# Maryland MS4 Phase II General Permit Workshops

August 8: Columbia August 13: Bel Air August 15: Hagerstown





- Dedicated to improving water quality and protecting the water environment
- Delaware, Maryland, and the District of Columbia
- Training and exchange of technical and scientific information
- 800 current members
- Always looking for more volunteers
- Member association of Water Environment Federation
- Stormwater Committee is one of 20 committees

## **CWEA Membership**

#### Benefits

- Networking
- Education opportunities
- Give back to your profession and community
- Networking
- Build leadership skills
- Strengthen professional and personal relationships
- Networking

www.chesapeakewea.org



#### **Stormwater Committee**

- Boundary Barbon Barb
- To join, contact Turgay Dabak: <u>Turgay.Dabak@atkinsglobal.com</u>

#### **CWEA Stormwater: Upcoming Events**

- August 27: Chesapeake TriCon Stormwater Preconference Workshop, Ocean City, MD
  - Lessons Learned: Insider Advice on MS4 Permit Compliance from MS4s Around the Region
- September 19: webinar
  - RiverTools: A Maintenance Training Kit for Schools
    - Presenters: Rebecca Stack (Designgreen) and Lauren Wheeler (Natural Resources Design)
- **December 11:** CWEA Stormwater Seminar MITAGS Linthicum Heights, MD
  - Proven Strategies for Stormwater Program Success: Challenges and Solutions from Design to Implementation

### **CWEA Stormwater:**

### Maryland Phase II MS4 Subcommittee

#### Members:

- Mark Charles, City of Rockville
- Manasa Damera, AECOM
- Jessica Seipp, Dewberry
- Mark Sievers, Tetra Tech
- Rebecca Winer-Skonovd, Biohabitats
- University of MD, Environmental Finance Ctr:
  - Jennifer Cotting
  - Ellen Kohler
  - Jennifer Egan

### **CWEA Stormwater:**

### Maryland Phase II MS4 Subcommittee

- Need for training for Phase II community
- Made phone calls, conducted some polls via email link
- Webinar on July 18<sup>th</sup>
- Posting ppts on CWEA website; will email out a link
- PDHs

# Workshop Agenda

- 10:00 10:10 am
- 10:10 11:00 am
- 11:00 11:05 am
- 11:05 11:45 am
- 11:45 am 12:15 pm
- 12:15 1:00 pm
- 1:00 2:00 pm
- 2:00 2:55 pm
- 2:55 3:00 pm

Welcome Budget/financing Break Budget/financing, cont Lunch Baseline/Restoration Requirement IDDE Discussion and Q&A with MDE Closing

### Impervious Surface Baseline and Restoration Requirement Calculations

- Background
- Simplified Calculation
- Enhanced Version
- Other Considerations

### Chesapeake Bay TMDL in Maryland MS4 Permits

- Total Maximum Daily Load (TMDL)
- Nutrient and sediment load reductions
- Reduction requirements translated into MD MS4 permits via a Restoration Requirement
- Restore or retrofit 20% of existing untreated impervious surface



# **Key Documents**

- Maryland Phase II MS4 Permit
  - Appendix B & D
- Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated (MDE, 2014)
  - aka MDE Accounting Guidance

Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated

Guidance for National Pollutant Discharge Elimination System Stormwater Permits

August 2014



1800 Washington Boulevard, Baltimore, MD 21230-1718 | www.mde.maryland.gov 410-537-3000 | 800-633-6101 | TTY Users 800-735-2258 Larry Hogan, Governor | Boyd Rutherford, Lt. Governor | Ben Grunbles, Secretary

Part V: Chesapeake Bay Restoration and Meeting TMDLs

- Commence restoration efforts for 20% of existing development that has little or no stormwater management
- Develop an implementation schedule to show the 20% impervious are restoration requirement (Restoration Requirement) is estimated to be achieved by 2025
- First iteration of Work Plan due Oct 31

#### Part V, cont

- Restoration efforts may include the use of:
  - Environmental Site Design (ESD)
    - e.g., micro-bioretention
  - Structural stormwater BMPs
    - e.g., stormwater wet pond
  - Retrofitting
    - e.g., modify dry pond for water quality treatment
  - Stream restoration
  - Other alternatives approved by MDE
    - e.g., reforestation



