

Loudoun County, Virginia

Phase II Chesapeake Bay TMDL Action Plan

2022 Update – March 6, 2022



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wood.

**Prepared in Compliance with Municipal Separate Storm Sewer System (MS4)
Permit No. VAR040067**

CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Ernest N. Brown Digitally signed by Ernest N. Brown
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Director, Loudoun County
Department of General Services

06MAR2022

Name

Title

Date

RECORD OF PLAN UPDATES

November 1, 2019	Original submittal to DEQ.
March 6, 2022	Update of proposed projects and projected pollutant reduction credit; update of calculations to reflect DEQ Guidance Memo No. 20-2003 – Chesapeake Bay TMDL Special Condition Guidance.

Phase II Chesapeake Bay TMDL Action Plan

Loudoun County, Virginia

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- Appendix D Public Comments
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Acronyms and Terms

Acronym	Explanation	Definition
BANCS	Bank Assessment for Non-Point Source Consequences of Sediment	A methodology used to assess streambank erosion and predict future erosion rates. Used to estimate pollutant reductions as a result of stream restoration projects.
BMP	Best Management Practice	Structural or non-structural techniques used to reduce pollution at its source or to capture and treat stormwater runoff.
DEQ	Virginia Department of Environmental Quality	The state regulatory agency responsible for issuance of VPDES permits.
IDDE	Illicit Discharge Detection and Elimination	An IDDE plan is developed and implemented to identify and eliminate illicit discharges to the MS4.
MCM	Minimum Control Measures	Minimum measures that must be implemented to reduce and eliminate sources of pollution. There are six MCMs in the County's MS4 VPDES permit.
MS4	Municipal Separate Storm Sewer System	A conveyance or system of conveyances that is owned and/or operated by a public entity.
NMP	Nutrient Management Plan	A BMP designed to reduce the amount of fertilizer while ensuring that adequate nutrients are available to maintain healthy turf and other vegetation.
TMDL	Total Maximum Daily Load	The maximum amount of a pollutant that can enter a water body without violating water quality standards.
TN	Total Nitrogen	One of three primary pollutants affecting the health of the Chesapeake Bay for which WLAs have been established.

Acronym	Explanation	Definition
TP	Total Phosphorus	One of three primary pollutants affecting the health of the Chesapeake Bay for which WLAs have been established.
TSS	Total Suspended Solids	Generally interchangeable with sediment for pollutant reduction purposes. One of three primary pollutants affecting the health of the Chesapeake Bay for which WLAs have been established.
VPDES	Virginia Pollutant Discharge Elimination System	The permit issued to an entity that allows for the discharge of stormwater to waters of the state under prescribed conditions. Loudoun holds a VPDES permit for its MS4.
USEPA	United States Environmental Protection Agency	The federal agency responsible for environmental regulation and enforcement.
WLA	Wasteload Allocation	The portion of a receiving water's loading capacity that is allocated to a specific source (such as a MS4).

Phase II Chesapeake Bay TMDL Action Plan

Loudoun County, Virginia



1. Introduction

1.1. Purpose

This Phase II Chesapeake Bay TMDL Action Plan updates and supersedes Loudoun County's previous strategies to meet the "Chesapeake Bay TMDL Special Condition" in Part II A of the General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) that became effective November 1, 2018 (2018 MS4 permit).

The Virginia Department of Environmental Quality (DEQ) approved the County's Phase I Chesapeake Bay TMDL Action Plan in 2015. A draft Phase II plan was submitted to DEQ in May 2018. A final Phase II plan was submitted to DEQ on November 1, 2019. Since that time, DEQ released new guidance on the procedures for meeting the Chesapeake Bay TMDL Special Condition (Guidance Memo No. 20-2003).¹ This version of the Phase II plan incorporates the new guidance and updates the Best Management Practices (BMPs) proposed to achieve pollutant reduction targets. Appendix E summarizes changes between the 2019 and 2021 versions of the Phase II plan.

The County's MS4 permit requires the development and implementation of action plans for impaired streams where a Total Maximum Daily Load (TMDL) assigns a waste load allocation (WLA) to the County that has been approved by the State Water Control Board. A TMDL establishes the maximum amount of a pollutant that can enter a water body without violating water quality standards. A WLA is the portion of a water body's TMDL that is allocated to a specific permitted source.

¹ Virginia DEQ Guidance Memo No. 20-2003, dated February 6, 2021, replaces Guidance Memo No. 15-2005, dated May 18, 2015.

In December 2010, the U.S. Environmental Protection Agency (U.S. EPA) established a TMDL for the Chesapeake Bay. Pollutants of concern (POCs) identified for the Bay include total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS). Virginia subsequently adopted a Watershed Implementation Plan (WIP) that establishes the framework for meeting the Chesapeake Bay TMDL. The Virginia WIP states that MS4 permit holders will implement a phased approach to reduction targets over three five-year permit cycles in accordance with the following: 5% by the end of the first permit cycle (June 30, 2018); 40% by the end of the second permit cycle (2023); and, 100% by the end of the third permit cycle (2028).

Loudoun County met the 5% reduction requirement for the first permit cycle. This Phase II Chesapeake Bay TMDL Action Plan establishes the County's 40% reduction target and identifies the BMPs for achieving the target in accordance with the 2018 MS4 permit, DEQ Guidance Memo No. 20-2003, and other guidance received by DEQ.

1.2. Summary of Required Reductions and BMPs to Achieve Reductions

Loudoun County's 40% reduction calculation is presented in Section 3. This includes: reductions from existing sources as of June 30, 2009; offsets to account for any increases in pollutant loads due to new sources initiating construction between July 1, 2009 and June 30, 2014; and, offsets to account for any grandfathered projects commencing construction after July 1, 2014.

Reductions and offsets are calculated based on the extent of the MS4 service area within the 2010 Census Urbanized Area. The County updated its MS4 service area map as part of the Phase II action plan development process. The map is presented in Appendix A. The updated MS4 service area has a total drainage area of 17,166.67 acres, consisting of 5,654.88 impervious acres and 11,511.79 pervious acres. This results in the following total reductions required to meet the 40% target: 6,214.46 pounds/year for TN; 723.18 pounds/year for TP; and, 600,725.96 pounds/year for TSS.

The MS4 permit requires the County to offset any increases from new sources initiating construction between July 1, 2009 and June 30, 2014 that disturbed one acre or greater as a result of the utilization of an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities. In addition, the County must offset any grandfathered projects that disturb one acre or greater that begin construction after July 1, 2014 and where the project utilizes an average land cover condition greater than 16%. The County adopted Chapter 1096 "Stormwater Management Ordinance" of the Codified Ordinances of Loudoun County in 2003. The water quality design criteria of the ordinance required a phosphorus loading rate of 0.45 pounds/acre/year, which is equivalent to 16% impervious cover. Effective July 1, 2014, the County increased the standard to a phosphorus loading rate of 0.41 pounds/acre/year, which is equivalent to 60% forest, 30% pasture, and 10% impervious cover. As a result, no new source or grandfathered project offsets are necessary.

The County has selected a range of BMPs to achieve the required POC reductions. These are summarized below and detailed in Section 4 through Section 6.

- Over-Treatment by Facilities Installed to Meet Development Requirements. This includes pollutant reduction in excess of what is required for land disturbing activities under the County's Stormwater Management Ordinance. Over-treatment is tracked by the County and reported on an annual basis.²
- County Stormwater Retrofits. This includes County-initiated stormwater quality retrofit projects as well as retrofits above regulatory minimums initiated as a result of proffers to the County by developers. Projects may include new structural facilities, design enhancements to existing facilities, and stream restoration projects.
- Nutrient Management Plans (NMPs). This includes NMPs implemented where nutrients are applied to under an acre within the MS4 service area and anywhere (over or under an acre) in areas outside of the MS4 service area.
- Street/Parking Lot Sweeping. This includes pollutant reductions associated with sweeping of County properties within the MS4 service area.
- Septic System Disconnects. This includes homes or businesses that are disconnected from individual septic systems starting January 1, 2006 within the MS4 service area. Credit is available for TN only.
- Nutrient Purchases. This includes purchased credit in accordance with § 62.1-44.19:21 of the Code of Virginia.
- Land Use Changes: This includes land use changes that result in a pollutant load reduction. Eligible land use changes include: (1) impervious to forest, mixed open, and turf; (2) turf to forest and mixed open; and, (3) mixed open to forest.
- Other BMPs. The County reserves the right to implement other BMPs that are allowed in accordance with DEQ's Guidance Memo No. 20-2003. These will be described in the County's MS4 annual reports to DEQ.

