated efficiencies, with EPA approval
- The Default BMP Efficiency button re-calculates the default BMP efficiencies and populates the form with default BMP efficiencies



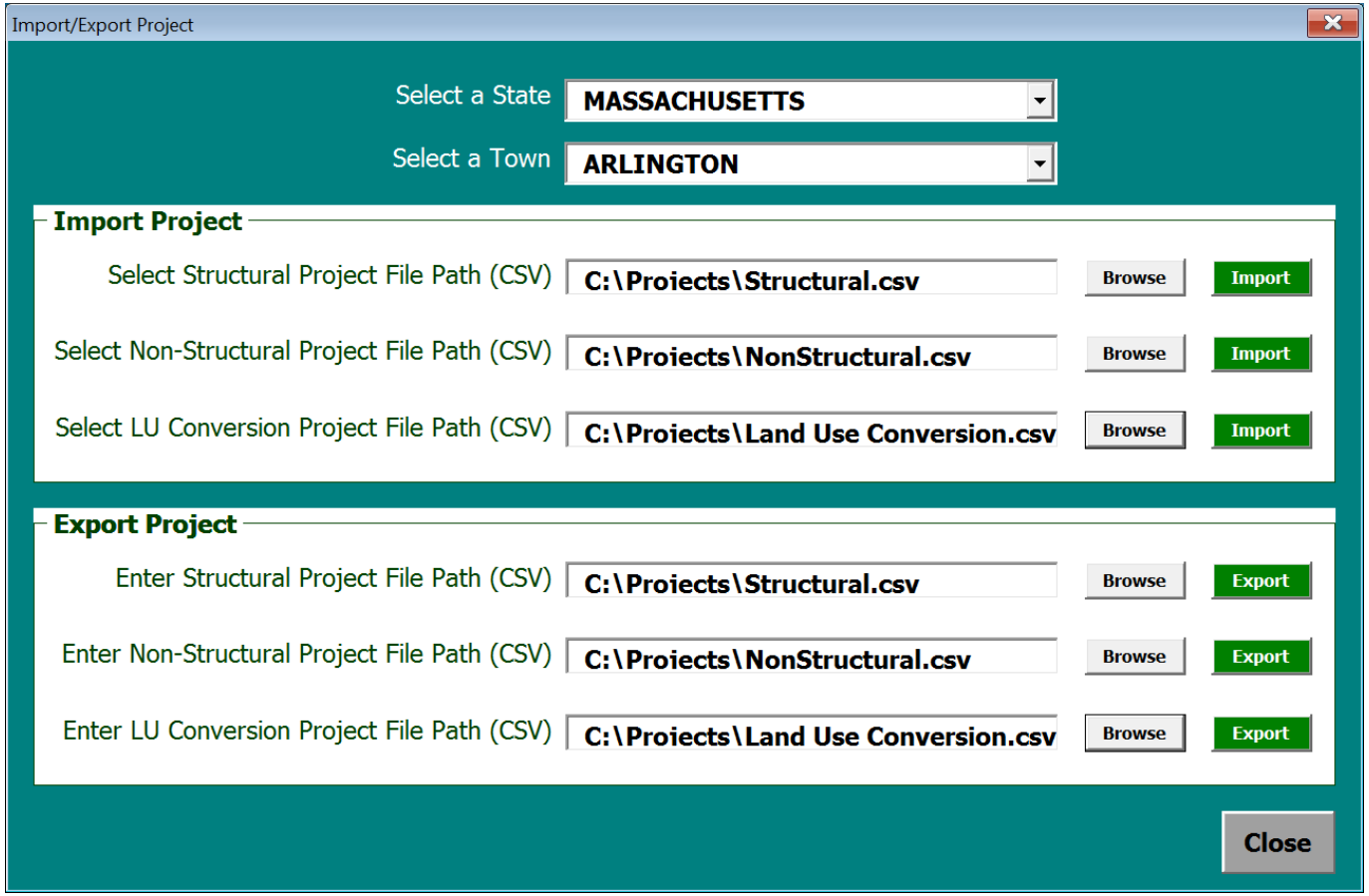
BATT: Add New Land Use Conversion Project

