BATT: BMP Accounting & Tracking Tool

Small MS4 Permit Technical Support Document, December 2016

BATT: An Overview

The BMP Accounting and Tracking Tool (BATT) is a customized spreadsheet-based tool for EPA Region 1 that facilitates watershed based nutrient accounting, tracking, and reporting associated with nutrient load reduction requirements in the Massachusetts and New Hampshire small MS4 permit. The tool provides three primary functions: (1) accounting and tracking of BMP implementation, (2) accounting and tracking changes in land use, and (3) reporting. Figure 1 shows the spreadsheet interface to launch the BATT program.

The first function, **accounting and tracking of BMP implementation**, documents nutrient controls implemented and their associated estimated nutrient load reductions for tracking progress of watershed-based implementation programs, and for demonstrating compliance with MS4 permit and/or TMDL nutrient reduction requirements. The second function, **accounting and tracking changes in land uses**, documents the changes in development and impervious cover within a permitted area or watershed in order to more accurately track net changes in nutrient loading within an area, recognizing that development or redevelopment may significantly change nutrient loading from a given land area, regardless of nutrient controls being implemented. The third function, **reporting**, generates reports of accomplished implementation activities and associated nutrient load reductions to document progress of watershed implementation programs and to assist users in satisfying permit reporting requirements and demonstrating compliance with associated MS4 permit and/or TMDL nutrient reduction requirements.
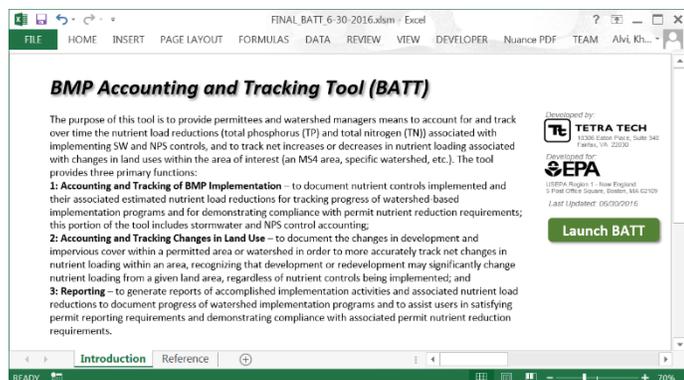

Figure 1. BATT interface

Available Land Uses

The selection of land use types is limited to the number of land use types available in the Opti-Tool and in the small MS4 permit, see Table 1. The letter at the end of the land use type denotes if the land use is impervious (I) or pervious (P). The options of hydrologic soil group (HSG) for the pervious land use type is shown in Table 1. The HSG is not applicable to the impervious land use type.

Table 1. Land Uses and Hydrologic Soil Group in BATT.

Land Use Type	Hydrologic Soil Group (HSG)
Agriculture (I)	--
Agriculture (P)	A,B,C, C/D, D
Commercial (I)	--
Commercial (P)	A,B,C, C/D, D
Forest (I)	--
Forest (P)	A,B,C, C/D, D
High Density Residential (I)	--
High Density Residential (P)	A,B,C, C/D, D
Highway (I)	--
Highway (P)	A,B,C, C/D, D
Industrial (I)	--
Industrial (P)	A,B,C, C/D, D
Low Density Residential (I)	--
Low Density Residential (P)	A,B,C, C/D, D
Medium Density Residential (I)	--
Medium Density Residential (P)	A,B,C, C/D, D
Open Land (I)	--
Open Land (P)	A,B,C, C/D, D

P: *pervious land*
I: *impervious land*

Available Structural BMPs

BATT provides a suite of structural BMPs to select from the list that includes biofiltration and infiltration practices with a range of infiltration rate options, see Table 2.

Table 2. Structural BMPs and infiltration rates for infiltration BMP types in BATT.

Structural BMPs	Infiltration Rate (in/hr)
Bioretention	--
Enhanced Bioretention	--
Extended Dry Detention Pond	--
Grass Swale (Conveyance)	--
Gravel Wetland	--
Infiltration Basin	0.17, 0.27, 0.52, 1.02, 2.41, 8.27
Infiltration Trench	0.17, 0.27, 0.52, 1.02, 2.41, 8.27
Porous Pavement	--
Wet Pond/Created Wetland	--

Available Non-Structural BMPs

BATT provides a suite of non-structural BMPs to select from the list that includes programmatic and source control practices, see Table 3.

