COUNTYWIDE WATERSHEDS
MONTGOMERY COUNTY, MD

Summary of Implementation Plan Schedule for the 2015 Fiscal Period with Expected Level of ESD and Pollutant Load Reductions

STRATEGIES BY WATERSHED AND SUBWATERSHED	TOTAL POTENTIAL COST	TOTAL RESTORATION POTENTIAL (ACRES)	% IMPLEMENTATION IN PERMIT CYCLE	IMPERVIOUS TREATED (ACRES)	ESD (%IMPERVIOUS)	COST (MILLIONS OF $)	ESD (% COST)	NITROGEN	PHOSPHORUS	SEDIMENT	BACTERIA	TRASH
Anacostia												
Completed and High Priority Projects	$15.8	315	100.0%	315	9%	$16	30%	5.8%	5.9%	1.9%	6.2%	5.5%
Low Priority Projects	$5.1	194	100.0%	194	8%	$5	61%	2.0%	2.1%	0.7%	2.2%	2.7%
Other Potential Projects	$249.2	2,217	33.0%	732	20%	$82	24%	7.7%	8.0%	2.6%	8.4%	10.0%
Public ESD Retrofits	$237.8	956	10.0%	96	100%	$24	100%	1.1%	1.1%	0.4%	1.2%	1.4%
Private ESD Retrofits	$213.0	857	10.0%	86	100%	$21	100%	1.0%	1.0%	0.3%	1.0%	1.3%
Riparian Reforestation	$1.4	6	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Stream Restoration	$93.7	-	11.7%	-	0%	$11	0%	5.0%	6.6%	38.1%	0.0%	0.0%
Programmatic Practices	$3.6	-	25.0%	-	0%	$0.9	0%	2.2%	2.1%	2.6%	2.0%	20.4%
Subtotal	$819.6	4,544	31.3%	1,421	26.3%	$160	45.4%	24.8%	26.8%	46.6%	21.0%	41.3%
Rock Creek												
Completed and High Priority Projects	$13.3	585	100.0%	585	1%	$13	13%	4.0%	5.0%	6.0%	5.5%	6.0%
Low Priority Projects	$8.8	665	100.0%	665	1%	$9	7%	3.9%	3.9%	6.2%	4.9%	7.0%
Other Potential Projects	$2.0	193	25.0%	48	0%	$1	0%	0.3%	0.3%	0.4%	0.4%	0.5%
Public ESD Retrofits	$247.1	1,020	10.0%	102	100%	$25	100%	1.3%	1.3%	1.4%	1.3%	1.5%
Private ESD Retrofits	$341.2	1,407	10.0%	141	100%	$34	100%	1.7%	1.7%	1.9%	1.8%	2.0%
Riparian Reforestation	$23.8	119	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Stream Restoration	$20.1	-	21.8%	-	0%	$4	0%	2.0%	1.5%	21.9%	0.0%	0.0%
Programmatic Practices	$1.2	-	100.0%	-	0%	$1	0%	11.0%	11.0%	0.0%	7.5%	0.0%
Subtotal	$657.6	3,989	38.6%	1,541	16.5%	$87	70.4%	24.1%	24.7%	37.8%	21.4%	17.0%
Cabin John												
Completed and High Priority Projects	$1.6	88	100.0%	88	2%	$2	19%	2.9%	3.0%	3.3%	3.2%	2.5%
Low Priority Projects	$1.6	10	100.0%	10	78%	$2	98%	0.2%	0.2%	0.2%	0.2%	0.3%
Other Potential Projects	$0.1	5	25.0%	1	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Public ESD Retrofits	$87.8	403	10.0%	40	100%	$9	100%	1.0%	1.0%	1.1%	1.1%	1.3%
Private ESD Retrofits	$103.1	473	10.0%	47	100%	$10	100%	1.2%	1.2%	1.3%	1.3%	1.5%
Riparian Reforestation	$7.8	39	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Stream Restoration	$16.2	-	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Programmatic Practices	$0.5	-	100.0%	-	0%	$0	0%	15.3%	14.4%	0.0%	9.9%	0.0%
Subtotal	$218.7	1,018	18.4%	187	52.0%	$23	92.0%	20.7%	19.9%	6.0%	15.7%	5.6%
Muddy Branch and Watts Branch												
Completed and High Priority Projects	$4.4	211	100.0%	211	1%	$4	8%	6.0%	6.0%	6.0%	0.0%	6.0%
Low Priority Projects	$2.0	26	100.0%	26	33%	$2	84%	0.2%	0.3%	1.2%	0.0%	0.2%
Other Potential Projects	$0.0	-	0.0%	-	0%	$0	0	0.0%	0.0%	0.0%	0.0%	0.0%
Public ESD Retrofits	$0.0	-	0.0%	-	100%	$0	100%	-	-	-	-	-
Private ESD Retrofits	$0.0	-	0.0%	-	100%	$0	100%	-	-	-	-	-
Riparian Reforestation	$0.0	-	0.0%	-	0%	$0	0%	-	-	-	-	-
Stream Restoration	$24.2	-	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Programmatic Practices	$0.0	-	100.0%	-	0%	$0	0%	-	-	-	-	-
Subtotal	$30.6	237	100.0%	237	4.3%	$6	31.6%	6.2%	6.3%	7.2%	0.0%	6.2%
Great Seneca (inclusive of Clopper Lake)												
Completed and High Priority Projects	$18.9	800	100.0%	800	1%	$19	6%	20.0%	20.0%	21.0%	0.0%	26.0%