- Required Information
  - Land Use Before
  - Land Use After
- The total land use area before conversion **must** be equal to the total land use area after conversion
- The new developed areas may generate more loads and result in negative credits



BATT: Import/Export Project (CSV Format)

- The import/export project function provides the option to browse for a comma separated values (CSV) file and then either import or export a project at the state and town level
- The total number and order of fields are fixed and BATT requires all the fields to be populated in the CSV file



BATT: Import/Export Project – Cont.

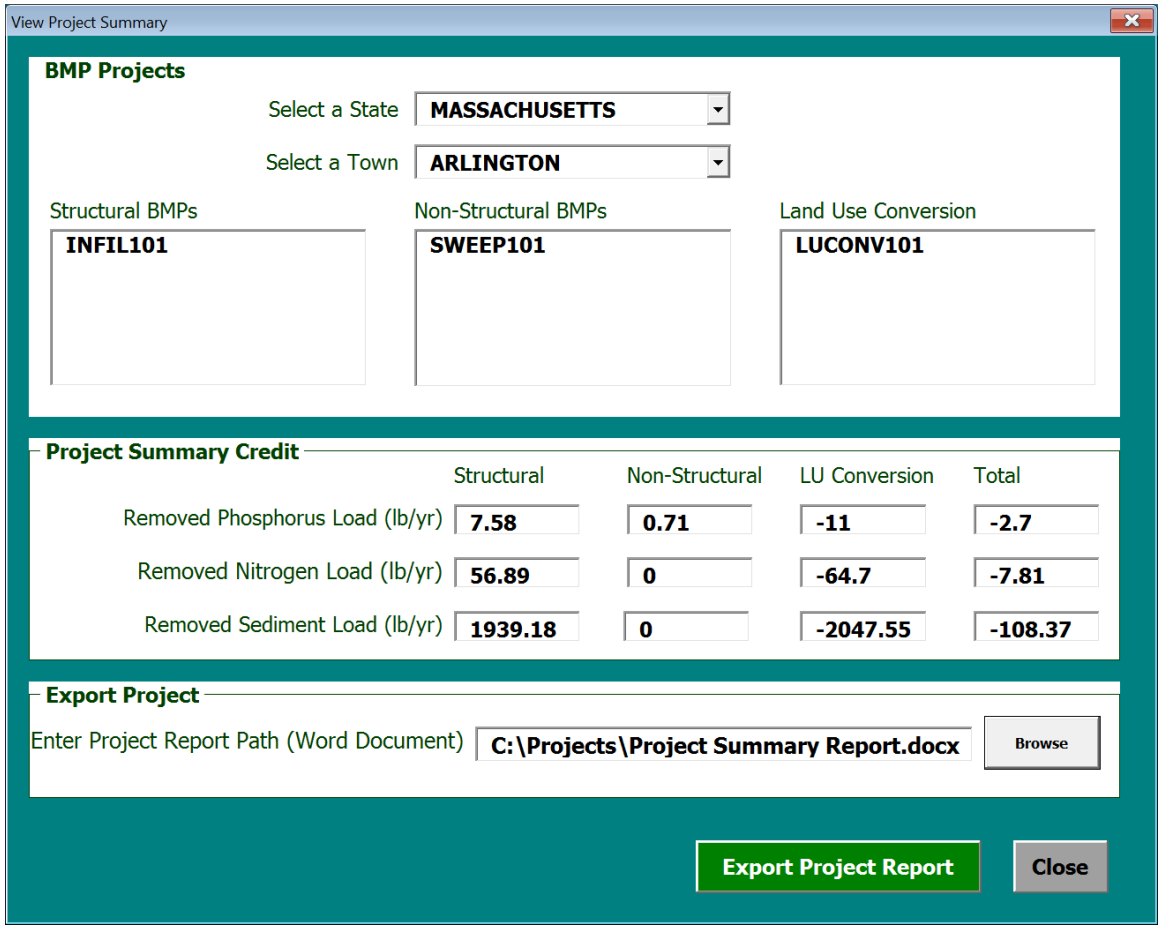
- The number of fields after the *Number of Land Uses* field should be repeated based on the value of *Number of Land Uses*
- If a field is not relevant to the project type it must not be skipped but rather use a flag value
  - N/A for text field
  - -999 for a number field
- Upon importing, BATT calculates the land loading rates
- Once a project is imported, a project can be edited through the *Add/Edit Project* feature or the nutrient load reduction can be summarized through the *View/Export Project (Summary Report)*