The 2018 MS4 permit requires the County to report total POC reductions achieved prior to July 1, 2018 to meet the 5% reduction target and to then demonstrate how the County will achieve additional reductions to meet the 40% reduction target. Table 1.A summarizes required reductions, reductions achieved prior to July 1, 2018, additional reductions planned through the end of the second permit cycle, and anticipated percent progress toward achieving the 100% reduction target.

² The County also tracks any under-treatment, which is subtracted from over-treatment credit.

Table 1.A – Summary of Required Reductions and Implemented and Planned BMPs

	Total Nitrogen (lbs/year)	Total Phosphorus (lbs/year)	Total Suspended Solids (lbs/year)
Existing Source Reductions to Meet 40% Target	6,214.46	723.18	600,725.96
+ New Source Offsets	-	-	-
+ Grandfathered Offsets	-	-	-
= Total Required Reductions and Offsets	6,214.46	723.18	600,725.96
- BMPs Prior to July 1, 2018	6,513.64	609.15	410,539.77
- BMPs July 1, 2018 and On	3,968.77	599.97	1,029,916.46
= Remainder/(Excess) Toward 40% Target	(4,267.95)	(485.94)	(839,730.26)
Progress Toward 100% Target	67.5%	66.9%	95.9%

Any reductions in excess of 40%, whether identified in this plan or reported to DEQ in the County's MS4 annual reports, will be applied to the third permit cycle requirements.

1.3. Permit Compliance Crosswalk

Table 1.B provides each of the requirements for this action plan from Part II A 11 of the 2018 MS4 permit and the specific sections where the requirements are addressed.

Table 1.B – Action Plan and Permit Compliance Crosswalk

Action Plan Section	MS4 Permit	MS4 Permit Requirement
Section 2	Part II A 11 a	Any new or modified legal authorities, such as ordinances, permits, policy, specific contract language, orders, and interjurisdictional agreements, implemented or needing to be implemented to meet the requirements of Part II A 3, 4, and 5.
Section 3	Part II A 11 b	The load and cumulative reduction calculations for each river basin calculated in accordance with Part II A 3, 4, and 5.

Action Plan Section	MS4 Permit	MS4 Permit Requirement
Section 5	Part II A 11 c	The total reductions achieved as of July 1, 2018 for each pollutant of concern in each river basin.
Section 5 and Appendix B	Part II A 11 d	A list of BMPs implemented prior to July 1, 2018 to achieve reductions associated with the Chesapeake Bay TMDL including: (1) The date of implementation; and, (2) The reduction achieved.
Section 6 and Appendix C	Part II A 11 e	The BMPs to be implemented by the permittee prior to the expiration of this permit to meet the cumulative reductions calculated in Part II A 3, 4, and 5, including as applicable: (1) Type of BMP; (2) Project name; (3) Location; (4) Percent removal efficiency for each pollutant of concern; and, (5) Calculation of the reduction expected to be achieved by the BMP calculated and reported in accordance with the methodologies established in Part II A 8 for each pollutant of concern.
Section 8 and Appendix D	Part II A 11 f	A summary of any comments received as a result of public participation required in Part II A 12 below, the permittee's response, identification of any public meetings to address public concerns, and any revisions made to the Chesapeake Bay TMDL Action Plan as a result of public participation.

2. Program and Legal Authority

The County has adopted an MS4 Program Plan that documents implementation of all MS4 permit requirements, including the programmatic and legal authorities required to meet the “Chesapeake Bay TMDL Special Condition.” The full MS4 Program Plan can be found at <https://www.loudoun.gov/stormwater>. Table 2.A provides a summary of elements of the six minimum control measures (MCMs) implemented by the County that relate to controlling total nitrogen, total phosphorus, and total suspended solids.

Table 2.A – MS4 Program Plan Components Related to the Chesapeake Bay TMDL

Minimum Control Measure	MS4 Program Plan Elements Related to Controlling TN, TP, and TSS
Public Education and Outreach on Stormwater Impacts	The County has identified nutrient and sediment impacts on water quality as two of its high-priority pollutants for the focus of its public education and outreach plan (PEOP). Plan elements include the development and distribution of educational materials (print and electronic), target audience training, and participation in the multi-media (radio, cable, and digital) campaign of the Northern Virginia Regional Commission’s Clean Water Partners.
Public Involvement and Participation	The County has designed a program to engage the public by meeting all public notice requirements and promoting at least four watershed management activities annually.
Illicit Discharge Detection and Elimination	The County has implemented an Illicit Discharge Detection and Elimination (IDDE) program designed to prevent, identify, and eliminate sources of pollutants, including nutrients and sediment.
Construction Site Stormwater Runoff Control	The County’s construction site stormwater runoff control program, implemented through the Erosion Control Ordinance (Chapter 1220), is fully consistent with the water quality control requirements of the Virginia Erosion and Sediment Control Act and the Virginia Stormwater Management Act, and their attendant regulations.

Minimum Control Measure	MS4 Program Plan Elements Related to Controlling TN, TP, and TSS
Post-Construction Stormwater Management	The County’s construction site stormwater runoff control program, implemented through the Stormwater Management Ordinance (Chapter 1096), is fully consistent with the water quality control requirements of the Virginia Stormwater Management Act and its attendant regulations.
Pollution Prevention and Good Housekeeping for Municipal Operations	The County has designed a program to prevent pollution from County facilities through the development of stormwater pollution prevention plans (SWPPPs), standard operating procedures (SOPs), and training. The program includes a specific action to develop nutrient management plans (NMPs) for all County owned and/or operated properties where nutrients are applied to more than one contiguous acre.

The County has reviewed its MS4 Program Plan and legal authorities and finds that no additional legal authorities are required for compliance with the “Chesapeake Bay TMDL Special Condition” at this time.

3. Load and Cumulative Reduction Calculations

The following sections describe the methodology used by the County to determine the existing POC load and cumulative target reduction calculations in accordance with Part II A 3, 4, and 5 of the 2018 MS4 permit.

3.1. MS4 Service Area Delineation

Reductions and offsets are calculated based on the extent of the MS4 service area within the 2010 Census Urbanized Area. Loudoun County has maintained a map of storm sewer pipes and outfall locations in a GIS environment for many years. The outfall database was updated during the previous MS4 permit cycle to include the estimated MS4 acres served by each outfall. Outfall drainage areas were hand-delineated by a qualified engineer and are maintained by the County on a continuous basis.

Outfalls in the County's database are classified into eight maintenance categories.³ The County has conservatively opted to assume responsibility for drainage to all outfalls in its database. In accordance with DEQ's Guidance Memo No. 20-2003, MS4 service areas accounted for by other permit holders are excluded. This includes the Town of Leesburg, the Northern Virginia Community College – Loudoun Campus (NVCC-Loudoun), and VDOT. While Leesburg's MS4 service area is drainage-area based, NVCC-Loudoun's is based on the property boundary⁴ and VDOT's is based on the right-of-way. The County coordinated with VDOT to obtain the latest MS4 service areas in GIS and obtained the NVCC-Loudoun parcel boundary from the County parcel database. The County reserves the right to further refine its MS4 service area based on outfall-specific assessments and determinations.

The County excluded parcels subject to a Virginia Pollutant Discharge Elimination System (VPDES) industrial stormwater permit⁵ and forested areas. The County obtained a list of VPDES industrial stormwater permit holders from DEQ and removed those permit holders within the MS4 service area. Table 3.A shows the list of excluded VPDES permit holders.

The County's MS4 service area map is presented in Appendix A. Based on the above analysis, the County has determined that a total of 17,166.67 acres is served by the regulated MS4.

³ Maintenance is usually the responsibility of the property owner; however, the County often has an easement on the outfall and/or associated storm sewer pipe.

⁴ Chesapeake Bay TMDL Action Plan, Northern Virginia Community College, June 30, 2015.

⁵ In accordance with DEQ Guidance Memo No 20-2003, this includes land regulated under any General VPDES permit that addresses industrial stormwater, including the General VPDES Permit for Stormwater Associated with Industrial Activity (VAR05), the General VPDES Permit for Concrete Products Facilities (VAG11), and the Nonmetallic Mineral Processing General Permit (VAR84).