Low Priority Projects	$6.6	87	100.0%	87	15%	$7	41%	3.7%	3.7%	4.3%	0.0%	4.3%
Other Potential Projects	$0.2	53	25.0%	13	0%	$0	0%	0.6%	0.6%	0.7%	0.0%	0.7%
Public ESD Retrofits	$0.0	-	0.0%	-	100%	$0	100%	-	-	-	-	-
Private ESD Retrofits	$0.0	-	0.0%	-	100%	$0	100%	-	-	-	-	-
Riparian Reforestation	$0.0	-	0.0%	-	0%	$0	0%	-	-	-	-	-
Stream Restoration	$25.9	-	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Programmatic Practices	$0.0	-	100.0%	-	0%	$0	0%	-	-	-	-	-
Subtotal	$51.6	941	95.8%	901	2.2%	$26	15.2%	24.3%	24.3%	26.0%	0.0%	31.0%
Clopper Lake (subshed of Great Seneca)												
Completed and High Priority Projects	$0.0	-	100.0%	-	0%	$0	0%	-	-	-	-	-
Low Priority Projects	$0.0	-	100.0%	-	0%	$0	0%	-	-	-	-	-
Other Potential Projects	$0.0	-	0.0%	-	0%	$0	0%	-	-	-	-	-
Public ESD Retrofits	$0.8	12	0.0%	-	100%	$0	100%	0.0%	0.0%	0.0%	0.0%	0.0%
Private ESD Retrofits	$0.5	8	0.0%	-	100%	$0	100%	0.0%	0.0%	0.0%	0.0%	0.0%
Riparian Reforestation	$0.2	2	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Stream Restoration	$0.0	-	0.0%	-	0%	$0	0%	-	-	-	-	-
Programmatic Practices	$0.01	-	100.0%	-	0%	$0.01	0%	61.0%	30.0%	0.0%	0.0%	0.0%
Subtotal	$1.5	22	0.0%	-	0.0%	$0.0	0.0%	61.0%	30.0%	0.0%	0.0%	0.0%
Lower Monocacy												
Completed and High Priority Projects	$0.0	-	0.0%	-	0%	$0	0%	-	-	-	-	-
Low Priority Projects	$0.0	-	0.0%	-	0%	$0	0%	-	-	-	-	-
Other Potential Projects	$0.0	-	0.0%	-	0%	$0	0%	-	-	-	-	-
Public ESD Retrofits	$8.6	40	0.0%	-	100%	$0	100%	0.0%	0.0%	0.0%	0.0%	0.0%
Private ESD Retrofits	$2.9	13	10.0%	1	100%	$0	100%	0.4%	0.4%	0.4%	0.4%	0.0%
Riparian Reforestation	$1.1	5	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Stream Restoration	$7.3	-	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Programmatic Practices	$0.1	-	0.0%	-	0%	$0.0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subtotal	$20.0	58	2.3%	1	100.0%	$0.29	100.0%	0.4%	0.4%	0.4%	0.4%	0.0%
Patuxent (Rocky Gorge)												
Completed and High Priority Projects	$0.4	5	100.0%	5	27%	$0	77%	0.7%	0.7%	0.8%	0.8%	1.0%
Low Priority Projects	$0.9	5	100.0%	5	100%	$1	100%	8.4%	8.2%	8.3%	8.2%	11.6%
Other Potential Projects	$2.0	-	25.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Public ESD Retrofits	$31.2	179	0.0%	-	100%	$0	100%	0.0%	0.0%	0.0%	0.0%	0.0%
Private ESD Retrofits	$18.6	106	1.0%	1	100%	$0	100%	0.1%	0.1%	0.1%	0.1%	0.2%
Riparian Reforestation	$2.5	12	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Stream Restoration	$19.1	-	2.5%	-	0%	$0	0%	0.3%	0.2%	0.9%	0.0%	0.0%
Programmatic Practices	$0.1	-	100.0%	-	0%	$0	0%	38.0%	8.2%	0.3%	4.7%	2.0%
Subtotal	$74.7	307	3.6%	11	64.5%	$3	54.5%	47.5%	17.4%	10.4%	13.8%	14.8%
Patuxent (Triadelphia)												
Completed and High Priority Projects	$0.0	-	100.0%	-	0%	$0	0%	-	-	-	-	-
Low Priority Projects	$0.4	2	100.0%	2	100%	$0	100%	0.5%	0.5%	0.6%	0.5%	1.0%
Other Potential Projects	$0.0	-	0.0%	-	0%	$0	0%	-	-	-	-	-
Public ESD Retrofits	$4.1	17	0.0%	-	100%	$0	100%	0.0%	0.0%	0.0%	0.0%	0.0%
Private ESD Retrofits	$4.7	19	5.0%	1	100%	$0	100%	0.3%	0.3%	0.3%	0.3%	0.5%
Riparian Reforestation	$0.1	1	0.0%	-	0%	$0	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Stream Restoration	$0.0	-	0.0%	-	0%	$0	0%	-	-	-	-	-
Programmatic Practices	$0.01	-	100.0%	-	0%	$0	0%	23.4%	3.5%	0.0%	0.0%	0.0%
Subtotal	$9.3	38	7.6%	3	100.0%	$0.6	99.1%	24.2%	4.3%	0.9%	0.8%	1.6%
Countywide Totals												
Total	**$1,884**	**11,154**	**38.6%**	**4,302**	**17.9%**	**$305**	**53.4%**	**17.8%**	**17.1%**	**22.7%**	**10.5%**	**18.0%**