BATT: Import/Export Project – Rules

- If Calculated BMP Efficiency is -999 or Edit Default Efficiency is N/A, then upon import, the tool will calculate the default BMP efficiencies based on BMP specifications and land uses
- If the Storage Volume (ft^3)/ Filter Depth (in.) is -999, then BATT assumes a value of 0
- If the Receiving Pervious Area is -999, then the tool assumes an area of 0
- If BMP storage volume or BMP treated land use area is zero, there will be no load credit for such BMPs
- If Land Use Area is -999, then BATT will assume an area of 0
- If Adjustment Factor is -999, then BATT will assume an adjustment factor of 1

BATT: View/Export Project (Summary Report)

- The view/export project report function lists the unique identification of BMP and land use conversion projects
- Summarizes phosphorus, nitrogen, and sediment total load reduction
- The project report includes the State and Town level project summary credit and individual project summary
- The Export Project Report exports the project summary to a word document



BATT: View/Export Project – Cont.

Table 1. Project Summary Credit for ARLINGTON

	Removed Phosphorus Load (lb/yr)	Removed Nitrogen Load (lb/yr)	Removed Sediment Load (lb/yr)
Structural	7.58	56.89	1939.18
Non-Structural	0.71	0	0
Land Use Conversion	-11	-64.7	-2047.55
Total	-2.7	-7.81	-108.37

Table 2. Structural Project Summary for ARLINGTON

Project ID	BMP Type	BMP Storage Capacity (ft^3)/ Filter Depth (in.)	Phosphorus BMP Efficiency (%)	Nitrogen BMP Efficiency (%)	Sediment BMP Efficiency (%)	Removed Phosphorus Load (lb/yr)	Removed Nitrogen Load (lb/yr)	Removed Sediment Load (lb/yr)	Impervious Area Treated (acres)	Runoff Depth (in.)
INFIL101	INFILTRATION BASIN	5250	65.37	80.69	88.36	7.58	56.89	1939.18	5	0.29

Table 3. Non-Structural Project Summary for ARLINGTON

Project ID	BMP Type	BMP Storage Capacity	Phosphorus BMP Efficiency (%)	Nitrogen BMP Efficiency (%)	Sediment BMP Efficiency (%)	Removed Phosphorus Load (lb/yr)	Removed Nitrogen Load (lb/yr)	Removed Sediment Load (lb/yr)	Impervious Area Treated (acre)	Runoff Depth (in.)
SWEEP101	ENHANCED SWEEPING PROGRAM	N/A	8	0	0	0.71	0	0	5	N/A

Table 4. Land Use Conversion Project Summary for ARLINGTON

Project ID	Removed Phosphorus Load (lb/yr)	Removed Nitrogen Load (lb/yr)	Removed Sediment Load (lb/yr)	Impervious Area Treated (acre)
LUCHANGE101	-11	-64.7	-2047.55	5

BATT: Example Structural BMP Import/Export (CSV Format)