Table 3.A – VPDES Permit Holders in the Loudoun County MS4

Permit Holder	Type	Number	Address	City
MWAA - Washington Dulles International Airport	Individual	VA0089541	45025 Aviation Dr Ste 400	Sterling
Loudoun Composting	Individual	VA0091430	44150 Wade Dr	Chantilly
Titan Virginia Ready Mix LLC - Sterling	Concrete	VAG110103	22963 Concrete Plz	Sterling
Virginia Concrete Company Inc - Chantilly Plant	Concrete	VAG110089	25086 Tanner Ln	Pleasant Valley
Aggregate Industries MAR - Chantilly	Concrete	VAG110318	25232 Willard Rd	Chantilly
Superior Concrete - Dulles	Concrete	VAG110094	44146 Wade Dr	Chantilly
Virginia Concrete Company Inc - Sterling	Concrete	VAG110084	44809 Old Ox Rd	Sterling
Virginia Concrete Company Inc - Sterling	Concrete	VAG110088	44866 Old Ox Rd	Sterling
GE Aviation Dowty Propellers	Industrial Stormwater	VAR052219	114 Powers Ct	Sterling
TTM Technologies North America LLC	Industrial Stormwater	VAR051145	1200 Severn Way	Sterling
Waste Management of Virginia - Sterling	Industrial Stormwater	VAR051088	1505 Moran Rd	Sterling
US Postal Service-Dulles Vehicle Maintenance Facility	Industrial Stormwater	VAR051068	22363 Randolph Dr	Sterling
Virginia Paving Company - Loudoun Plant	Industrial Stormwater	VAR050922	23232 Shaw Rd	Sterling
William A Hazel Incorporated - Recycling Facility	Industrial Stormwater	VAR052245	25020 Willard Rd	Chantilly
Virginia Paving Company - Chantilly	Industrial Stormwater	VAR050863	25094 Tanner Ln	Chantilly
Trowbridge Steel Company Incorporated	Industrial Stormwater	VAR050906	44886 Old Ox Rd	Sterling
Loudoun Quarries Division	Nonmetallic Mineral Mining	VAG840095	23070 Shaw Rd	Sterling
Chantilly Crushed Stone Incorporated	Nonmetallic Mineral Mining	VAG840106	25052 Tanner Ln	Chantilly

3.2. Pervious and Impervious Surface Delineation

A GIS approach was used to determine the County's regulated urban impervious and regulated urban pervious acres. Planimetric impervious cover is based on 2009 GIS data. Impervious cover surfaces include buildings, roads, parking lots, sidewalks, recreational surfaces, and other similar features.

To calculate the 2009 impervious regulated area, the 2009 planimetric impervious cover features were clipped using the MS4 boundary polygon layer and the resulting acres were totaled. Regulated pervious acres were calculated by subtracting the regulated impervious acres from the total MS4 acres.

Based on the above analysis, the County has determined that the 17,166.67 acres in the MS4 service area is divided into 5,654.88 impervious acres and 11,511.79 pervious acres.

3.3. Reduction Requirements

The County is located within the Potomac River Basin. Therefore, reduction requirements are calculated in accordance with Part II A 3, Table 3b of the 2018 MS4 permit.

Table 3.B presents the estimated existing source loads and the 40% reduction requirement in accordance with the MS4 permit and the Chesapeake Bay TMDL Special Conditions Guidance.

Table 3.B – Calculation Sheet for Estimating Existing Source Loads and Reduction Requirements for the Potomac River Basin

Pollutant	Subsource	A. Loading Rate (lbs/ac/yr)	B. Existing Developed Land 2009 (acres)	C. Loading (lbs/yr)	D. MS4 Required Bay Total L2 Loading Rate Reduction	E. Percentage of L2 Required Reduction by 2023	F. 40% Cumulative Reduction Required by 2023	G. Sum of 40% Cumulative Reduction (lbs/yr)
TN	Imp.	16.86	5,654.88	95,341.28	0.0900	0.40	3,432.29	6,214.46
TN	Perv.	10.07	11,511.79	115,923.73	0.0600	0.40	2,782.17	
TP	Imp.	1.62	5,654.88	9,160.91	0.1600	0.40	586.30	723.18
TP	Perv.	0.41	11,511.79	4,719.83	0.0725	0.40	136.88	
TSS	Imp.	1,171.32	5,654.88	6,623,674.04	0.2000	0.40	529,893.92	600,725.96
TSS	Perv.	175.80	11,511.79	2,023,772.68	0.0875	0.40	70,832.04	

3.4. New Source Offset

Part II A 4 of the 2018 MS4 permit requires the County to offset 40% of increases from new sources initiating construction between July 1, 2009 and June 30, 2014 that disturb one acre or greater as a result of the utilization of an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities. The County adopted Chapter 1096 "Stormwater Management Ordinance" of the Codified Ordinances of Loudoun County in 2003. The water quality design criteria of the ordinance required a phosphorus loading rate of 0.45 pounds/acre/year, which is equivalent to 16% impervious cover. Effective July 1, 2014, the County increased the standard to a phosphorus loading rate of 0.41 pounds/acre/year, which is equivalent to 60% forest, 30% pasture, and 10% impervious cover. Therefore, no new source offset is required.

3.5. Grandfathered Projects Offset

Part II A 5 of the 2018 MS4 permit requires the County to offset any grandfathered projects that disturb one acre or greater that begin construction after July 1, 2014 and where the project utilizes an average land cover condition greater than 16%. As noted in Section 3.4, the County adopted post-construction stormwater management requirements in 2003 that define the average land cover condition as 16%. Therefore, no grandfathered source offset is required.

3.6. Total Reduction and Offset Requirements

Table 3.C presents the total reduction and offset requirements that the County must achieve during the second MS4 permit cycle.

Table 3.C – Total Reduction and Offset Requirements

Reductions and Offsets	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Existing Source Reductions to Meet 40% Target	6,214.46	723.18	600,725.96
+ New Source Offsets	-	-	-
+ Grandfathered Offsets	-	-	-
= Total Reductions and Offsets	6,214.46	723.18	600,725.96

4. Overall Pollutant Reduction Strategy

The County's overall strategy for achieving POC reductions includes a combination of BMPs as described below:

- Over-Treatment by Facilities Installed to Meet Development Requirements. This includes pollutant reductions achieved in excess of what is required for land disturbing activities under the County's Stormwater Management Ordinance. Over-treatment is tracked by the County and reported on an annual basis. For each development plan, the County tracks the post-development TP load, the TP removal required, and the TP removal achieved. The County takes credit for the difference between TP removal required and TP removal achieved.⁶ The methodology described in Appendix V.E of the DEQ guidance is used by the County to determine the reduction credit for TN and TSS.
- County Stormwater Retrofits. This includes County-initiated stormwater quality retrofit projects as well as retrofits above regulatory minimums initiated as a result of proffers to the County by developers. Projects may include new structural facilities, design enhancements to existing facilities, and stream restoration projects. The methodologies described in Appendices V.A, V.B, V.C, and V.D of the DEQ guidance are used by the County to calculate pollutant reduction credit.
- Nutrient Management Plans (NMPs). This includes NMPs implemented where nutrients are applied to under an acre within the MS4 service area and anywhere (over or under an acre) in areas outside of the MS4 service area. Credit is only available for TP and TN and is calculated in accordance with Appendix V.L of the DEQ guidance.
- Street/Parking Lot Sweeping. This includes pollutant reductions associated with sweeping of County properties within the MS4 service area. While the County's current frequency of sweeping does not qualify for pollutant reduction credit, any future credit will be calculated in accordance with Appendix V.G of the DEQ guidance.
- Septic System Disconnects. This includes homes or businesses that are disconnected from individual septic systems starting January 1, 2006 within the MS4 service area. Credit is available for TN only. The methodology described in Appendix V.O of the DEQ guidance is used to calculate pollutant reduction credit from residential systems. Credit for commercial or institutional disconnects is calculated on a case-by-case basis.
- Nutrient Purchases. This includes purchased credit in accordance with § 62.1-44.19:21 of the Code of Virginia.
- Land Use Changes: This includes land use changes that result in a pollutant load reduction. Eligible land use changes include: (1) impervious to forest, mixed open, and turf; (2) turf to forest and mixed open; and, (3) mixed open to forest. The methodology

⁶In some instances, over-treatment occurs as a result of the phasing of land-disturbing activities. Future phases are tracked by the County and over-treatment credit is reduced as appropriate.

described in Appendix V.H of the DEQ guidance is used by the County to calculate pollution reduction credit.

- Other BMPs. The County reserves the right to implement other BMPs that are allowed in accordance with DEQ's Guidance Memo No 20-2003. This includes, but is not limited to, rooftop disconnects, rainwater harvesting, forest buffers, urban tree canopy expansion, and impervious cover removal. Any reductions will be described in the County's MS4 annual reports to DEQ.

