

Prince George's County

Table 2. Preliminary scenario for urban impervious retrofits to meet County MS4 permit by 2017

BMP type County	Impervious area (acres)	Pervious area (acres)	Estimated cost per impervious acre (\$/acre)	Estimated total cost
Bioretention areas	305	1,728 ^a	\$100,000	\$30,500,000
Filtering practices	379	2,148 ^a	\$100,000	\$37,900,000
Infiltration practices	1,124	6,369 ^a	\$100,000	\$112,400,000
Filtration ponds	725	4,108 ^a	\$35,000	\$25,375,000
Wetland restoration	251 ^b	199 ^b	\$82,669 ^c	\$20,750,000
Stream restoration	645 ^b	3,655 ^a	\$55,764 ^c	\$35,968,000
Forest buffer	484 ^d	939 ^e	\$11,763 ^c	\$5,693,273
Dry pond retrofits	1,222 ^b	3,477 ^b	\$15,712 ^c	\$19,200,000
Urban nutrient management	1,000 ^d	11,108 ^e	Minimal	\$100,000
Impervious area disconnect	975 ^e		\$30,000	\$29,235,000
State phosphorus fertilizer reduction	tbd ^f	tbd	Minimal	Minimal
Sum for County	7,109	33,732	\$44,607	\$317,121,273
Municipal without Bowie				
Bioretention areas	75	175 ^a	\$100,000	\$7,500,000
Filtering practices	89	208 ^a	\$100,000	\$8,900,000
Infiltration practices	329	768 ^a	\$100,000	\$32,900,000
Filtration ponds	216	504 ^a	\$35,000	\$7,560,000
Urban nutrient management	111 ^d	1,232 ^e	Minimal	Included in above
Impervious area disconnect	108 ^e		\$30,000	\$3,240,000
State phosphorus fertilizer reduction	tbd	tbd	Minimal	Minimal
Sum for Municipal without Bowie	928	2,886	\$64,771	\$60,100,000
County and Municipal (without Bowie)				
Total	8,037	36,618	\$46,936	\$377,221,273

Notes:

a. Pervious area estimated from amount of impervious land treated.

b. Known number of acres.

c. Estimated cost per acre is based on known total projected project cost.

d. Impervious area is calculated from equivalent impervious acres per MDE's June 2011 draft document, *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*.

e. Estimated/assumed amount.

f. These amounts will be determined by the state.

Table 3. Preliminary additional BMP scenario for urban impervious retrofits for 2017–2020

BMP type County	Impervious area (acres)	Pervious area (acres)	Estimated cost per impervious acre (\$/acre)	Estimated total cost
Bioretention areas	691	3,916 ^a	\$85,000	\$58,735,000
Filtering practices	275	1,558 ^a	\$85,000	\$23,375,000
Infiltration practices	675	3,825 ^a	\$85,000	\$57,375,000
Filtration ponds	1,265	7,168 ^a	\$35,000	\$44,275,000
Wetland restoration	502	398	\$82,669 ^b	\$41,500,000
Stream restoration	1,290	7,310	\$55,764 ^b	\$71,936,000
Forest buffer	484	2,743	\$11,763 ^b	\$5,693,273
Impervious area disconnect	975 ^c		\$30,000	\$29,235,000
Sum for County	6,157	26,918		\$332,124,273
Municipal without Bowie				
Bioretention areas	165	385 ^a	\$85,000	\$14,025,000
Filtering practices	85	198 ^a	\$85,000	\$7,225,000
Infiltration practices	216	504 ^a	\$85,000	\$18,360,000
Filtration ponds	716	1,671 ^a	\$35,000	\$25,060,000
Impervious area disconnect	108 ^c		\$30,000	\$3,240,000
Sum for Municipal without Bowie	1,290	2,758		\$67,910,000
County and Municipal (without Bowie)				
Total	7,447	26,918	\$53,721	\$400,034,273

Notes:

a. Pervious area estimated from amount of impervious land treated.

b. Estimated cost per acre is based on known total projected project cost from 2017 scenario.

c. Estimated/assumed amount.

Urban nutrient management was represented in Table 2. Once installed, structural BMPs and impervious disconnection will begin performing toward required pollutant reduction with appropriate maintenance. Urban nutrient program is an institutional control that should continue to be implemented continuously to meet required pollutant reduction and needs to be input into the model/MAST only once, as reported in Table 2.

