

Stormwater Best Management Practice Database

A Tool for Long Term Managing and Reporting
Installation and Facility BMPs and their Efficiencies

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Stormwater Best Management Practice Database

Inventory

Inspection



®

US Army Corps of Engineers
BUILDING STRONG®



Developed by the US Army Corps of Engineers,
Baltimore District

Planning Division Mission

- ***Provide comprehensive water resources planning services - Civil Customers***
- ***Provide comprehensive facility planning and technical support services - DoD and Federal Agencies***



Programs and Services-DoD and Federal Agencies

Full range of comprehensive planning, environmental and technical services to help customers develop new facilities and manage existing facilities. Services fall under the following:

- ▶ **Facility Planning**
 - Site Screening and Selection Studies
 - Environmental Constraints Analysis
 - GIS mapping and analysis
- ▶ **Water Resources Planning**
 - Watershed Management Analysis and Planning
 - ***TMDL Technical Support***
 - ***LID Planning***
 - ***Stormwater Management Plans***
 - Wetland Delineations
 - Hydrologic Modeling
- ▶ **Environmental Management and Regulatory Compliance**
 - National Environmental Policy Act (NEPA)
 - Integrated Natural Resources Management Plans
 - Threatened and Endangered Species Surveys
- ▶ **Cultural Resources**
 - Archeological Investigations and Data Recovery
 - Integrated Cultural Resource Management Plans



Key DoD and Federal Customers

- **Army Installations**
- **Army National Guard**
- **Army Reserves**
- **Asst Chief of Staff for Installation Mgmt (ACSIM)**
- **Joint Base Andrews**
- **U.S. Navy**
- **FEMA**