Source: Montgomery County DEP

#### Append B, Section III: Guidance for Impervious Area Restoration Program Development

#### Section III. Guidance for Impervious Area Restoration Program Development

Small MS4 owners and operators covered under this NPDES general permit are required to commence impervious area restoration for twenty percent of existing developed lands that have little or no stormwater management by the end of the permit term. This requirement supports the Maryland Watershed Implementation Plan (WIP) strategy for achieving nutrient and sediment load reductions on small MS4 properties to address Chesapeake Bay and local total maximum daily loads (TMDLs). Guidance for implementing restoration activities is available in the 2014 MDE document *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*, hereafter referred to as the Accounting Guidance. While the most recent version of the Accounting Guidance should be referenced by all stormwater permittees, the method below highlights the most relevant information from that document for small MS4 owners and operators. This provides a clear outline for compliance with impervious area restoration for small MS4s.

#### A. Establishing Baselines: Impervious Surface Area Assessment

Permittees must develop an impervious surface area baseline assessment and delineate the areas that are treated with acceptable water quality BMPs to the maximum extent practicable (MEP). This analysis will provide the baseline used to calculate the twenty percent restoration requirement. The following information is needed for this assessment:

#### Append D, Section I: Impervious Area Restoration Reporting Form

- Partial treatment
- Nonstructural BMPs

2. Complete the information below based on the most recent data:

Total impervious acres of jurisdiction covered under this permit:

Total impervious acres treated by stormwater water quality best management practices (BMPs):

Total impervious acres treated by BMPs providing partial water quality treatment (multiply acres treated by percent of water quality provided):

Total impervious acres treated by nonstructural practices (i.e., rooftop disconnections, non-rooftop disconnections, or vegetated swales):

Total impervious acres untreated in the jurisdiction:

Twenty percent of this total area (this is the restoration requirement):

Verify that all impervious area draining to BMPs with missing inspection records is not considered treated. Describe how this information was incorporated into the overall analysis:

- Related Permit Requirement: Develop BMP Inventory/Database
- Key fields for Baseline and Restoration Requirement calcs:
  - BMP type (e.g., dry pond, bioretention)
  - Construction Purpose: New Development, Redevelopment, Restoration, Conversion
  - Dates: approved date, built date, year
  - **PE\_ADR**: water quality treatment provided by BMP in rainfall inches
  - IMP\_ACR: impervious acres addressed by BMP
- MDE Database Guidance can be found here:

https://mde.state.md.us/programs/Water/StormwaterManagementProgram/Documents/Phase%20II%20MS4%20Database%20Guidance.pdf

#### **Appendix B**

- References Accounting Guidance
- General baseline and restoration requirement calculation methodology
- BMP crediting

Alternative BMP	Calculating Impervious Acre Credit <sup>1</sup>	Impervious Acre Equivalent
Mechanical Street Sweeping	Acres swept multiplied by 0.07 = acres of credit	0.07
Regen/Vacuum Street Sweeping	Acres swept multiplied by 0.13 = acres of credit	0.13
Reforestation on Pervious Urban	Acres of reforested land multiplied by 0.38 = acres of credit	0.38
Impervious Urban to Pervious	Acres of reforested land multiplied by 0.75 = acres of credit	0.75
Impervious Urban to Forest	Acres of reforested land multiplied by 1.00 = acres of credit	1.00
Regenerative Step Pool Storm Conveyance (SPSC) <sup>2</sup>	Located in dry or ephemeral channels; credit is based on rainfall depth treated	Varies <sup>2</sup>
Catch Basin Cleaning	Tons of dry material collected multiplied by 0.40 = acres of credit	0.40
Storm Drain Vacuuming	Tons of dry material collected multiplied by 0.40 = acres of credit	0.40
Mechanical Street Sweeping	Tons of dry material collected multiplied by 0.40 = acres of credit	0.40
Regen/Vacuum Street Sweeping	Tons of dry material collected multiplied by 0.40 = acres of credit	0.40

Table P.4 Alternative Ushan PMPs and Imnemious A.