	IMPERVIOUS TREATED (ACRES)
Countywide High and Low Priority	2,993
20% Targeted Impervious	4,292

TARGETED REDUCTION	NITROGEN	PHOSPHORUS	SEDIMENT
Chesapeake Bay TMDL, Urban MS4 Reductions (2017)	9%	12%	20%
Chesapeake Bay TMDL, Urban MS4 Reductions (2020)	20%	34%	37%

Assumptions:
1. 100% Completed and High Priority Projects
2. 25-33% Other potential projects
3. 100% of Public Outreach Potential for all TMDL watersheds
4. 10% of ESD potential in urban watersheds, ~1 acre ESD goal for rural watersheds
5. No riparian reforestation, Completed stream restoration
6. Used watershed area weighing to calculate countywide total pollutant removals

COUNTYWIDE WATERSHEDS
MONTGOMERY COUNTY, MD

The Countywide effort was driven by impervious cover treatment targets and Chesapeake Bay TMDL 2017 and 2020 reduction targets associated with sediment and nutrients for urban MS4s. For impervious cover, it was assumed that a 20% target would be required for each five-year permit cycle. The Bay TMDL targets for urban MS4 areas were easily met for all pollutants in 2017 and easily met for nitrogen and sediment but more difficult to meet for phosphorus in 2020.