5. BMPs Implemented During the First Permit Cycle

Progress made toward achieving pollutant reductions during the first permit cycle is documented in this section. A list of BMPs, including the date of implementation and the reductions achieved, is included in Appendix B as required in Part II A 4 of the 2018 MS4 permit.

5.1. Over-Treatment by Facilities Installed to Meet Development Requirements

The County achieved pollutant reductions during the first permit cycle as a result of over-treatment by stormwater management facilities installed to meet the requirements for new development under the County’s Stormwater Management Ordinance. Detailed information is included in Appendix B.

5.2. County Stormwater Retrofits

The County implemented several stormwater retrofit projects during the first permit cycle. These are described in Figure 5.A. Detailed pollutant reduction spreadsheets for these projects, including all required information in the 2018 MS4 permit, is provided in Appendix B in a format consistent with the Chesapeake Bay TMDL Special Conditions Guidance.

Figure 5.A – Description of Completed County-Initiated Stormwater Retrofit

Gwen Thompson Briar Patch Park Retrofits	Description
	<p>Gwen Thompson Briar Patch Park was retrofit in 2016 with a constructed wetland facility. The retrofit treats 27.11 acres of impervious cover.</p>

Murray's Bridge Removal Project	Description
	<p>The Murray's Bridge removal project occurred in 2014 on Goose Creek. The bridge was abandoned in place in 1970. The remainder of the bridge was impeding flow and causing bank erosion on both sides. A report by Wetland Studies and Solutions, Inc. estimated erosion reduction rates as a result of the removal of the bridge and the stabilization of stream banks. The picture on the left shows the abutment and resulting erosion prior to stabilization.</p>
Riverside High School Retrofits	Description
	<p>Two Level 1 bioretention facilities and six dry swales were installed at Riverside High School in 2015 per proffered conditions above regulatory requirements. Together, the retrofits treat 4.55 acres of impervious cover.</p>
Sterling Business Park Pervious Pavement	Description
	<p>Pervious pavement was installed at Sterling Business Park per proffered conditions above regulatory requirements. The pervious pavement treats 0.15 acre of impervious cover.</p>

Sterling BMW Retrofit	Description
	<p>A Downstream Defender hydrodynamic separator unit was installed at Sterling BMW per proffered conditions above regulatory requirements. The facility treats 1.82 acres of impervious cover.</p>

Countryside/McPherson Circle Retrofit	Description
	<p>A CDS hydrodynamic separator unit was installed at McPherson Circle near Brookmeade Court per proffered conditions above regulatory requirements. The facility treats 1.66 acres of impervious cover.</p>

5.3. Nutrient Management Plans

The County did not achieve any credit through NMPs during the first permit cycle.

5.4. Street/Parking Lot Sweeping

The County achieved pollutant reductions during the first permit cycle as a result of its street/parking lot sweeping program. The average amount swept from 2015-2017 was 17,500 pounds per year. The County anticipated changes to the DEQ guidance, which now requires the use of the methodology described in Recommendations of the Expert Panel to Define Removal Rates for Street and Storm Drain Cleaning Practices (May 19, 2016). The minimum standard applicable to the County (practice SPC-6) requires a vacuum assisted sweeper at a frequency of four passes per year. The County does not currently meet this standard. Therefore, credit for street sweeping has been set to zero.

5.5. Septic System Disconnects

The County achieved pollutant reductions during the first permit cycle as a result of septic system disconnects. Septic disconnects from January 1, 2006 through the end of the first permit cycle along with the TN reduction calculations are shown in Appendix B.

5.6. Nutrient Purchases

The County did not purchase any credit during the first permit cycle.

5.7. Land Use Changes

The County achieved pollutant reductions during the first permit cycle as a result of land use changes. These included four tree planting projects to convert turf to forested land use. One project (Eagle Ridge Middle School) is located within the MS4 service area, while three projects (Belle Terra HOA, South Riding, and Loudoun County Landfill) are located outside of the MS4 service area. Calculations, including accounting for baseline conditions for changes outside of the MS4, are shown in Appendix B.

5.8. Other BMPs

The County did not implement other BMPs as provided for in DEQ Guidance Memo No. 20-2003 during the first permit cycle.

Table 5.A – Summary of Compliance with First Permit Cycle Requirements

BMPs	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Over-Treatment	2,611.42	516.19	361,670.86
County Stormwater Retrofits	369.44	69.19	39,862.74
Nutrient Management Plans	-	-	-
Street/Parking Lot Sweeping	-	-	-
Septic System Disconnects	3,449.25	-	-
Nutrient Purchases	-	-	-
Land Use Changes	83.53	23.76	9,006.17
Other BMPs	-	-	-
Total BMPs	6,513.64	609.15	410,539.77
First Permit Cycle (5%) Reductions and Offsets	776.81	90.40	75,090.75
Remainder/(Excess) Toward 5% Target	(5,736.83)	(518.75)	(335,449.02)

6. BMPs Planned for the Second Permit Cycle

This section describes the BMPs that have been or will be implemented during the second permit cycle to achieve the cumulative 40% POC reduction target as required in Part II A 11 e of the 2018 MS4 permit.

6.1. Over-Treatment by Facilities Installed to Meet Development Requirements

The County will continue to document pollutant reductions as a result of over-treatment by stormwater management facilities installed to meet the requirements for new development under the County's Stormwater Management Ordinance. The average annual reduction achieved from FY2016-FY2018 was 440 lbs/year for TN, 43 lbs/year for TP, and 40,000 lbs/year for TSS. In FY2019, the County experienced negative credit TP and TSS as a result of two previous over-treatment projects being used for new development. No credit was claimed in FY2020 and FY2021. The County is conservatively assuming no additional credit for the remainder of the second permit cycle (FY22-FY23). Any actual reductions will be reported in annual reports to DEQ.

Table 6.A – Summary of Reductions from Over-Treatment

	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Achieved During First Permit Cycle	2,611.42	516.19	361,670.86
Planned for Second Permit Cycle	6.46	(0.12)	(1,114.30)
Total	2,617.88	516.07	360,556.56

6.2. County Stormwater Retrofits

The County will continue to install stormwater retrofit projects (including pond retrofits and stream and outfall restorations) during the second permit cycle. Two projects have been completed and one is under construction. These are summarized in Figure 6.A. Planned and conceptual projects are summarized in Figure 6.B. The County reserves the right to substitute planned/conceptual projects with equivalent projects based on further analysis. Pollutant reduction spreadsheets for all projects are provided in Appendix C in a format consistent with the Chesapeake Bay TMDL Special Conditions Guidance.