### **MDE Accounting Guidance**

- Baseline and restoration requirement calculation methodology
- BMP crediting

Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated

Guidance for National Pollutant Discharge Elimination System Stormwater Permits

August 2014



Department of the Environment

1800 Washington Boulevard, Baltimore, MD 21230-1718 | www.mde.maryland.gov 410-537-3000 | 800-633-6101 | TTY Users 800-735-2258 Larry Hogan, *Governor* | Boyd Rutherford, *Lt. Governor* | Ben Grumbles, *Secretary* 

# MDE Accounting Guidance

#### Stormwater Management by Era

Era	Description
<1985	No water quality treatment
1985 - 2002	<ul> <li>Primarily flood control</li> <li>BMP design criteria can be used to verify whether or not water quality is provided</li> </ul>
2002 - 2010	Stormwater Design Manual in effect; water quality treatment provided
>2010	ESD required; water quality treatment provided

# Calculations

- Simplified Calculation
- Enhanced Version

#### **Baseline & Restoration Requirement Calculations**

Step 1: Total Impervious Surface

**Step 2: Subtract Treated Impervious Surface** 

**Step 3: Determine Baseline Impervious Surface** 

**Step 4: Determine Restoration Requirement** 

Step 5: Determine Treatment/Restoration Since 2006

**Step 6: Calculate Remaining Restoration Requirement** 

# Baseline and Restoration Calculation:

### Simple Version

- Use best available impervious cover polygons
- Municipalities/facilities located within a County – check with County GIS
- Extract acreage from GIS to get total impervious cover
- Example
  - Total IA = 596.2 ac



# Step 1. Total Impervious Surface

- If impervious cover polygons unavailable, use the high resolution land cover data set (2013)
- Can be downloaded here:

https://chesapeakeconservancy.org/conservation-innovation-

<u>center/land-cover-data-project/</u>



BMP Construction Purpose	Water Quality BMP Era <sup>1</sup>	Water Quality Treatment Provided (Y/N)	Subtract from Baseline or Restoration Requirement	Notes/Assumptions
All	Pre-2002	Ν	n/a	BMPs dated pre-2002 do not provide water quality treatment*
New Development	≥2002	Y	Baseline	
Redevelopment and Restoration	2002 - 2005	Y	Baseline	
<b>Redevelopment and</b> <b>Restoration</b>	≥2006	Y	Restoration Requirement	2006 and later restoration or redevelopment BMPs may count towards the Restoration Requirement (MDE's Accounting Guidance)

\*BMP design criteria can be used to verify whether or not water quality is provided

	YEAR BMP	TYPE CON	_PURPOSE IMP_	ACRES	PE_ADR EQU	_IMP_ACR PROJE	CT_LENGTH
BMP Database	2009	APRP	NEWD	0.396	1	0.396	
	2003	FBIO	NEWD	0.06	1	0.06	
	2003	FBIO	NEWD	0.08	1	0.08	
	2003	FBIO	NEWD	0.072	1	0.072	
	2006	ITRN	NEWD	0.0123	1	0.0123	
	2004	ITRN	NEWD	0.08	1	0.08	
	2005	ITRN	NEWD	1.07	1	1.07	
	2005	FSND	REDE	0.74	0.8	0.592	
	2010	NDRR	NEWD	0.007	1	0.007	
	2010	NDRR	NEWD	0.007	1	0.007	
	2010	NDNR	NEWD	0.091	1	0.091	
	2010	MRNG	REDE	0.065	1	0.065	
	2007	MIDW	REDE	0.06	1	0.06	
	2002	ITRN	NEWD	0.29	1	0.29	
	2013	APRP	REDE	0.003	0.2	0.0006	
	2013	APRP	REDE	0.003	0.1	0.0003	
	2013	NDRR	REDE	0.036	1	0.036	
	2013	MRNG	REDE	0.02	1	0.02	
	2013	NDRR	REDE	0.02	0.6	0.012	
	2013	NDRR	REDE	0.02	0.4	0.008	
	2017	STRE	REST			44.87	4487
	2017	SHST	REST			46.52	1163
					TOTAL	94.35	