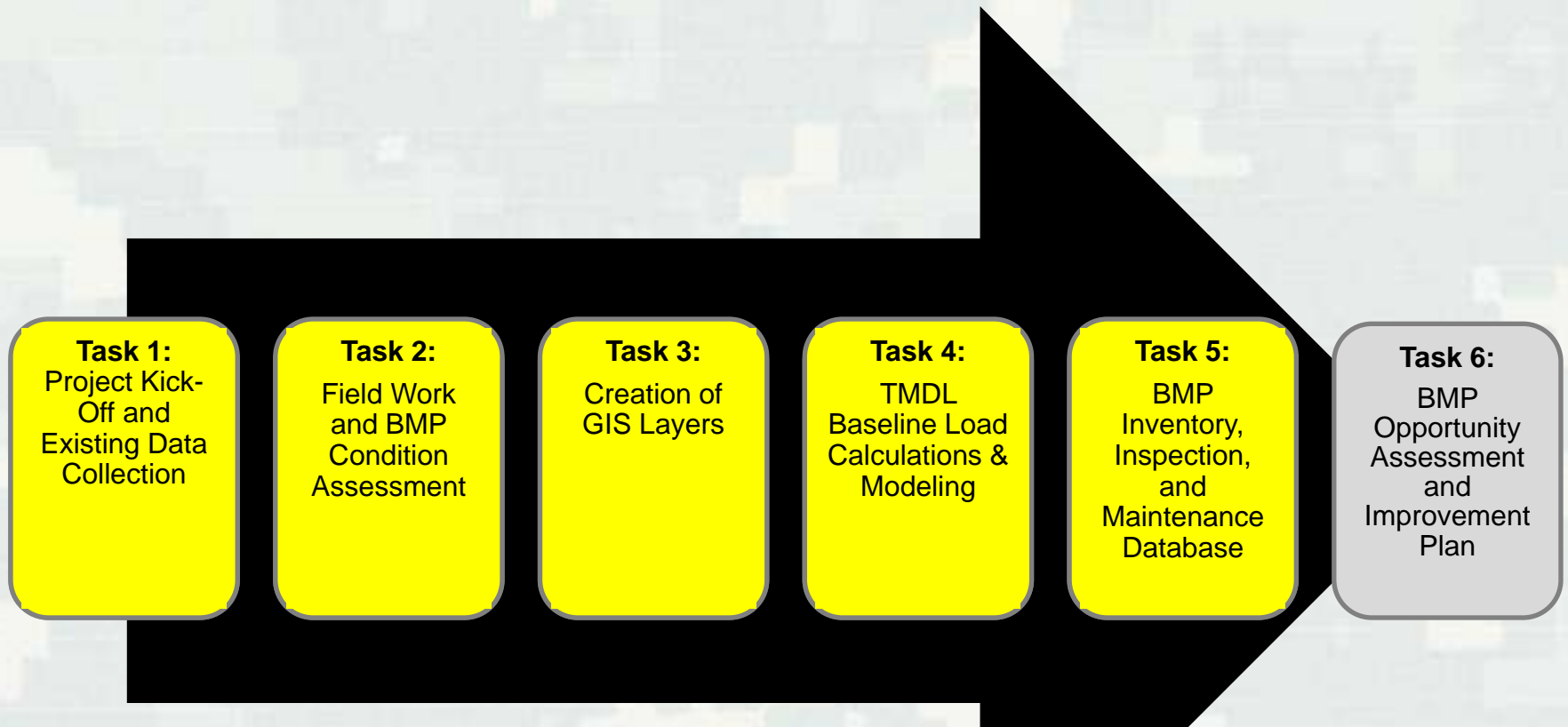
Planning Division's TMDL Customers

- Army National Guard
(DE, MD, PA, VA, DC and NY)
- IMCOM Atlantic Region *(Ft. Belvoir, Ft. Lee, Joint Base Meyer/Henderson Hall, Ft. Meade, Adelphi Laboratory, Aberdeen Proving Ground, Ft. McNair, Carlisle Barracks)*
- Army Reserves (*99th*)
- ACSIM
 - ▶ Army TMDL Master Plan
 - ▶ Army TMDL Protocol Guidance Document

Over 200 Facilities!



TMDL Project Approach Overview



Continual Coordination with Customer and Regulatory Agencies



Stormwater BMP Database

- Many civil and military partners using the database- Stafford County, VA; Andrews Air Force Base; Virginia Department of Transportation (VDOT); NAVFAC; IMCOM Installations
- Able to tailor to customers needs
- User friendly
- Microsoft Access based- available to all
- Currently only desktop application-not on-line



Stormwater BMP Database

- First developed in 2005 for Stafford County, Virginia, to inventory and assess the condition of stormwater BMPs as a requirement of their NPDES permit.

- Features include:
 - General BMP Data
 - Field Assessment Data
 - GIS Export Capabilities
 - Basic Reporting Functions

Stormwater BMP Master Database
Stafford County, Virginia
Stafford County Department of Code Administration

StructureID:
Date:
General BMP Type:
Inspector:
PDF File:
Latitude Deg: Latitude Min:
Longitude Deg: Longitude Min:
Status:
Location:
Residential? ☐ Under Bond? ☐
Parcel Key: Latitude:
Parcel ID: Longitude:
LRSN:
HUC:
Discharges To:
Retrofit Potential:
As-Built Plans? ☐ Maintenance Agreement? ☐
How Often Maintained?
Acres Treated:
Condition:
Comments/Notes:

Photo Filename:
Filename:
Record:

Ponds | Filtration | Infiltration | Manufactured/Underground | Miscellaneous | LID

Pond Type:
Pond Length (ft):
Pond Average Width (ft):
Spillway Depth (ft):
BMP Depth (ft):
Pond Water Depth (ft):
Pond Treatment Volume (cf):

Accessibility: ☐ Inaccessible
Dam Embankment: ☐ Overgrown
Trees: ☐
Shrubbery: ☐
Scrub Brush: ☐
Inadequate Cover: ☐
Erosion: ☐
Settlement: ☐
Piping: ☐
Slippage: ☐
Burrow Holes: ☐

Emergency Spillway: ☐ ES Eroding
☐ ES Obstructed
☐ ES Non-Operational
☐ No ES
Riser: ☒ Low-Flow Blocked
☐ BMP Damaged
☐ BMP Missing
☐ Riser Blocked
☐ Riser Damaged
Principal Spillway Pipe (PSP): ☐ PSP Blocked
☐ PSP Joints Leaking
☐ PSP Failure
☐ PSP Settlement