Figure 6.A – County Stormwater Retrofits – Completed/Under Construction

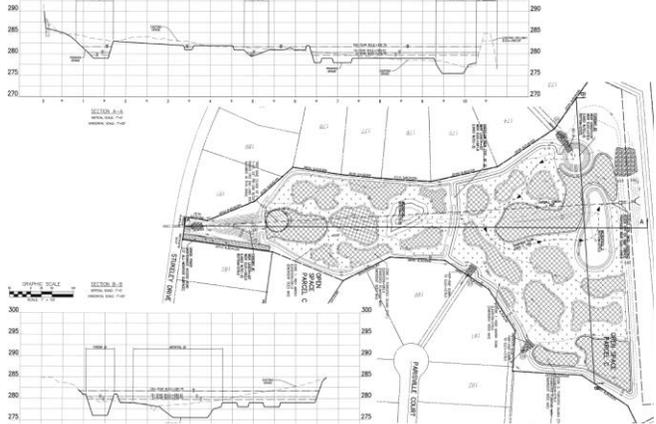
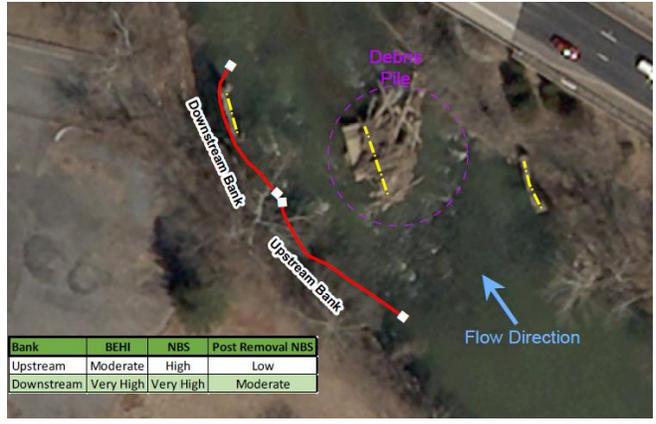
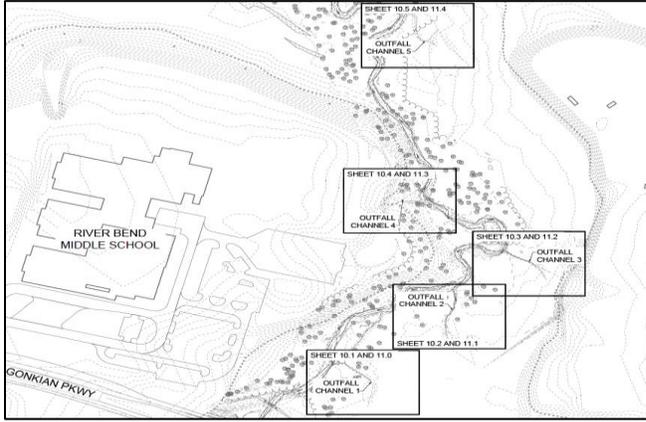
<p>Loudoun Valley Estates Pond Retrofit</p> 	<p>Description</p> <p>This project was completed in May 2020. The pond was originally built as an extended detention dry pond. The retrofit involved converting the facility to a constructed wetland. The facility drains 72.85 acres, including 17 acres of impervious area. This project was funded in part by a Virginia Stormwater Local Assistance Fund grant.</p>												
<p>Goose Creek Debris Removal</p>  <table border="1" data-bbox="196 1241 513 1297"> <thead> <tr> <th>Bank</th> <th>BEHI</th> <th>NBS</th> <th>Post Removal NBS</th> </tr> </thead> <tbody> <tr> <td>Upstream</td> <td>Moderate</td> <td>High</td> <td>Low</td> </tr> <tr> <td>Downstream</td> <td>Very High</td> <td>Very High</td> <td>Moderate</td> </tr> </tbody> </table>	Bank	BEHI	NBS	Post Removal NBS	Upstream	Moderate	High	Low	Downstream	Very High	Very High	Moderate	<p>Description</p> <p>This project was completed in September 2020. The project involved the removal of piers and debris associated the original Route 7 bridge over Goose Creek. The superstructure of the bridge was removed in 2013. However, remaining piers (which collapsed) were causing near bank stress and erosion. A report was developed for the County detailing the water quality benefits of removing the piers and debris.</p>
Bank	BEHI	NBS	Post Removal NBS										
Upstream	Moderate	High	Low										
Downstream	Very High	Very High	Moderate										
<p>Yorktown Court Pond Retrofit</p> 	<p>Description</p> <p>This project is under construction with completion expected in 2022. The project involves the conversion of an existing dry detention pond to an extended detention pond. The facility drains 36.67 acres, including 11.47 acres of impervious area.</p>												

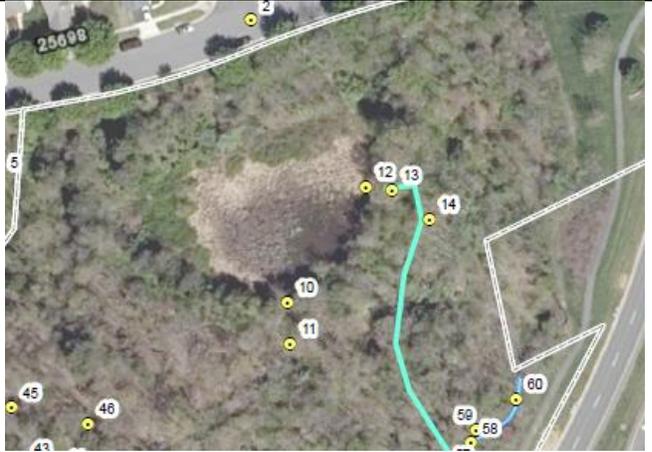
Figure 6.B – County Stormwater Retrofits – Planned/Conceptual

Countryside/Riverbend Stream Restoration	Description
	<p>This project involves the restoration of approximately 3,000 linear feet of highly degraded stream. The County has performed a BANCS assessment indicating that restoration will result in an initial TSS reduction of 396.34 tons/year before application of the effectiveness factor and baseline.</p>
Countryside/Riverbend Outfall Restoration	Description
	<p>This project involves the restoration of five highly degraded outfall channels between Riverbend Middle School and Potomac Falls High School. The County has performed a BANCS assessment indicating that restoration will result in an initial TSS reduction of 34.96 tons/year before application of the effectiveness factor and baseline.</p>
Sterling Commercial Pond Retrofit (MD1745)	Description
	<p>This pond was originally built as an extended detention dry pond to serve a highly commercial/industrial area. The project involves converting the pond to a constructed wetland. The facility drains ~105 acres, including ~40 acres of impervious area.</p>

Confluence Park Outfall Restoration	Description
	<p>This project involves the restoration of a highly degraded outfall channel. The County has performed a BANCS assessment indicating that restoration will result in an initial TSS reduction of 23.88 tons/year before application of the effectiveness factor and baseline.</p>

Conklin Park Stream Restoration	Description
	<p>This project involves the restoration of approximately 2,200 linear feet of highly degraded stream. The County has performed a BANCS assessment indicating that restoration will result in an initial TSS reduction of 181.34 tons/year before application of the effectiveness factor and baseline.</p>

Conklin Park Retrofit – JC77	Description
	<p>This project involves converting a wet pond into a constructed wetland. The facility drains ~53 acres, including ~16 acres of impervious area.</p>

Conklin Park Retrofit – XX267	Description
	<p>This project involves converting a silted up former farm pond with no water quality control into a constructed wetland. The facility drains ~15 acres, including ~6 acres of impervious area.</p>

Rose Hill Estates/Bettis Drive Channel Repair	Description
	<p>This project involves the restoration of a highly degraded outfall channel. The County has performed a BANCS assessment indicating that restoration will result in an initial TSS reduction of 158.55 tons/year before application of the effectiveness factor and baseline.</p>

Rostormel Outfall Restoration	Description
	<p>This project involves the restoration of a highly degraded outfall channel. The County has performed a BANCS assessment indicating that restoration will result in an initial TSS reduction of 104.33 tons/year before application of the effectiveness factor and baseline.</p>

Willow Lake Pond Retrofit	Description
	<p>This project involves converting a wet pond into a BMP Clearinghouse Level 1 Wet Pond. The facility drains ~122 acres, including ~53 acres of impervious area. The County has received a SLAF grant for this project.</p>

Willow Lake Outfall Restorations	Description
	<p>This project involves the restoration of highly degraded outfall channels associated with Willow Lake. This includes the main outfall channel and the emergency spillway channel. The surface water level is at the emergency spillway, which is causing erosion. The County has performed a BANCS assessment indicating that restoration will result in an initial TSS reduction of 23.46 tons/year before application of the effectiveness factor and baseline. The County has received a SLAF grant for this project.</p>

Table 6.B – County Stormwater Retrofit Credit Ledger

Project	TN Credit (lbs/year)	TP Credit (lbs/year)	TSS Credit (lbs/year)	Anticipated Completion
Loudoun Valley Estates	208.86	23.50	10,465.27	2020
Goose Creek Debris Removal	56.88	26.20	49,898.80	2020
Yorktown Court Pond Retrofit	73.78	3.76	9,468.56	2022
Countryside/Riverbend Stream Restoration	408.87	188.30	372,452.11	2022
Countryside/Riverbend Outfall Restorations	32.65	17.59	34,493.86	2022
Sterling Commercial Retrofit - MD1745	193.88	32.48	29,754.15	2022
Confluence Park Outfall	25.07	10.11	23,880.00	2023
Conklin Park - Stream Restoration	89.39	39.99	172,205.66	2023
Conklin Park - JC77 Retrofit	29.64	4.54	3,809.83	2023
Conklin Park - XX267 Retrofit	36.07	5.89	5,129.75	2023
Rose Hill Estates/Bettis Drive Channel Repair	21.24	1.00	158,024.49	2023
Rostormel Outfall Restoration	302.71	48.19	104,057.31	2023
Willow Lake Pond – Retrofit	232.02	20.29	13,236.76	2023
Willow Lake Pond – Outfalls	26.02	11.98	22,815.91	2023
Total	2,106.51	503.02	1,049,555.19	

Table 6.C – Summary of Reductions from County Stormwater Retrofits

	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Achieved During First Permit Cycle	369.44	69.19	39,862.74
Planned for Second Permit Cycle	1,737.06	433.83	1,009,692.45
Total	2,106.51	503.02	1,049,555.19

6.3. Nutrient Management Plans

The County will take credit for six nutrient management plans (NMPs) implemented outside of the MS4 and two NMPs implemented in the MS4 that are under one acre. A list of NMPs, including the date of expected implementation and the reductions achieved, is included in Appendix C.