- Remove all  $\geq$  2006 REDE and REST BMPs and save for later
- Sort into full treatment, partial treatment, and nonstructural for reporting purposes

REPORTING								
CATEGORIES	YEAR	BMP_TYPE	CON_PURPOSE	IMP_ACRES	PE_ADR	EQU_IMP_ACR	PROJECT_LENGTH	TOTAL
	2009	APRP	NEWD	0.396	1	0.396		
	2003	FBIO	NEWD	0.06	1	0.06		
	2003	FBIO	NEWD	0.08	1	0.08		
Eull	2003	FBIO	NEWD	0.072	1	0.072		2 06
I'un	2006	ITRN	NEWD	0.0123	1	0.0123		2.00
	2004	ITRN	NEWD	0.08	1	0.08		
	2005	ITRN	NEWD	1.07	1	1.07		
	2002	ITRN	NEWD	0.29	1	0.29		
Partial	2005	FSND	REDE	0.74	<mark>0.8</mark>	0.592		0.59
	2010	NDRR NDRR	NEWD	0.007	1	0.007		
Non-structural	2010	<b>NDRR</b>	NEWD	0.007	1	0.007		0.11
	2010	NDNR	NEWD	0.091	1	0.091		
				Т	<b>OTAL TE</b>	FATED IMDE	NINUS SUDEACE	9 76

# Step 3. Determine Baseline Impervious Surface

#### Baseline

Subtract total impervious surface (Step 1) from treated impervious surface (Step 2)

- Step 1 = 596.2 acres
- Step 2 = 2.76 acres
- Step 3
  - □ 596.2 2.76 = 593.4 acres

# Step 4. Determine Restoration Requirement

#### **Restoration Requirement**

- 20% of baseline (Step 3)
  - □ 593.4 \* 0.2 = 118.7 acres

#### Step 5. Determine Treatment/Restoration Since 2006

• ≥ 2006 Redevelopment and Restoration BMPs

YEAR	BMP_TYPE	CON_PURPOSE	IMP_ACRES	PE_ADR	EQU_IMP_ACR	PROJECT_LENGTH
2010	MRNG	REDE	0.065	1	0.0650	
2007	MIDW	REDE	0.06	1	0.0600	
2013	APRP	REDE	0.003	0.2	0.0006	
2013	APRP	REDE	0.003	0.1	0.0003	
2013	NDRR	REDE	0.036	1	0.0360	
2013	MRNG	REDE	0.02	1	0.0200	
2013	NDRR	REDE	0.02	0.6	0.0120	
2013	NDRR	REDE	0.02	0.4	0.0080	
2017	STRE	REST			44.8700	4487
2017	SHST	REST			46.5200	1163
ADI	DITIONAL	<b>FREATED IMP</b>	ERVIOUS SU	URFACE	91.6	

### Step 6. Calculate Remaining Restoration Requirement

Subtract additional treatment/restoration (Step 5) from Restoration Requirement (Step 4)

- Step 4 Step 5
  - □ **118.7 - 91.6**

**Remaining Restoration Requirement = 27.1 acres** 

### Baseline and Restoration Calculation: Enhanced Version

**Baseline & Restoration Requirement Calculations** 

**Step 1: Total Impervious Surface** 

**Step 2: Subtract Treated Impervious Surface** 

**Step 3: Determine Baseline Impervious Surface** 

**Step 4: Determine Restoration Requirement** 

**Step 5. Determine Treatment/Restoration Since 2006** 

**Step 6: Calculate Remaining Restoration Requirement** 

# Step 1. Total Impervious Surface

#### Create a 2002 impervious layer

- From MDE's Accounting Guidance: Phase II jurisdictions may... use 2002 as the baseline year for determining the impervious surface area subject to restoration requirements
- Modify existing impervious surface layers using aerials and/or google earth historical imagery dated 2002 or later