Field Name
State*,**
Town*,**
Unique Project ID**
Selected BMP Type*,**
Active BMP (Yes/No)*,**
Project Type (New Development/Retrofit)*,**
Multi Sector General Permit (Yes/No)*,**
Phosphorus: Calculated BMP Efficiency (%)***
Phosphorus: Edit Default Efficiency (Yes/No)*,**
Nitrogen: Calculated BMP Efficiency (%) ***
Nitrogen: Edit Default Efficiency (Yes/No)*,**
Total Suspended Solids: Calculated BMP Efficiency (%)***
Total Suspended Solids: Edit Default Efficiency (Yes/No)*,**
Phosphorus Load Reduction (lb/yr)***
Nitrogen Load Reduction (lb/yr)***
Total Suspended Solids Load Reduction (lb/yr)***
Date of BMP Completion**
Date of Last Inspection**
Subcatchment ID**
Receiving Water**
Infiltration Rate (in/hr)*,**
Storage Volume (ft^3) / Filter Depth (in.)**
BMP latitude (degree)**
BMP Longitude (degree)**
Address**
BMP Built to Design Specification (Yes/No)*,**
O&M Plan Provided and Reviewed (Yes/No)*,**
Property Parcel ID**
Responsible Party**
Contact Phone**
Number of Land Uses**
Land Use Type1*,**
Land Use Area (ac) 1**
Hydrologic Soil Group1*,**
TP Calculated Land Area Loading (lb/ac/yr)1***
TP Adjustment Factor1**,***
TN Calculated Land Area Loading (lb/ac/yr)1***
TN Adjustment Factor1**,***
TSS Phosphorus Calculated Land Area Loading (lb/ac/yr)1***
TSS Adjustment Factor1**,***

**The value should match with the options available in BATT.*
***BATT required input (import CSV file).*
****BATT calculated output (export CSV file).*

BATT: Example Structural BMP Import

State	Town	Unique Project ID	Selected BMP Type	Active BMP (Yes/No)	Project Type	Multi Sector General Permit	Phosphorus: Calculated BMP Efficiency (%)	Phosphorus: Edit Default Efficiency (EPA Approved)	Nitrogen: Calculated BMP Efficiency (%)	Nitrogen: Edit Default Efficiency (EPA Approved)	Total Suspended Solids: Calculated BMP Efficiency (%)	Total Suspended Solids: Edit Default Efficiency (EPA Approved)	Phosphorus Load Reduction (lb/yr)	Nitrogen Load Reduction (lb/yr)	Total Suspended Solids Load Reduction (lb/yr)
MASSACHUSETTS	ARLINGTON	B101	BIORETENTION	-999	New Development	No	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	EB101	ENHANCED BIORETENTION	Yes	New Development	No	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	DRY101	EXTENDED DRY DETENTION POND	Yes	New Development	No	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	GS101	GRASS SWALE (CONVEYANCE)	Yes	New Development	No	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	GW101	GRAVEL WETLAND	Yes	New Development	No	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	IT101	INFILTRATION TRENCH	Yes	New Development	No	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	PP101	POROUS PAVEMENT	Yes	New Development	No	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	SI101	SURFACE INFILTRATION	Yes	New Development	No	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	WP101	WET POND/CREATED WETLAND	Yes	New Development	No	-999	-999	-999	-999	-999	-999	-999	-999	-999

BATT: Example Structural BMP Import – Cont.

Date of BMP Completion	Date of Last Inspection	Subcatchment	Receiving Water ID	Infiltration Rate (in/hr)	Storage Volume (ft^3)/ Filter Depth (in.)	BMP latitude (degree)	BMP Longitude (degree)	Address	BMP Built to Design Specification (Yes/No)	O&M Plan Provided and Reviewed (Yes/No)	Property Parcel ID	Responsible Party	Contact Phone
1/1/2016	1/1/2016	SWS101	RCH101	N/A	5250	N/A	N/A	1263	No	No	N/A	N/A	N/A
1/1/2016	1/1/2016	SWS101	RCH101	N/A	7570	N/A	N/A	123	No	No	N/A	N/A	N/A
1/1/2016	1/1/2016	N/A	N/A	N/A	65000	N/A	N/A	123	No	No	N/A	N/A	N/A
1/1/2016	1/1/2016	N/A	N/A	N/A	54000	N/A	N/A	123	No	No	N/A	N/A	N/A
1/1/2016	1/1/2016	N/A	N/A	N/A	15000	N/A	N/A	123	No	No	N/A	N/A	N/A
1/1/2016	1/1/2016	N/A	N/A	2.41	98765	N/A	N/A	123	No	No	N/A	N/A	N/A
1/1/2016	1/1/2016	N/A	N/A	N/A	0	N/A	N/A	123	No	No	N/A	N/A	N/A
1/1/2016	1/1/2016	N/A	N/A	0.17	567980	N/A	N/A	123	No	No	N/A	N/A	N/A
1/1/2016	1/1/2016	N/A	N/A	N/A	30000	N/A	N/A	123	No	No	N/A	N/A	N/A