Table 6.D – Summary of Reductions from Nutrient Management Plans

	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Achieved During First Permit Cycle	0.00	0.00	
Planned for Second Permit Cycle	11.96	0.24	
Total	11.96	0.24	

6.4. Street/Parking Lot Sweeping

The County does not currently meet the standard in Recommendations of the Expert Panel to Define Removal Rates for Street and Storm Drain Cleaning Practices (May 19, 2016) to take credit for its street sweeping program. The County will assess its practices and include any reductions in the County’s MS4 annual reports.

Table 6.E – Summary of Reductions from Street Sweeping

	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Achieved During First Permit Cycle	0.00	0.00	0.00
Planned for Second Permit Cycle	To be determined.	To be determined.	To be determined.
Total	0.00	0.00	0.00

6.5. Septic System Disconnects

The County will continue to take credit for septic disconnects. The County obtained a comprehensive list of septic system disconnects from the Loudoun County Health Department. The list includes disconnects from January 1, 2006 through FY2021. The list was cross-checked with the County’s MS4 service area using GIS. This resulted in 18 disconnects on parcels completely within the MS4, 479 disconnects on parcels intersecting the MS4, 4,375 disconnects

on parcels outside of the MS4, and 571 disconnects with unknown locations. DEQ has indicated that it may allow permittees to claim septic disconnect reductions outside of the MS4 with a baseline reduction.⁷ Further guidance from DEQ is pending. The County is taking a conservative approach for this plan and taking credit only for disconnects on parcels completely within or intersecting the MS4.

Table 6.F – Summary of Reductions from Septic System Disconnects

	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Achieved During First Permit Cycle	3,449.25		
Planned for Second Permit Cycle	1,247.40		
Total	4,696.65		

6.6. Nutrient Purchases

The County has purchased 90 pounds per year of TP in accordance with § 62.1-44.19:21 of the Code of Virginia (30 pounds each year in FY2019, FY2020, and FY2021). The County intends to continue to purchase at least 30 pounds of TP each year through FY2023. Associated TN and TSS (which differs based on the specific provider) will be reported in MS4 annual reports to DEQ. For planning purposes, the County is using a conservative TP:TN ratio of 1:6 and TP:TSS ratio of 1:102 based on purchases made through FY2021.

Table 6.G – Summary of Reductions from Nutrient Purchases

	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Achieved During First Permit Cycle	0.00	0.00	0.00
Planned for Second Permit Cycle	910.16	150.00	15,272.19
Total	910.16	150.00	15,272.19

6.7. Land Use Changes

The County will continue to take credit for land use changes. Two land use conversions (turf to forest) have been completed in the second permit cycle. Both are outside of the MS4 service

⁷ Email from Derick Winn, DEQ, September 28, 2021.

area. The County anticipates another 10 acres of turf to forest land use change and has conservatively assumed these will be outside of the MS4. Conversion details and applicable credit will be reported to DEQ in the County's MS4 annual reports.

Table 6.H – Summary of Reductions from Land Use Changes

	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Achieved During First Permit Cycle	83.53	23.76	9,006.17
Planned for Second Permit Cycle	55.73	16.02	6,066.12
Total	139.25	39.78	15,072.28

6.8. Other BMPs

The County will report other BMPs as provided for in the Chesapeake Bay TMDL Special Condition Guidance in MS4 annual reports to DEQ.

Table 6.I – Summary of Reductions from Other BMPs

	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Achieved During First Permit Cycle	0.00	0.00	0.00
Planned for Second Permit Cycle	To be determined.	To be determined.	To be determined.
Total	0.00	0.00	0.00

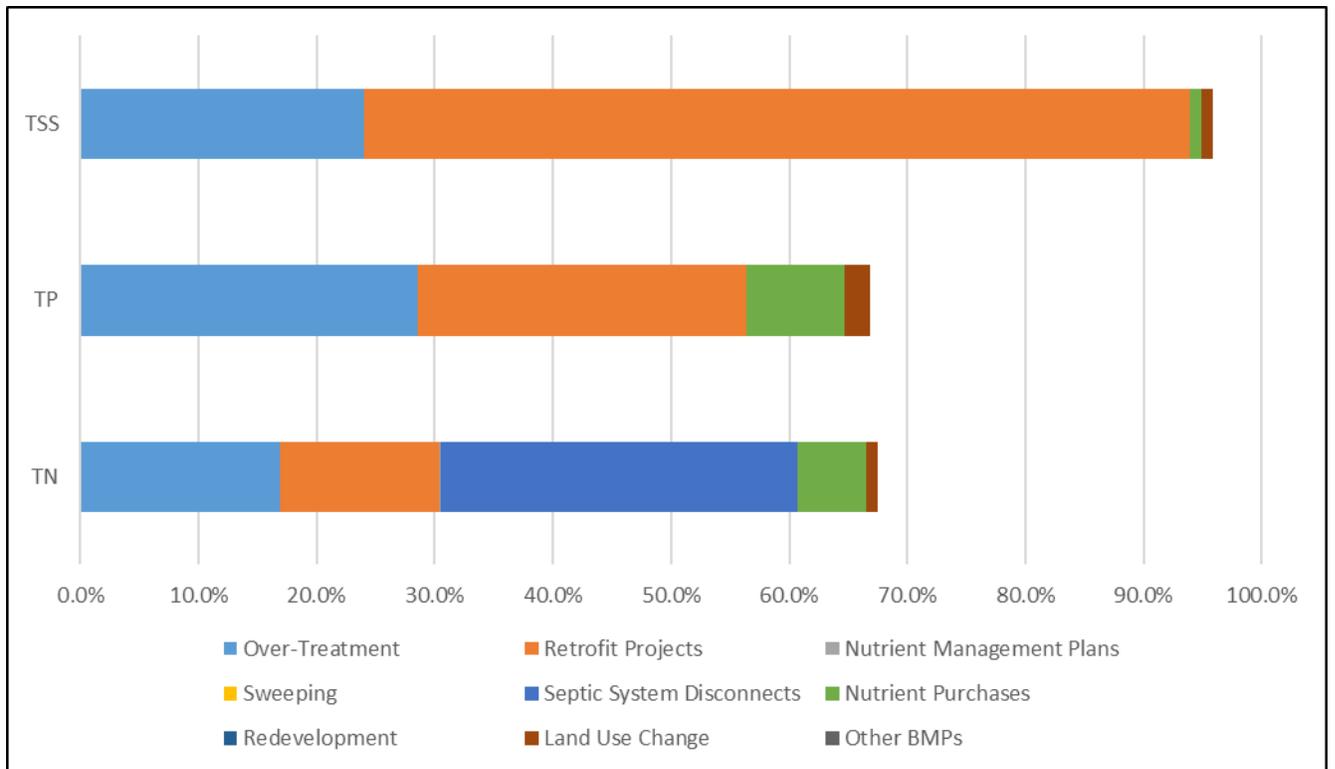
7. Compliance Summary

Tables 7.A and 7.B demonstrate how the County will meet the required reductions from Section 3 for each POC with the BMPs described in Sections 6.1 through 6.8.