BMP Construction Purpose	Water Quality BMP Era <sup>1</sup>	Water Quality Treatment Provided (Y/N)	Subtract from Baseline or Restoration Requirement	Notes/Assumptions
All	Pre-2002	Ν	n/a	BMPs dated pre-2002 do not provide water quality treatment*
New Development	≥2002	n/a	n/a	New Development occurring post-2002 does not exist in the 2002 impervious surface baseline
Redevelopment and Restoration	2002 - 2005	Y	Baseline	
Redevelopment and Restoration	≥2006	Y	<b>Restoration Requirement</b>	2006 and later restoration or redevelopment BMPs may count towards the Restoration Requirement (MDE's Accounting Guidance)

\*BMP design criteria can be used to verify whether or not water quality is provided

# Step 1. Total Impervious Surface

#### 2010 vs 2002



Source: Google Earth imagery



# Step 1. Total Impervious Surface

- Identify and Subtract Other MS4 Areas:
  - State Highway Administration (SHA)
  - State Properties
  - Federal Properties
  - Other MS4 properties within jurisdiction
  - Industrial Permit Holders Subject to Restoration Requirement

**Download parcel layer from Maryland SDAT** 



# Step 1. Total Impervious S

- Industrial Permit Holders subject to Restoration Requirement
  - Can identify using MDE's Wastewater Permits Interactive Search Portal
    - Review NOI for Restoration Requirement Compliance



#### MARYLAND DEPARTMENT OF THE ENVIRONMENT

MDE1800 Washington Boulevard • Baltimore MD 21230410-537-3000 • 1-800-633-6101• www.mde.maryland.gov

#### MDE WMA Industrial Stormwater Facility Report

Facility Name:	Chesapeake Shipb	uilding Corporation			
State Permit Num:	12SR1267	NPDES Num:	MDRC	001267	
Type of Ownership:	X Private	Federal	State/	'Local	
Facility Address (incl. county):	710 Fitzwater St, S Wicomico County	alisbury, MD 21801			
Facility unstaffed and	inactive (if checke	d):			
Primary SIC:	3731 Secto	or R - Construction of	f Steel Ships a	nd Boats	
Current Status:	Issued			100 S. 6	
Application Received	: 2/11/2014	Effective	Date:	11/21/2014	
Expiration Date:	12/31/2018	Effective	End Date:	6/29/2019	_
Total property size in	acres:	13.54			
Eight Digit Watershe	d Name: 021	30301- Lower Wico	mico River		
Jurisdiction of MS4 fa	acility discharges (if	applicable):	Salisbury		
Stormwater Pollution Primary Contact:	n Prevent Plan (SWF	PPP)	Anthony Seve	ern	
Subject to Chesapeal	ke Bay Restoration I	Requirements:	Yes	>	1
Total Impervious sur	face area (sq. ft.)		469576.80		
Untreated imperviou	s surface area (sq. f	t)	261360.00		

1.2000

Yes

Impervious surface area subject to 20% restoration

requirement (acres) Restoration Complete?

# Step 1. Total Impervious Surface

- If NOI unavailable, restoration requirement criteria according to the General Permit for Discharges of Stormwater Associated with Industrial Activity (Permit No. 12-SW):
  - within the Chesapeake Bay Watershed
  - 5 acres or greater in size
  - Iocated within a Phase I or Phase II MS4
  - not owned by or leased from an entity that is permitted as an MS4
    - If owned or leased by MS4, then property should be included in MS4's baseline
- If unsure, ask MDE

#### Additional Considerations:

- Rural Area Credits
- Extra credit

#### **Rural Area Credits**

- Desktop GIS analysis
- Representative field investigation to validate desktop analysis
- Survey and GIS analysis submitted to MDE for approval

#### **Rural Area Credits: Large Lot Disconnection**

- Areas zoned rural residential
- 1 house or less per 3 acres
- Disconnection or sheetflow criteria in Stormwater Design Manual
  - Pervious area at least 15 ft long down gradient of downspout
  - Slope <= 5%
  - Hydrologic soil groups (HSG) A, B, or C



#### **Rural Area Credits: Roadside Swales**

- Grass swale criteria in the Stormwater Design Manual
- Resource: SHA's Existing Water Quality Grass Swale Identification Protocol