Outfall Structure: ☐ Outfall Undermined
☐ Outfall Separated
Outfall Channel: ☐ Channel Blocked
☐ Channel Eroding
Impoundment Area: ☐ Large Debris
☐ Unhealthy
☒ No Riparian Buffer
☐ Shore Erosion
☐ Silted In
☐ Low-Flow Ditch Blocked
☐ Low-Flow Ditch Damage
☐ Forebay Silted In



Stormwater BMP Database

- In 2009, completed database for Andrews Air Force Base.
- New Features include:
 - ▶ Improvement Information
 - ▶ Links to Aerial Photographs

General Information

Structure ID: DP3-10
 Last Date Inspected: 11/12/2008
 General BMP Type: Ponds
 Inspector: MS/ED/JRT
 Latitude Deg: 1344848.942
 Longitude Deg: 414725.708
 Aerial Photo: Yes - [CLICK](#)
 Status: Inaccessible No
 Location: Skills Center on the corner of VA and Manchester
 Discharges To: Underground SW System: Meeting House Branch: Middle Potomac-Anacostia-Occoquan
 Retrofit Potential: Medium
 As-Built Plans? ☐
 PDF File: N/A
 How Often Maintained?:
 Acres Treated:
 Condition: Fair
 Comments/Notes: Surrounded by fence NO ACCESS, no gate; No access to riser; Can't tell if flow flow critice is blocked; Need to research where outflow goes; Overgrown vegetation. Riser appears to be in fair condition (CMP shows no rust or corrosion). Inflow NE corner needs some riprap work. Pond is excavated, so trees growing on pond edges do not pose threat to integrity.

Photograph Information

Photo Filename: DP3-10.JPG
 Photo:

Improvement Information

Improvement SOW Needed? Yes
 Improvement SOW Prepared? Yes
 Improvement SOW Funding: \$304,527.00