BATT: Example Structural BMP Import – Cont.

Number of Land Uses	Land Use Type 1	Land Use Area (ac) 1	Hydrologic Soil Group 1	TP Calculated Land Area Loading (lb/ac/yr) 1	TP Adjustment Factor 1	TN Calculated Land Area Loading (lb/ac/yr) 1	TN Adjustment Factor 1	TSS Phosporus Calculated Land Area Loading (lb/ac/yr) 1	TSS Adjustment Factor 1
1	OPEN LAND (I)	45	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	OPEN LAND (I)	45	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	OPEN LAND (I)	45	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	OPEN LAND (I)	45	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	OPEN LAND (I)	45	N/A	N/A	N/A	N/A	N/A	N/A	N/A
-999	OPEN LAND (I)	45	N/A	N/A	N/A	N/A	N/A	N/A	N/A

BATT: Example Non-Structural BMP Import/Export (CSV Format)

Field Name
State*,**
Town*,**
Unique Project ID**
BMP Type*,**
Active (Yes/No)*,**
TP Efficiency***
Edit Default TP Efficiency (Yes/No)*,**
TN Efficiency***
Edit Default TN Efficiency (Yes/No) *,**
TSS Efficiency***
Edit Default TSS Efficiency (Yes/No) *,**
Phosphorus Reduction Load***
Nitrogen Reduction Load***
Total Suspended Sediment Reduction Load***
Date of BMP Completion**
Subcatchment**
Receiving Water ID**
Storage Volume**
Receiving Pervious Area**
Release Rates*,**
Pervious Area HSG*,**
Sweeper Technology*,**
Sweeper Frequency*,**
Responsible Party**
Contact Phone Number**
Number of Land Uses**
Land Use Type 1*,**
Land Use Area (ac) 1**
Hydrologic Soil Group 1*,**
TP Calculated Land Area Loading (lb/ac/yr) 1***
TP Adjustment Factor 1**,***
TN Calculated Land Area Loading (lb/ac/yr) 1***
TN Adjustment Factor 1**,***
TSS Phosphorus Calculated Land Area Loading (lb/ac/yr) 1***
TSS Adjustment Factor 1**,***

**The value should match with the options available in BATT.*
***BATT required input (import CSV file).*
****BATT calculated output (export CSV file).*

BATT: Example Non-Structural BMP Import

State	Town	Unique Project ID	BMP Type	Active	Phosphorus: Calculated BMP Efficiency (%)	Phosphorus: Edit Default Efficiency (EPA Approved)	Nitrogen: Calculated BMP Efficiency (%)	Nitrogen: Edit Default Efficiency (EPA Approved)	Total Suspended Solids: Calculated BMP Efficiency (%)	Total Suspended Solids: Edit Default Efficiency (EPA Approved)	Phosphorus Reduction Load (lb/yr)	Nitrogen Reduction Load (lb/yr)	Total Suspended Sediment Reduction Load (lb/yr)
MASSACHUSETTS	ARLINGTON	CBC101	CATCH BASIN CLEANING	No	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	IADISCONN101	IMPERVIOUS AREA DISCONNECTION	Yes	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	IADISCONNS101	IMPERVIOUS AREA DISCONNECTION THROUGH STORAGE	Yes	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	NoFert	NO APPLICATION OF FERTILIZERS CONTAINING PHOSPHORUS	Yes	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	LL101	ORGANIC WASTE/LEAF LITTER COLLECTION PROGRAM	Yes	-999	-999	-999	-999	-999	-999	-999	-999	-999
MASSACHUSETTS	ARLINGTON	ESP101	ENHANCED SWEEPING PROGRAM	Yes	-999	-999	-999	-999	-999	-999	-999	-999	-999

BATT: Example Non-Structural BMP Import – Cont.