SECTION 3: 2012 – 2013 MILESTONES

Anne Arundel County Government WIP -- Two Year Milestones (2012 - 2013)

IMPLEMENTATION ACTION MILESTONES (2012-2013)	BMP Type	# of Projects	TN Efficiency ⁽²⁾	TP Efficiency ⁽²⁾	TSS Efficiency ⁽²⁾	Units	Units Available	TN Load Reduction	TP Load Reduction	TSS Load Reduction	Impervious Acres Treated	Unit Cost (\$/lbs of TN)	Line Item Cost
Urban and Suburban Stormwater ⁽¹⁾													
Connect incised perennial streams to floodplain using instream weirs	Stream Conventional	4	0.02	0.0035	2.55	Linear Feet	10016	200	35	13	244	\$ 31,475	\$ 6,305,000
Restore perennial degraded and severely degraded	Stream Wetland	5	40	60	85	Acres	587	678	131	14	227	\$ 13,629	\$ 9,239,616
Restoring zero order ephemeral streams and pipe outfalls with Step Pool Storm Conveyance (filtering systems)	Ephemeral Filtration	17	50	60	90	Acres	1015	516	93	11	399	\$ 24,266	\$ 12,524,327
Retrofit pre-2002 ponds as Shallow Wetland	Pond wetland/filtration	11	40	60	85	Acres	280	210	38	3	84	\$ 14,123	\$ 2,968,946
Street Sweeping (closed section road)	Street Sweep	TBD	4	4	22	Acres	967	349	349	1918	967	\$ 1,663	\$ 580,043
Inlet cleaning	Inlet Clean	TBD	10	2	56	Acres	2371	2137	427	11966	1660	\$ 534	\$ 1,141,326
Stormwater to the MEP for County Schools	SW to MEP	3	50	60	90	Acres	35	156	187	281	14	\$ 4,604	\$ 719,075
Watershed Organization Projects ⁽³⁾	LID NGO	N/A	50	60	90	Acres	1045	4709	5650	8475	418	Cost not incurred by County	
Stormwater to the MEP for County Facilities	LID Facilities	16	50	60	90	Acres	41	185	222	333	16	\$ 4,604	\$ 850,608
Upland Tree Plantings	Plantings	N/A	66	77	57	Acres	60	357	416	308	N/A	\$ 9,430	\$ 1,500,000
TOTAL								9,496	7,549	23,322			\$ 29,523,941
Waste Water Treatment Facilities													
ENR Upgrade to Annapolis WRF	ENR	1	N/A	N/A	N/A	N/A	N/A	158,388	47,524	0	N/A	\$126	\$20,000,000
TOTAL								158,388	47,524	0	N/A		\$20,000,000
Septic Systems													
OSDS NRU Strategy													
Reduction Act of 2009 ⁵	Residential Septic	360	50	0	0	each	360	4,378	0	0	0	\$12,500	\$4,500,000
Implementation of the Bay Restoration Fund Program	Residential Septic	260	50%	0	0	each	260	3,162	0	0	0	\$12,500	\$3,250,000
Code in Critical Areas & Bog Protection Areas ⁶	Residential Septic	72	50%	0	0	each	72	547	0	0	0	\$12,500	\$900,000
Groundwater Protection Plan (Outside Critical Areas) ⁷	Residential Septic	60	50%	0	0	each	60	456	0	0	0	\$12,500	\$750,000
OSDS Public Sewer Connection Strategy													
Connection to Public Sewer via Petition Project (Deale Road Wastewater Extension Petition Project) ⁸	Residential	35					35	851	0	0	0		
	Commercial	14		0			14	1,770	0	0	0		
TOTAL								11,164	0	0	0		
PROGRAM DEVELOPMENT ACTION MILESTONES (2012-2013)													
Urban Stormwater													
Establish MOU with SHA for implementation of urban stormwater projects													
Draft & adopt legislation to create a stormwater utility enterprise fund													
Coordinate with Fed/State regulators to reduce permitting time													
Continue investigating options for nutrient trading as a tool to offset future loads from new development.													
Waste Water Treatment Facilities													
Refine costs for design/construction of pump station upgrades													
In 2012, revise Water and Sewer Master plan to incorporate areas outside of the Sewer Service Areas that are intended to be connected as part of the WIP. Develop new requirements and boundaries for the proposed Cluster Treatment Areas to incorporate them into the Water and Sewer Master Plan. Develop Policies and Procedures to promote public sewer in management areas designated as high priority and for capital improvement projects.													
Septic Systems													
Request FY12 County budget appropriation for Septic Implementation Plan													
Execute contract for Septic Implementation Plan													
Continue to refine sewer extension and cluster treatment system implementation plans and cost estimates.													
Determine long term funding methods to pay for connection of existing OSDS to public sewer and cluster treatment systems. Develop mechanisms and policies to achieve funding, may require legislation actions. Begin planning for long term implementation of these funding policies.													