Table 3. Non-structural BMPs and BMP specification options.

Non- Structural BMPs	Release Rate (Day)	Sweeper Technology	Sweeper Frequency
Catch Basin Cleaning	--	--	--
Enhanced Sweeping Program	--	High-Efficiency Regenerative Air Vacuum, Mechanical Broom, Vacuum Assisted	Monthly, Twice/year (Spring and Fall), Weekly
Impervious Area Disconnection	--	--	--
Impervious Area Disconnection Through Storage	1,2,3	--	--
No Application of Fertilizers Containing Phosphorus	--	--	--
Organic Waste/ Leaf Litter Collection Program	--	--	--

Launching BATT

The BATT is launched from the 'Launch BATT' button on the Introduction Screen that appears when the model spreadsheet is first opened (Figure 1). After selecting 'Launch BATT', the *Home Page* form will appear, see Figure 2. The Home form offers the option to either add/edit project, import/export project, or view/export project summary report.


Figure 2. BATT home page form

Option 1. Add/Edit Project (Manual Edit)

The add/edit project function provides the option to create a new project or edit a previously saved project. A project is defined as an individual structural BMP, non-structural BMP, or land use conversion project.

Option 1. Add/Edit Project

The user is **required** to select a state and town before proceeding with to editing or deleting an existing project or creating a new project, see Figure 3. The *Town* option box is populated based on the selected *State*. The *Edit* option launches a project form containing the BMP project and land use information. The *Delete* option removes the selected project from the project database within BATT spreadsheet. The *Update Existing Project List* updates the structural, non-structural, and land use conversion project list after a project is edited, deleted or added. The New Project options: *Add BMP (Structural)*, *Add BMP (Non-Structural)*, and *Add Land Use Conversion* launch a project form depending on the project type.
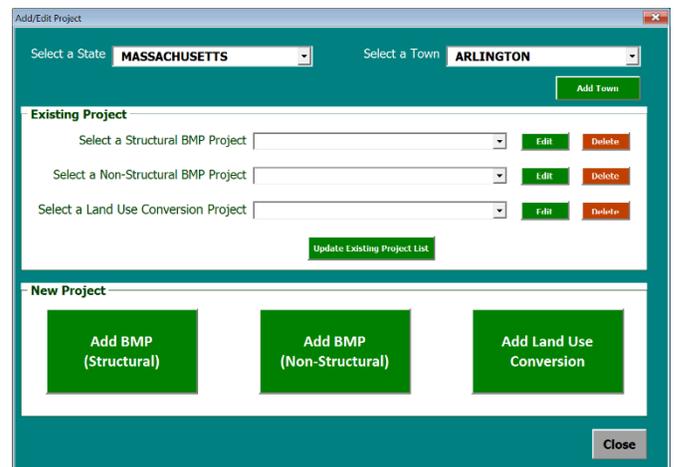
Figure 3. Add/Edit Project (Manual Input) form

After a new project is launched, the user is prompted to provide land use information (Figure 4). The land use type, hydrologic soil group, and land use area are **<u>required</u>** components. If the land use type is impervious, then the Hydrologic Soil Group option will become disabled and a N/A value will appear.

Figure 4. Land Use Information

After the land use type, land use area, and the hydrologic soil group are provided the user has two options, edit land loading rates or add the land use information into the *BMP Drainage Area* box. 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, see Figure 5. 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.

Figure 5. Edit Loading Rates (example – High Density Residential (I) land use type)

For land use conversion project, the *Next* button will prompt the user to the *Land Use After* tab. Within *the Land Use After* tab, the user can provide the date of conversion completion, property parcel ID, contact phone, and the land use information. The total land use area before conversion must be equal to the total land use area after conversion.

For structural and non-structural BMPs, after the land use information has been entered, the user can move onto the next step to input BMP information. The Next button prompts the user to the BMP Information tab, see Figure 6.

Figure 6. Add Structural BMP – BMP Information

Within the BMP Information tab, the user must provide a unique Project ID, BMP type, and associated BMP specifications before the tool can calculate credit. The *Edit BMP Efficiencies* calculates the selected BMP efficiency for phosphorus, nitrogen, and total suspended solids, see Figure 7. The *Edit Default Efficiency (EPA Approved)* check box provides an option to edit the calculated efficiencies. The user defined efficiency numbers must be approved by EPA. Once the *Edit Default Efficiency (EPA Approved)* button is checked, the user can edit the calculated BMP efficiencies percentage. The *Default BMP Efficiency* button re-calculates the default BMP efficiencies and populates the form with default numbers.

