

VPDES MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT
VAR040094

Chesapeake Bay TMDL Action Plan

THE UNIVERSITY OF MARY WASHINGTON

October 14, 2019

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1.0 LEGAL AUTHORITIES

No new legal authorities, such as ordinances, permits, policy, specific contract language, orders, and interjurisdictional agreements have been implemented.

2.0 REQUIRED LOAD REDUCTIONS

Cumulative reductions calculations can be found in Appendix A. The required reductions have been updated to reflect land cover as of June 30, 2019 for the Fredericksburg and Stafford campuses.

Table 1: Required Cumulative Phase II Reductions

Pollutant	Sum of 40% Cumulative Reduction (lb/yr)
Nitrogen	41.23
Phosphorus	7.42
Total Suspended Solids	2,451.54

3.0 TOTAL CURRENT REDUCTION

Cumulative reductions calculations can be found in Appendix B. Current cumulative reductions exceed the required phase II removal reductions.

Table 2: Achieved Cumulative Reductions

Pollutant	Cumulative Reduction (lb/yr)
Nitrogen	48.89
Phosphorus	43.75
Total Suspended Solids	28,804.15

4.0 CURRENT IMPLEMENTED BMPS

Currently the University has implemented one BMP and four stream restoration projects for compliance.

Table 3: Current Implement BMPS

BMP	Date Implemented	Nitrogen Removal Reduction (lb/yr)	Phosphorus Removal Reduction (lb/yr)	TSS Removal Reduction (lb/yr)
Stream Restoration – SR1	October 2015	9.00	8.16	5,385.60
Stream Restoration – SR2	October 2015	17.25	15.64	10,322.40
Stream Restoration – SR3	October 2015	8.25	7.48	4,936.80
Stream Restoration – SR4	October 2015	13.50	12.24	8,078.40
Annex B Parking - Infiltration	October 2017	0.89	0.23	80.95
	Total	48.89	43.75	28,804.15

5.0 BMPS TO BE IMPLEMENTED

Currently the University intends to implement one BMP

Table 4: Proposed BMPS

BMP Type	Project Name	Location	Nitrogen Removal Efficiency (%)	Phosphorus Removal Efficiency (%)	TSS Removal Efficiency (%)	Nitrogen Removal Reduction (lb/yr)	Phosphorus Removal Reduction (lb/yr)	TSS Removal Reduction (lb/yr)	Calculation Method
Manufactured – Vortex Seperator	UMW Addition & Renovation to Jepson Sciences Center	Jepson Science Center	35%	55%	70%	5.31	1.08	382.57	Chesapeake Bay Program, Retrofit ST Curves – RD=1"
Total						5.31	1.08	382.57	

6.0 **PUBLIC PARTICIPATION**

A draft copy of this action plan was posted on the University of Mary Washington MS4 webpage for comment on October 15, 2019. At this time the University has not received any comments from the public on the revised Chesapeake Bay TMDL Action Plan.

APPENDIX A – CUMULATIVE REDUCTION CALCULATIONS

Table 3 c: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the Rappahannock River Basin (Fredericksburg and Stafford Campuses)

Pollutant	Subsource	Loading rate (lbs/ac/yr)	Total Existing Acres Served by MS4 (06/30/09)	Load (lbs/yr)	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	Percentage of L2 required reduction by 6/30/2023	40% cumulative reduction required by 6/30/2023	Sum of 40% cumulative reduction (lb/yr)
Nitrogen	Regulated Urban Impervious	9.38	55.67	522.18	9%	40%	18.80	39.62
	Regulated Urban Pervious	5.34	162.50	867.75	6%	40%	20.83	
Phosphorus	Regulated Urban Impervious	1.41	55.67	78.49	16%	40%	5.02	6.81
	Regulated Urban Pervious	0.38	162.50	61.75	7%	40%	1.79	
Total Suspended Solids	Regulated Urban Impervious	423.97	55.67	23602.41	20%	40%	1888.19	2206.75
	Regulated Urban Pervious	56.01	162.50	9101.63	9%	40%	318.56	

POC Loads as of June 30, 2009 (pre-Development)