Date of BMP Completion	Subcatchment ID	Receiving Water ID	Storage Volume (ft^3)/ Filter Depth (in.)	Receiving Pervious Area (ac)	Release Rates (days)	Pervious Area HSG	Sweeper Technology	Sweeper Frequency	Responsible Party	Contact Phone Number
12/31/2-15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12/31/2-15	N/A	N/A	N/A	4300000	N/A	B	N/A	N/A	N/A	N/A
12/31/2-15	N/A	N/A	65000	4500000	1	B	N/A	N/A	N/A	N/A
12/31/2-15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12/31/2-15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12/31/2-15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TWICE/YEAR (SPRING AND FALL)	N/A	N/A

BATT: Example Land Use Conversion Import/Export (CSV Format)

Field Name
State*,**
Town*,**
Unique Project ID**
Phosphorus Load Reduction (lb/yr)***
Nitrogen Load Reduction (lb/yr)***
Total Suspended Solids Load Reduction (lb/yr)***
Date of Conversion Completed**
Subcatchment ID**
Receiving Water ID**
Property Parcel ID**
Responsible Party**
Contact Phone**
Number of Land Uses After**
Number of Land Uses Before**
Land Use Type 1*,**
Land Use Area (ac) 1**
Hydrologic Soil Group 1*,**
TP Calculated Land Area Loading (lb/ac/yr) 1***
TN Adjustment Factor 1**,***
TN Calculated Land Area Loading (lb/ac/yr) 1***
TN Adjustment Factor 1**,***
TSS Phosphorus Calculated Land Area Loading (lb/ac/yr) 1***
TSS Adjustment Factor 1**,***
Land Use Type 1*,**
Land Use Area (ac) 1**
Hydrologic Soil Group 1*,**
TP Calculated Land Area Loading (lb/ac/yr) 1***
TN Adjustment Factor 1**,***
TN Calculated Land Area Loading (lb/ac/yr) 1***
TN Adjustment Factor 1**,***
TSS Phosphorus Calculated Land Area Loading (lb/ac/yr) 1***
TSS Adjustment Factor 1**,***

**The value should match with the options available in BATT.*
***BATT required input (import CSV file).*
****BATT calculated output (export CSV file).*

BATT: Example Land Use Conversion Import

State	Town	Unique Project ID	Phosphorus Load Reduction (lb/yr)	Nitrogen Load Reduction (lb/yr)	Total Suspended Solids Load Reduction (lb/yr)	Date of Conversion Completed	Subcatchment ID	Receiving Water	Property Parcel ID	Responsible Party	Contact Phone	Number of Land Uses After	Number of Land Uses Before
MASSACHUSETTS	ARLINGTON	LUC101	N/A	N/A	N/A	12/31/2015	N/A	N/A	N/A	N/A	N/A	1	1

BATT: Summary

- Accessible to all users with Microsoft Excel 2013 software
- BMP performance curves for estimating long-term cumulative nutrient and sediment load reduction for structural stormwater controls
- Literature information and other EPA studies for estimating nutrient and sediment load reduction efficiencies for non-structural stormwater controls
- Results are consistent with loading rates and BMP performance documented in the EPA Region 1 MS4 permits
- Report shows progress towards the implementation of PCP, developed for compliance with the MA and NH permits

Feedback and Other Presentations

- Questions or comments?
  - Suzanne Warner (Warner.Suzanne@epa.gov)
- Links to other presentations
  - https://www.epa.gov/npdes/npdes-stormwater-webcasts