> **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.
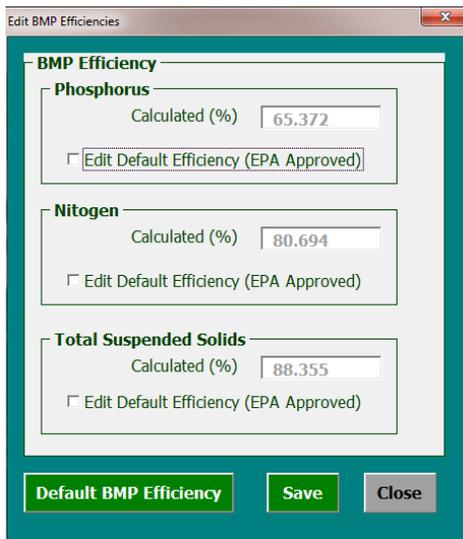
Figure 7. Edit BMP Efficiencies (example – Infiltration Basin)

The *Refresh* button re-calculate the BMP efficiencies, if the user changed the BMP type or BMP specifications. The *Calculate Credit* button calculates the load reductions from the implemented BMP, see Figure 8.
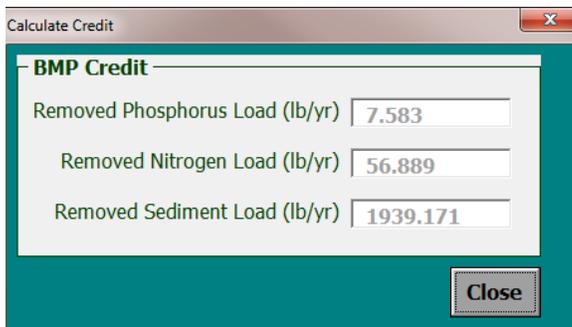
Figure 8. Calculate Credit (example – Structural BMP project)

Option 2. Import/Export Project (CSV Format)

Option 2. Import/ Export Project

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 import project feature imports structural, non-structural, or land use conversion projects into the project database within BATT. For an imported CSV file, the total number and order of fields are fixed and BATT requires all the fields to be populated in the CSV file. Even 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 and -999 for a number field.

Upon importing, BATT calculates the land loading rates and the BMP efficiencies. 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 function.

Example Structural BMP Import/Export CSV

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)*,**
Nitogen: 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).

Option 3. View/Export Project (Summary Report)

Option 3. View/ Export Project

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, and provides the option to export the project summary to a word document.

The user selects the *State* and *Town* to populate a list of structural, non-structural, and land use conversion projects previously saved for that town. The user interface will also show the load reductions (credits) achieved through implementation of those projects. The *Export Project Report* provides the user an option to export the summary report to a user defined word document, see Figure 9.
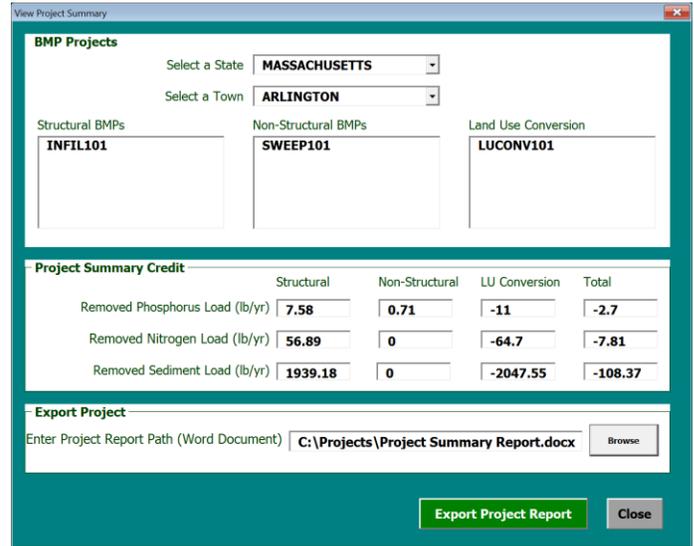

Figure 9. BATT Project Summary

Example Project Summary Report

Table B1. 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 B2. Structural Project Summary for ARLINGTON

Project ID	BMP Type	BMP Storage Capacity (ft³)/ 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 B3. 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 B4. 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

Where Can I go for More Information?

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