Parameter	Acceptable Value(s)
Bottom Width	2 feet (ft) minimum, 8ft maximum
Swale Length	Greater than 35ft
Channel Slope	Less than or equal to 4.0%, or between 4-6% with check dams provided to meet flow depth and velocity criteria
Maximum Flow	Less than or equal to 1.0 feet per second (fps) for runoff from the one-inch rainfall (water quality storm) Less than 5 fps (non-erosive) for runoff from the ten-year design event
Side Slopes	3:1 or flatter
Thick Vegetative Cover	Present
Surface Area of the Channel	Greater than 2% of the contributing drainage area
Maximum Flow Depth	4" and manning's n=0.15 for 1 inch water quality storm





Highway Hydraulics Division 707 N. Calvert Street Baltimore, MD Agent 2014 December 2015 - Update

#### Extra Credit

#### • 0.1 additional acres for every 0.4" treated >1"

YEAR	BMP_TYPE	CON_PURPOSE	IMP_ACRES	PE_ADR	EQU_IMP_ACR
2004	FSND	REDE	0.74	1.4	0.84

Table 3. Impervious Acre Credit for Treatment Above and Below 1 Inch of Rainfall						
Rainfall Depth Treated	Impervious Acre Credit per	Impervious Acre Credit per				
(inches)	Acre of Watershed	50 Acres of Watershed				
	Impervious Area	Impervious Area				
0.5	0.5	25				
0.75	0.75	37.5				
1.0	1	50				
1.4	1.1	55				
1.8	1.2	60				
2.2	1.3	65				
2.6	1.4	70				

Source: MDE Accounting Guidance

### Step 5. Determine Treatment/Restoration Since 2006

Alternative BMP Credits

#### Take credit for existing activities:

- Street sweeping
  - Depends on technology
  - High density areas where sweeping occurs 2x/month
  - 7 impervious acres credited for every 100 acres swept
- Catch basin/storm drain cleaning
  - High density areas; storm drain routinely maintained
    - 4 impervious acres credited for every 10 tons of material removed

#### Step 5. Determine Treatment/Restoration Since 2006

#### • Appendix B

Alternative BMP	Calculating Impervious Acre Credit <sup>1</sup>	Impervious Acre Equivalent
Mechanical Street Sweeping	Acres swept multiplied by 0.07 = acres of credit	0.07
Regen/Vacuum Street Sweeping	Acres swept multiplied by 0.13 = acres of credit	0.13
Reforestation on Pervious Urban	Acres of reforested land multiplied by 0.38 = acres of credit	0.38
Impervious Urban to Pervious	Acres of reforested land multiplied by 0.75 = acres of credit	0.75
Impervious Urban to Forest	Acres of reforested land multiplied by 1.00 = acres of credit	1.00
Regenerative Step Pool Storm Conveyance (SPSC) <sup>2</sup>	Located in dry or ephemeral channels; credit is based on rainfall depth treated	Varies <sup>2</sup>
Catch Basin Cleaning	Tons of dry material collected multiplied by 0.40 = acres of credit	0.40
Storm Drain Vacuuming	Tons of dry material collected multiplied by 0.40 = acres of credit	0.40
Mechanical Street Sweeping	Tons of dry material collected multiplied by 0.40 = acres of credit	0.40
Regen/Vacuum Street Sweeping	Tons of dry material collected multiplied by 0.40 = acres of credit	0.40
T 194 W		

Table B.4 Alternative Urban BMPs and Impervious Acre Credit

### **Other Considerations**

- Inspection and maintenance verification needed to maintain credit assoc. with BMPs
  - Triennial inspections
  - Document in BMP Database
- Trading
  - Maryland Water Quality Trading and Offset Program
  - <u>https://mde.maryland.gov/programs/Water/WQT/Pages/index.aspx</u>
    - Within Chesapeake Bay TMDL watersheds
    - Types of credits:
      - Wastewater (exceeding baseline concentrations)
      - Septic systems upgrades
      - Stormwater



### **Questions?**

#### Rebecca Winer-Skonovd Biohabitats 667.401.8434 <u>rwinerskonovd@biohabitats.com</u>