Table 7.A – Compliance Summary – Table

	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Reductions from Existing Sources to Meet 40% Target	6,214.46	723.18	600,725.96
+ New Source Offsets	-	-	-
+ Grandfathered Offsets	-	-	-
= Total Reductions and Offsets	6,214.46	723.18	600,725.96
- Actual and Planned BMPs from Sections 5 and 6	10,482.41	1,209.12	1,440,456.22
<i>Over-Treatment</i>	2,617.88	516.07	360,556.56
<i>County Stormwater Retrofits</i>	2,106.51	503.02	1,049,555.19
<i>Nutrient Management Plans</i>	11.96	0.24	-
<i>Street/Parking Lot Sweeping</i>	-	-	-
<i>Septic System Disconnects</i>	4,696.65	-	-
<i>Nutrient Purchases</i>	910.16	150.00	15,272.19
<i>Land Use Change</i>	139.25	39.78	15,072.28
<i>Other BMPs</i>	-	-	-
= Remainder/(Excess)	(4,267.95)	(485.94)	(839,730.26)
Progress Toward 100% Target	67.5%	66.9%	95.9%

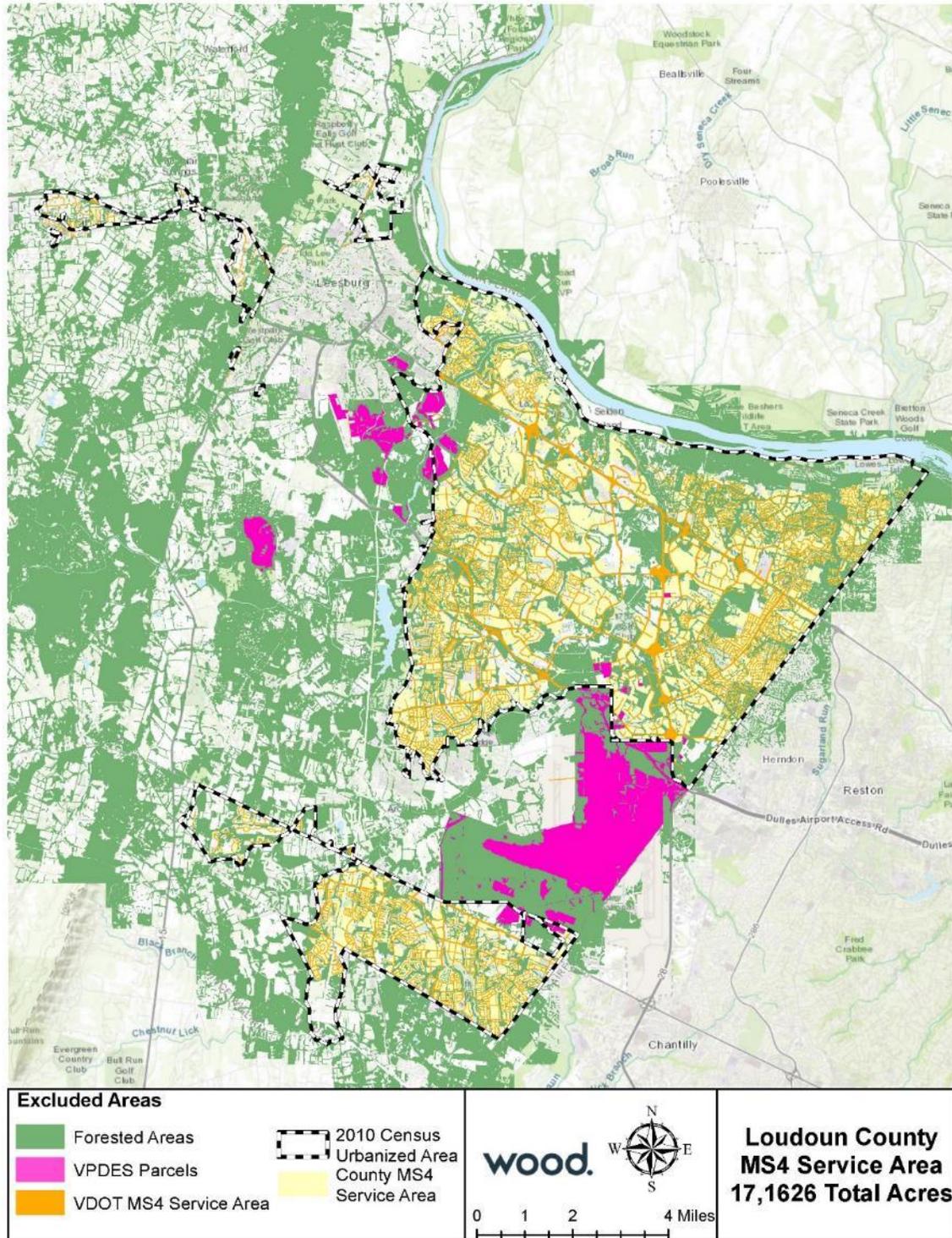
Figure 7.A – Compliance Summary – Chart



8. Public Comments

The County is required to provide an opportunity for public comment on this plan in accordance with Part II A 11 f of the 2018 MS4 permit. This updated Phase II plan was posted to the County’s website and a public notice was distributed with instructions for how to provide comments on February 1, 2022. The deadline for receiving comments was February 28, 2022. A snapshot of the public notice and a summary of comments are provided in Appendix D.

Appendix A – Loudoun County MS4 Service Area Delineation



Appendix B

BMPs Implemented During the First Permit Cycle

All calculations and supporting documentation were included in the initial Chesapeake Bay TMDL Action Plan and/or MS4 annual reports provided to DEQ.

BMP Under/Over Evaluation

Prior to FY2016

The following table summarizes pollutant reduction credit from FY2009 through FY2015.⁸

	TP (lbs/year)	TN (lbs/year)	TSS (lbs/year)
Surplus	577.63	1,816.40	343,811.20
Removed	(188.99)	(521.90)	(101,772.97)
Total	388.64	1,294.50	242,038.23

FY2016

Plan Name	Number	BMP Type	Post Development TP Load	TP Reduction Required	TP Reduction Achieved	TP Credit	Proportion	TN Site Load	TN BMP Efficiency	TN Total Reduction	TN Credit	TSS Site Load	TSS BMP Efficiency	TSS Total Reduction	TSS Credit
Loudoun County ES28	STPL-2016-0033	Enhanced Extended Detention	73.94	30.69	30.85	0.16	1.0%	510.19	0.20	102.04	1.02	34692.65	0.60	20815.59	208.16
Beaumeade	CPAP-2013-0034	Retention	116.88	73.41	73.38	0.17	0.0%	806.47	0.30	241.94	0.00	54840.10	0.60	32904.06	0.00
Stone Ridge Association	CPAR-2015-0048	Retention	0.38	0	0.19	0.19	100.0%	2.62	0.20	0.79	0.79	178.30	0.60	106.98	106.98
Sugarland Day Care Center	STPL-2014-0027	Bioretention	2.78	1.0995	1.3448	0.3053	23.0%	19.18	0.64	12.28	2.82	1304.38	0.55	717.41	165.00
COPT	STMP-2015-0010	Retention	53.47	39.53	39.88	0.35	1.0%	368.94	0.30	110.68	1.11	25088.12	0.60	15052.87	150.53
Vine & Branches	STPL-2016-0018	Bioretention	8.46	4.65	5.07	0.42	8.0%	58.37	0.64	37.36	2.99	3969.43	0.55	2183.19	174.66
East Gate Self Storage	STPL-2016-0028	Wet Pond	70.17	41.02	41.65	0.63	2.0%	484.17	0.30	145.25	2.91	32923.76	0.60	19754.26	395.09
The Grange At Willowsford	CPAP-2013-0050	Extended Detention	46.4	3.47	4.15	0.68	16.0%	320.16	0.20	64.03	10.24	21770.88	0.60	13062.53	2090.00
Panda Stonewall	SPAM-2016-0033	Extended Detention	41.2	16.3	17.01	0.71	4.0%	284.28	0.20	56.86	2.27	19331.04	0.60	11598.62	463.94
Tanglewood North	CPAP-2014-0002	Extended Detention	8.16	1.52	2.33	0.81	35.0%	56.30	0.20	11.26	3.94	3828.67	0.60	2297.20	804.02
Loudoun Center	CPAP-2014-0026	Wet Pond	6.6	2	2.9	0.9	31.0%	45.54	0.30	13.66	4.23	3096.72	0.60	1858.03	575.99
Gateway Community Church	STPL-2014-0029	Extended Detention	10.1	2.55	4.03	1.48	37.0%	69.69	0.20	13.94	5.16	4738.92	0.60	2843.35	1052.04
Glascock Field	STPL-2015-0021	Wet Pond	6.56	2.33	3.85	1.52	39.0%	45.26	0.30	13.58	5.30	3077.95	0.60	1846.77	720.24
Centergate Self Storage	STPL-2015-0026	Wet Pond	20.9	8.48	10.46	1.98	19.0%	144.21	0.30	43.26	8.22	9806.28	0.60	5883.77	1117.92
Marbury Phase III	CPAR-2013-0052	Extended Detention	129.7	26.6	28.8	2.2	8.0%	894.93	0.20	178.99	14.32	60855.24	0.60	36513.14	2921.05
Willowsford	CPAP-2012-0082	Wet Pond	8.71	0	4.36	4.36	100.0%	60.10	0.30	18.03	18.03	4086.73	0.60	2452.04	2452.04
Longview Crest	CPAP-2015-0027	Conserved Open Space	15.54	0	5.18	5.18	100.0%	107.23	0.25	26.81	26.81	7291.37	0.70	5103.96	5103.96
Cryasone LLC	STMP-2016-0003	Wet Pond	31.31	13.5	18.69	5.19	28.0%	216.04	0.30	64.81	18.15	14690.65	0.60	8814.39	2468.03
Lenah Mill	CPAP-2014-0007	Wet Pond	74.14	11.16	29.84	18.68	63.0%	511.57	0.30	153.47	96.69	34786.49	0.60	20871.89	13149.29
Total						45.9153					225				34118.94

⁸ Individual project data was provided to Jeff Selengut, DEQ, in a memo dated November 19, 2021, which was acknowledged by DEQ in an email dated December 20, 2021. Additional details are available from the County upon request.