Visual Field Assessment Data

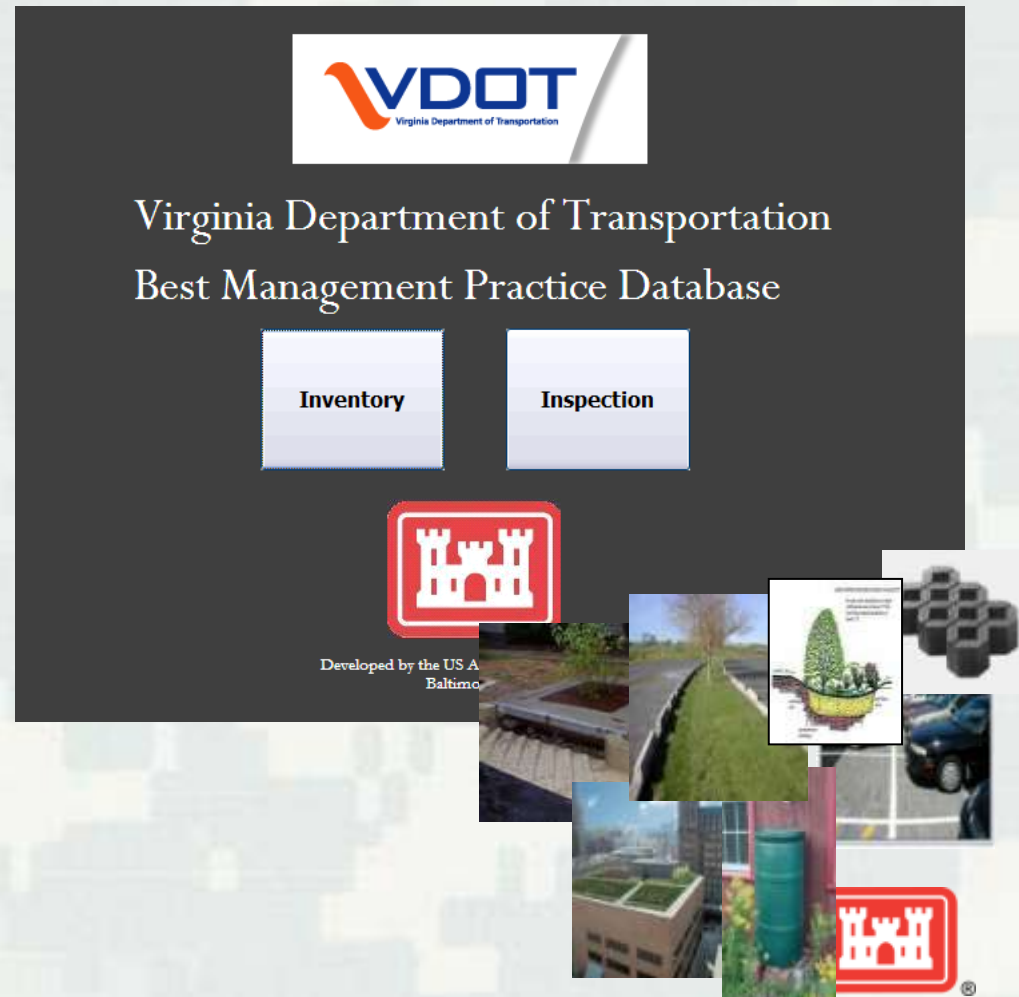
Ponds	Filtration	Infiltration	Manufactured/Underground	Miscellaneous	UD
Pond Type: Dry Pond	<input checked="" type="checkbox"/> Accessibility <input checked="" type="checkbox"/> Dam Embankment <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubbery <input checked="" type="checkbox"/> Scrub Brush <input type="checkbox"/> Inadequate Cover <input type="checkbox"/> Erosion <input type="checkbox"/> Settlement <input type="checkbox"/> Piping <input type="checkbox"/> Slopage <input type="checkbox"/> Burrow Holes	<input checked="" type="checkbox"/> Inaccessible <input type="checkbox"/> ES Obstructed <input type="checkbox"/> ES Non-Operational <input checked="" type="checkbox"/> No ES <input type="checkbox"/> Low-Flow Blocked <input type="checkbox"/> BMP Damaged <input type="checkbox"/> BMP Missing <input type="checkbox"/> Riser Blocked <input type="checkbox"/> Riser Damaged <input type="checkbox"/> Principal Spillway Pipe (PSP) <input type="checkbox"/> PSP Blocked <input type="checkbox"/> PSP Joints Leaking <input type="checkbox"/> PSP Failure <input type="checkbox"/> PSP Settlement	<input type="checkbox"/> Emergency Spillway <input type="checkbox"/> Outfall Structure <input type="checkbox"/> Outfall Undersized <input type="checkbox"/> Outfall Separated <input type="checkbox"/> Outfall Channel <input type="checkbox"/> Channel Blocked <input type="checkbox"/> Channel Eroding <input type="checkbox"/> Impoundment Area <input type="checkbox"/> Large Debris <input type="checkbox"/> Unhealthy <input checked="" type="checkbox"/> No Riparian Buffer <input type="checkbox"/> Shore Erosion <input type="checkbox"/> Silted In <input type="checkbox"/> Low-Flow Ditch Blocked <input type="checkbox"/> Low-Flow Ditch Damage <input type="checkbox"/> Forebay Silted In		

Summary of Improvement Project: Clear excess vegetation; clear and inspect inlets; replace riprap at inlets; inspect riser.



Stormwater BMP Database

- Continually working with Virginia Department of Transportation (VDOT) to develop database for all BMPs and outfalls owned by VDOT.
- New Features include:
 - ▶ **Outfall Database**
 - ▶ **More Graphically Pleasing**
 - ▶ **User Friendly Maintenance Reporting**
 - ▶ **History of Inspections**



Stormwater BMP Database

- NAVFAC: completed fully functional “cradle-to-grave” BMP and outfall tracking system for NSF Annapolis and Naval Academy
- New Features include:
 - ▶ **State and Federal permitting tracking capability**
 - ▶ **Construction inspections to give history of the progression of project**
 - ▶ **Embedded location map**

The screenshot displays the 'BMP Inventory Database' web application. At the top, there's a 'Photo' section with a landscape image and an 'Inventory Map' showing a site location. The main form includes fields for 'General BMP Type' (set to 'SW Pond'), 'Alternate ID', 'Inventory Date', and 'Field Surveyor'. It also has sections for 'Status' (Complete), 'Project No.', 'PPMS No.', 'Maintained By', 'As-Built Plans', 'Maintenance Agreement', 'Latitude', 'Longitude', 'PDF File', and 'Comments/Notes'. Below these is a 'BASIN GENERAL DESCRIPTION' section with a table of features:

BASIN GENERAL DESCRIPTION			
Accessibility	Inlets and Forebay	Embankment	Emergency Spillway
<input type="checkbox"/> Access road present? <input type="checkbox"/> Basin has security fence?	<input type="checkbox"/> Inlet channel present? <input type="checkbox"/> Pipe outfall present?	<input type="checkbox"/> Inlets? <input type="checkbox"/> Forebay present?	<input type="checkbox"/> Embankment? <input type="checkbox"/> Spillway?
<input type="checkbox"/> Emergency draw pipe <input type="checkbox"/> Outlet Structure Type <input type="checkbox"/> River top trash rack <input type="checkbox"/> Low flow orifice <input type="checkbox"/> Upper stage orifice	<input type="checkbox"/> Principal Spillway Pipe (PSP) <input type="checkbox"/> PSP present? <input type="checkbox"/> PSP material	<input type="checkbox"/> Outfall channel <input type="checkbox"/> Direct discharge to stormwater sewer system	<input type="checkbox"/> Impoundment Area <input type="checkbox"/> Low flow ditch system



Stormwater BMP Database

- Currently, working with IMCOM-NE to inventory and assess BMPs for Chesapeake Bay TMDL Requirements-7 installations total

- New Features include:
 - Pollutant load calculation capability
 - Enhanced reporting functionality for TMDL requirements

IMCOM Stormwater BMP Inventory Database

GENERAL

Select by SWM ID:

SWM ID: Alternate ID:
 Inventory Date: Field Surveyor:
 General BMP Type:

LOCATIONAL

Latitude: Longitude:
 Waterbody BMP discharges into:
 Location:

Chesapeake Bay TMDL

	DDOE Baseline Loadings			Baseline Loadings (ERDC)			Baseline Allocation			
	Average	N	P	S	N	P	S	N	P	S
CSO	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
MS4	12.0	14.1	2.3	100.0	11.0	1.0	1.0	12.4	1.7	1.0
Other	96.0	495.1	61.8	10.7	1.0	1.0	1.0	383.6	45.1	3.0
Total	108.0	510.2	85.2	111.7	13.0	3.0	3.0	397.0	47.8	5.0

TMDL Calculation

	Load per acre			Reduction Needed			Reduction Needed with BMP			Calculated Reduction			Efficiency (%)
	N	P	S	N	P	S	N	P	S	N	P	S	
CSO	100.0	100.0	100.0	0.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	70
MS4	1.2	0.2	8.3	1.7	0.6	89.0	1.5	2.4	41.0	1.2	0.2	8.3	75
Other	5.2	0.9	0.1	111.5	34.7	7.7	35.7	23.1	5.8	51.6	8.5	1.1	80
Total	106.5	101.0	108.4	113.2	35.4	106.7	137.2	25.5	146.8	152.8	108.8	109.4	14.7

BMP Information

Across Treated: MS4: Other: Year built:
 CSO: ☒ Total: 21 Included in CBM? ☐



Summary

- Providing TMDL support to most Army facilities and installations in the CBW.
- Strong relationships with State and Federal CB TMDL stakeholders.
- TMDL modeling approach for planning at smaller scales vs CB model scale.
- BMP Database is a tool for:
 - ▶ Maintaining a BMP inventory
 - ▶ Capturing BMP inspections
 - ▶ Tracking BMP maintenance
 - ▶ Capturing and analyzing TMDL and BMP modeling results
 - ▶ Calculating whether or not waste load allocations are being met
 - ▶ Analyzing BMP current and future MILCON scenarios to formulate two year milestones and meet TMDL/stormwater permit requirements (i.e., MS4s permits)
 - ▶ Permit Reporting
- BMP database can run reports and export reports to other database systems (i.e., NEIEN and FFI).



Current and Future Efforts

- ***Current:*** Integration of BMP cost estimator into database
- ***Future:*** Capturing EISA 438 compliance
- ***Future:*** Online BMP Database



Demonstration-BMP Database



Questions?

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