Pollutant	Subsource	Loading rate (lbs/ac/yr)	Total Existing Acres Served by MS4 (06/30/09)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	Sum of Estimated Total POC (lb/yr)
Nitrogen	Regulated Urban Impervious	9.38	55.67	522.18	1389.93
	Regulated Urban Pervious	5.34	162.50	867.75	
Phosphorus	Regulated Urban Impervious	1.41	55.67	78.49	140.24
	Regulated Urban Pervious	0.38	162.50	61.75	
Total Suspended Solids	Regulated Urban Impervious	423.97	55.67	23602.41	32704.03
	Regulated Urban Pervious	56.01	162.50	9101.63	

Post-Development Conditions 07/01/2018

Subsource	Pollutant	2009 EOS Loading Rate (lbs/acre/yr)	Total Existing Acres Served by MS4 (07/01/18)	Estimated Total POC Load as of 07/01/18 (lbs/yr)	Sum of Estimated Total POC (lb/yr)
Regulated Urban Impervious	Nitrogen	9.38	63.33	594.04	1420.88
Regulated Urban Pervious		5.34	154.84	826.85	
Regulated Urban Impervious	Phosphorus	1.41	63.33	89.30	148.13
Regulated Urban Pervious		0.38	154.84	58.84	
Regulated Urban Impervious	Total Suspended Solids	423.97	63.33	26850.02	35522.61
Regulated Urban Pervious		56.01	154.84	8672.59	

Total Load Change from "New Sources" between 6/30/09 and 07/01/18

Subsource	Pollutant	Estimated Total POC Load as of 07/01/18 (lbs/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	load Change (lbs/yr)	Total Load Change (lbs/yr)
Regulated Urban Impervious	Nitrogen	594.04	522.18	71.85	30.95
Regulated Urban Pervious		826.85	867.75	-40.90	
Regulated Urban Impervious	Phosphorus	89.30	78.49	10.80	7.89
Regulated Urban Pervious		58.84	61.75	-2.91	
Regulated Urban Impervious	Total Suspended Solids	26850.02	23602.41	3247.61	2818.57
Regulated Urban Pervious		8672.59	9101.63	-429.04	

Total Load Removal Required

Pollutant	Subsource	Load as of (06/30/09)	Load change since (07/1/18)	Load (lbs/yr)	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	Percentage of L2 required reduction by 6/30/2023	40% cumulative reduction required by 6/30/2023	Sum of 40% cumulative reduction (lb/yr)
Nitrogen	Regulated Urban Impervious	522.18	71.85	594.04	9%	40%	21.39	41.23
	Regulated Urban Pervious	867.75	-40.90	826.85	6%	40%	19.84	
Phosphorus	Regulated Urban Impervious	78.49	10.80	89.30	16%	40%	5.71	7.42
	Regulated Urban Pervious	61.75	-2.91	58.84	7%	40%	1.71	
Total Suspended Solids	Regulated Urban Impervious	23602.41	3247.61	26850.02	20%	40%	2148.00	2451.54
	Regulated Urban Pervious	9101.63	-429.04	8672.59	9%	40%	303.54	

APPENDIX B – CUMULATIVE REDUCTION ACHIEVED CALCULATIONS

Urban Stream Restoration Calculations

Stream Restoration	Restoration Length (lf)	Removal Rates (lbs/yr/lf)			POC Removal (lbs/yr)		
		TN	TP	TSS	TN	TP	TSS
SR 1	120	0.075	0.068	44.88	9.00	8.16	5385.60
SR 2	230	0.075	0.068	44.88	17.25	15.64	10322.40
SR 3	110	0.075	0.068	44.88	8.25	7.48	4936.80
SR 4	180	0.075	0.068	44.88	13.50	12.24	8078.40

Total Removal	48.00	43.52	28723.20
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Proposed Projects	Type	Total Area Treated (Ac) (DA to BMP)			Pollutant Load			Removal Efficiencies			Removal Achieved			Calculation Methodology
		Imp.	Perv.	Forest	N (lbs)	P (lbs)	TSS (lbs)	N	P	TSS	N (lbs)	P (lbs)	TSS (lbs)	
Annex B Parking Lot	Manufactured	0.24	0.38	0	4.28	0.48	123.04	55	40	72	2.35	0.19	88.46	P=BMP Clearinghouse, N&TSS=Bay Program ST curves, RD=1"