Countywide Watersheds
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets 2017	Permit/ TMDL Targets 2020
Impervious Area Treated (acres)	4,302	6,014	7,722	10,518	11,154	6,008	7,723
% of Impervious Area Treated by ESD	18%	34%	47%	60%	63%		
Impervious Area Treatment Cost (Million $)	305	622	987	1,687	1,884		
% of Cost for ESD	53%	66%	70%	80%	80%		
Nitrogen (% Reduction)	18%	25%	36%	46%	51%	9%	20%
Phosphorus (% Reduction)	17%	23%	34%	44%	46%	12%	34%
Sediment (% Reduction)	23%	34%	54%	60%	62%	20%	37%
Bacteria (% Reduction)	11%	15%	20%	28%	30%		
Trash (% Reduction)	18%	26%	33%	41%	42%		

Assumptions:
1. Does not include repeated Outreach and Education costs beyond FY2015
2. Does not include an inflation multiplier

MS4 Permit Area WLA Compliance Endpoints by Watershed or Subwatershed

Anacostia Watershed
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets
Impervious Area Treated (acres)	1,421	2,393	3,364	4,272	4,544	
% of Impervious Area Treated by ESD	26%	44%	61%	69%	71%	
Impervious Area Treatment Cost (Million $)	160	307	486	732	820	
% of Cost for ESD	45%	62%	71%	78%	78%	
Nitrogen (% Reduction)	25%	39%	68%	89%	100%	**82%**
Phosphorus (% Reduction)	27%	42%	77%	100%	100%	**81%**
Sediment (% Reduction)	47%	72%	100%	100%	100%	**88%**
Bacteria (% Reduction)	21%	33%	46%	59%	64%	**88%**
Trash (% Reduction)	41%	65%	89%	100%	100%	

Rock Creek Watershed
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets
Impervious Area Treated (acres)	1,541	1,961	2,381	3,625	3,989	
% of Impervious Area Treated by ESD	17%	28%	36%	57%	61%	
Impervious Area Treatment Cost (Million $)	87	172	262	566	658	
% of Cost for ESD	70%	79%	79%	89%	90%	
Nitrogen (% Reduction)	24%	30%	38%	55%	61%	
Phosphorus (% Reduction)	25%	30%	38%	54%	60%	
Sediment (% Reduction)	38%	50%	92%	100%	100%	
Bacteria (% Reduction)	21%	27%	33%	50%	55%	**96%**
Trash (% Reduction)	17%	24%	31%	50%	55%	

Cabin John Creek Watershed
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets
Impervious Area Treated (acres)	187	380	570	1,018	1,018	
% of Impervious Area Treated by ESD	52%	72%	78%	87%	87%	
Impervious Area Treatment Cost (Million $)	23	65	114	215	219	
% of Cost for ESD	92%	91%	86%	90%	88%	
Nitrogen (% Reduction)	21%	27%	39%	55%	58%	
Phosphorus (% Reduction)	20%	26%	35%	49%	51%	
Sediment (% Reduction)	6%	17%	60%	91%	100%	
Bacteria (% Reduction)	16%	22%	27%	40%	40%	**31%**
Trash (% Reduction)	6%	12%	19%	34%	34%	

Muddy Branch and Watts Branch Subwatersheds
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets
Impervious Area Treated (acres)	237	237	237	237	237	
% of Impervious Area Treated by ESD	4%	4%	4%	4%	4%	
Impervious Area Treatment Cost (Million $)	6	8	19	25	31	
% of Cost for ESD	32%	27%	11%	8%	7%	None
Nitrogen (% Reduction)	6%	7%	15%	18%	22%	
Phosphorus (% Reduction)	6%	7%	10%	12%	13%	
Sediment (% Reduction)	7%	8%	14%	17%	20%	
Bacteria (% Reduction)	0%	0%	0%	0%	0%	
Trash (% Reduction)	6%	6%	6%	6%	6%	