Continue researching more cost effective alternatives to serve the proposed cluster treatment areas. Initiate a pilot project to serve a cluster treatment area in 2013.													
Develop a tracking and reporting system to follow the progress of OSDS conversion and upgrades.													
Develop Policies and Procedures for handling Operation and Maintenance for upgraded OSDS													
Develop approach for prioritization of OSDS upgrades.													
Determine Staffing requirements and receive position authorizations.													
Develop policies to reduce nutrient loading due to future growth of OSDS.													
Review and Clarify legal and administrative policies to connect existing OSDS to public sewer and cluster treatment systems.													
Review and Clarify permitting requirements to connect existing OSDS to public sewer and cluster treatment systems.													
Develop Countywide Public Relations Strategy													
Footnotes													
⁽¹⁾ Urban Stormwater pollutant reduction strategy reported for FY-12 and FY-13 is based on currently programmed County CIP projects and does not imply that all projects will be fully constructed by the end of FY13. These project are currently in various levels of implementation from concept design and project initiation to under construction. Construction completion is contingent upon permitting, right of way, availability of capital and grant funds, and other factors.													
⁽²⁾ All Urban and Suburban stormwater strategy efficiencies with the exception of wetland creation systems are based on MDE's June 2011 document "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated." In this document MDE utilizes a similar efficiency for wetland creation and wet ponds, which deviates from efficiencies reported in earlier publications. The pollutant reduction computations reported in this spreadsheet are based on TN = 40%, TP=60%, and TSS= 85%, which is consistent with "Center for Watershed Protection. 2007a. National Pollutant Removal Performance Database. Version 3. Ellicott City, MD. September 2007. Available at: http://www.cwp.org/Downloads/bmpwriteup_092007_v3.pdf ."													
⁽³⁾ Watershed Organization Projects represents the total pollutant reduction from all type of restoration strategies (Stream, outfalls, ponds, LID, plantings, shoreline stabilization, etc.). Refer to the specific project list table for Watershed Organization projects for more detail on the individual BMP efficiencies and reductions.													
⁽⁴⁾ reserved													
⁽⁵⁾ This includes both new, repaired, and replaced OSDS													
⁽⁶⁾ Assumes that this only includes those OSDS within the Bog Protection Areas and outside of the Critical Area, those in the Critical Area would be under the Chesapeake Bay Nitrogen Reducing Act of 2009													
⁽⁷⁾ Assumes that these areas are within the 50% Delivery Ratio													
⁽⁸⁾ Assumed that average flow rate for commercial properties = 1300 gpd. This equals approximately 1300/250 = 5.2 EDUs per Commercial Property. TN Load Reductions will be included in the Broadwater WRF capacity													

Howard County WIP

III.2013 Milestones

Milestones for fiscal years FY2012 and FY2013

- Complete Feasibility Study for stormwater utility
- Establish Watershed Stewards Academy and hold first round of classes
- Develop plan for enhanced education and outreach program for septic system pump outs and urban nutrient management Seek increased funding to expand County sponsored watershed enhancement grant program
- Construct stormwater pond retrofits to treat a drainage area of approximately 70 acres
- Construct stream restoration projects for approximately 10,000 feet of stream
- Complete stormwater retrofit evaluation of County owned buildings and begin implementation of identified retrofit projects
- Seek additional funding for providing economic incentives to septic system owners to encourage retrofit of BAT systems
- Continue street sweeping and reforestation programs at current levels
- Resolve the discrepancy between the MAST model and County Health Department records regarding the number of septic systems in the County