Lower Monocacy Watershed
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets
Impervious Area Treated (acres)	1	16	32	58	58	
% of Impervious Area Treated by ESD	100%	85%	84%	91%	91%	
Impervious Area Treatment Cost (Million $)	0	4	11	18	20	
% of Cost for ESD	100%	85%	54%	63%	58%	
Nitrogen (% Reduction)	0%	5%	14%	22%	24%	
Phosphorus (% Reduction)	0%	5%	16%	26%	28%	
Sediment (% Reduction)	0%	5%	46%	61%	69%	61%
Bacteria (% Reduction)	0%	6%	12%	19%	19%	
Trash (% Reduction)	0%	0%	0%	0%	0%	

Upper Patuxent - Tridelphia Subwatershed
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets
Impervious Area Treated (acres)	3	12	20	38	38	
% of Impervious Area Treated by ESD	100%	98%	97%	99%	99%	
Impervious Area Treatment Cost (Million $)	1	3	5	9	9	
% of Cost for ESD	99%	98%	98%	99%	99%	
Nitrogen (% Reduction)	24%	27%	29%	34%	34%	
Phosphorus (% Reduction)	4%	7%	9%	14%	14%	15%
Sediment (% Reduction)	1%	4%	6%	12%	12%	
Bacteria (% Reduction)	1%	4%	6%	12%	12%	
Trash (% Reduction)	2%	6%	11%	21%	21%	

Lower Patuxent - Rocky Gorge Subwatershed
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets
Impervious Area Treated (acres)	11	88	165	307	307	
% of Impervious Area Treated by ESD	64%	89%	90%	95%	95%	
Impervious Area Treatment Cost (Million $)	3	17	40	70	75	
% of Cost for ESD	55%	82%	64%	73%	68%	
Nitrogen (% Reduction)	47%	55%	67%	82%	85%	
Phosphorus (% Reduction)	17%	25%	36%	52%	53%	15%
Sediment (% Reduction)	10%	19%	45%	70%	79%	
Bacteria (% Reduction)	14%	23%	32%	47%	47%	
Trash (% Reduction)	15%	30%	46%	68%	68%	

Great Seneca Subwatershed
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets
Impervious Area Treated (acres)	901	921	941	941	941	
% of Impervious Area Treated by ESD	2%	2%	2%	2%	2%	
Impervious Area Treatment Cost (Million $)	26	48	50	51	52	
% of Cost for ESD	15%	8%	8%	8%	8%	
Nitrogen (% Reduction)	24%	41%	43%	44%	45%	**None**
Phosphorus (% Reduction)	24%	32%	34%	34%	34%	
Sediment (% Reduction)	26%	41%	43%	44%	44%	
Bacteria (% Reduction)	0%	0%	0%	0%	0%	
Trash (% Reduction)	31%	32%	33%	33%	33%	

Great Seneca - Clopper Lake Subwatershed
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets
Impervious Area Treated (acres)	0	6	12	22	22	
% of Impervious Area Treated by ESD	0%	86%	86%	92%	92%	
Impervious Area Treatment Cost (Million $)	0	0	1	2	2	
% of Cost for ESD	0%	72%	73%	84%	84%	
Nitrogen (% Reduction)	61%	67%	72%	79%	79%	
Phosphorus (% Reduction)	30%	36%	41%	48%	48%	45%
Sediment (% Reduction)	0%	5%	10%	17%	17%	
Bacteria (% Reduction)	0%	0%	0%	0%	0%	
Trash (% Reduction)	0%	6%	11%	18%	18%	

TMDL Target NOT Met

TMDL Target Met

Assumptions:
1. Does not include repeated Outreach and Education costs beyond FY2015
2. Does not include an inflation multiplier