County Retrofit Projects

Gwen Thompson Briar Patch Park Constructed Wetland

Project	Gwen Thompson Briar Patch Park					
Description:	New constructed wetland treating existing impervious area.					
Completion Date:	Spring 2016	Watershed:	Sugarland Run			
Latitude:	39.01642	Longitude:	-77.38862			
Methodology:	DEQ Guidance Memo No 20-2003 - Chesapeake Bay TMDL Special Condition (2/6/2021)					
Efficiencies:	TN and TP = Appendix V.A - Virginia Stormwater BMP Clearinghouse for Constructed Wetland #1 TSS = Appendix V.C - Chesapeake Bay Program Established Efficiencies					
Downward Modification Table	Applies to retrofit of existing facilities only - 50% maximum.					
BMP Type	Modification Type	Downward Modification (%)				
NA	NA				0	
		Total %			0	
Efficiency for New Facility						
Pollutant	Existing Facility Efficiency	Downward Modification * Existing Pond Efficiency	New Facility Efficiency	Total Efficiency		
TN	0	0	25	25.00		
TP	0	0	50	50.00		
TSS	0	0	60	60.00		
Calculation Sheet	Table 3b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin					
Subsource	Pollutant	Total Existing Acres Served by MS4 (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	New BMP Efficiency	Load Reduction
Regulated Urban Impervious	Total Nitrogen	27.11	16.86	457.07	25.00	114.27
Regulated Urban Pervious		53.68	10.07	540.56	25.00	135.14
Forested (Reg or Unreg)		0	1.16	0.00	25.00	0.00
Regulated Urban Impervious	Total Phosphorus	27.11	1.62	43.92	50.00	21.96
Regulated Urban Pervious		53.68	0.41	22.01	50.00	11.00
Forested (Reg or Unreg)		0	0.07	0.00	50.00	0.00
Regulated Urban Impervious	Total Suspended Solids	27.11	1,171.32	31,754.49	60.00	19,052.69
Regulated Urban Pervious		53.68	175.80	9,436.94	60.00	5,662.17
Forested (Reg or Unreg)		0	57.54	0.00	60.00	0.00
		TN Reduction (lbs/year)	249.41			
		TP Reduction (lbs/year)	32.96			
		TSS Reduction (lbs/year)	24,714.86			

Murray's Ford Bridge Removal and Bank Stabilization

Murray's Ford Bridge Removal and Bank Stabilization					
BAY TMDL CREDIT - L2 BASELINE					
Latitude: 39.0387192			Goose Creek		
Longitude: -77.5360684			Calculation Method: Expert Panel Protocol 1 based on Bank Erosion Hazard Index and Near-Bank Stress tools (WSSI, 2011).		
Assessment Length (ft)	450.00				
STEP 1	TN	TP	TSS		
Impervious 5% Rate Reduction (lbs/ac/yr) from Table 3b of 2013 Permit	0.07587000	0.01296000	11.71320000		
Pervious 5% Rate Reduction (lbs/ac/yr) from Table 3b of 2013 Permit	0.03021000	0.00148625	0.76912500		
Initial Sediment Reduction (tons/yr)			133.25		
Conversion to Pounds (2.28*TSS Tons for TN; 1.05*TSS Tons for TP; TSS*2,000)	303.81	139.91	266,500.00		
Apply Effectiveness of 50%	151.91	69.96	133,250.00		
Apply Delivery Factor of 0.181 for TSS in Piedmont			24,118.25		
Total Reduction Based on Protocol 1 (lbs)	151.91	69.96	24,118.25		
STEP 2	Total	Impervious	Forested	Pervious	Total Urban
Regulated Acres	390.44	104.41	-	286.03	390.44
Unregulated Acres	220,767.18	3,392.55	96,695.66	120,678.97	124,071.52
	221,157.62	3,496.96	96,695.66	120,965.00	124,461.96
STEP 3		Portion of Reductions (lbs/yr)			
	Land Ratio	TN	TP	TSS	
Regulated Urban	0.00	0.27	0.12	42.58	
Unregulated Urban	0.56	85.22	39.25	13,530.57	
Unregulated Forested	0.44	66.42	30.59	10,545.10	
STEP 4	TN	TP	TSS		
Required Baseline Reduction on Unregulated Impervious (lbs/yr)	5,147.86	879.35	794,752.33		
Required Baseline Reduction on Unregulated Pervious (lbs/yr)	72,914.23	3,587.18	1,856,344.26		
Total Required Baseline Reduction on Unregulated (lbs/yr)	78,062.09	4,466.53	2,651,096.59		
MS4 Credits	0.27	0.12	42.58		
Unregulated Urban Credits	-	-	-		
Unregulated Forested Credits	66.42	30.59	10,545.10		
Total Credits	66.68	30.71	10,587.68		

Sterling BMW Downstream Defender Retrofit

Project	Sterling BMW Downstream Defender					
Description:	New Downstream Defender hydrodynamic separator unit.					
Completion Date:	Mar-17	Watershed:	Broad Run			
Latitude:	39.012322	Longitude:	-77.440083			
Methodology:	DEQ Guidance Memo No 20-2003 - Chesapeake Bay TMDL Special Condition (2/6/2021)					
Efficiencies:	TP = Appendix V.A - Virginia Stormwater BMP Clearinghouse Practice 16, Hydrodynamic Devices TN and TSS = Appendix V.C - Chesapeake Bay Program Established Efficiencies					
Downward Modification Table	Applies to retrofit of existing facilities only - 50% maximum.					
BMP Type	Modification Type	Downward Modification (%)				
NA	NA	0				
	Total %	0				
Efficiency for New Facility						
Pollutant	Existing Facility Efficiency	Downward Modification * Existing Pond Efficiency	New Facility Efficiency	Total Efficiency		
TN	0	0	5	5.00		
TP	0	0	20	20.00		
TSS	0	0	10	10.00		
Calculation Sheet	Table 3b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin					
Subsource	Pollutant	Total Existing Acres Served by MS4 (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	New BMP Efficiency	Load Reduction
Regulated Urban Impervious	Total Nitrogen	1.82	16.86	30.69	5.00	1.53
Regulated Urban Pervious		0.12	10.07	1.21	5.00	0.06
Forested (Reg or Unreg)		0	1.16	0.00	5.00	0.00
Regulated Urban Impervious	Total Phosphorus	1.82	1.62	2.95	20.00	0.59
Regulated Urban Pervious		0.12	0.41	0.05	20.00	0.01
Forested (Reg or Unreg)		0	0.07	0.00	20.00	0.00
Regulated Urban Impervious	Total Suspended Solids	1.82	1,171.32	2,131.80	10.00	213.18
Regulated Urban Pervious		0.12	175.80	21.10	10.00	2.11
Forested (Reg or Unreg)		0	57.54	0.00	10.00	0.00
	TN Reduction (lbs/year)	1.59				
	TP Reduction (lbs/year)	0.60				
	TSS Reduction (lbs/year)	215.29				

Countryside/McPherson Circle CDS Retrofit

Project	Countryside/McPherson Circle CDS					
Description:	New CDS hydrodynamic separator unit.					
Completion Date:	Jan-18	Watershed:	Potomac River			
Latitude:	39.055485	Longitude:	-77.41785			
Methodology:	DEQ Guidance Memo No 20-2003 - Chesapeake Bay TMDL Special Condition (2/6/2021)					
Efficiencies:	TP = Appendix V.A - Virginia Stormwater BMP Clearinghouse Practice 16, Hydrodynamic Devices TN and TSS = Appendix V.C - Chesapeake Bay Program Established Efficiencies					
Downward Modification Table	Applies to retrofit of existing facilities only - 50% maximum.					
BMP Type	Modification Type	Downward Modification (%)				
NA	NA	0				
	Total %	0				
Efficiency for New Facility						
Pollutant	Existing Facility Efficiency	Downward Modification * Existing Pond Efficiency	New Facility Efficiency	Total Efficiency		
TN	0	0	5	5.00		
TP	0	0	20	20.00		
TSS	0	0	10	10.00		
Calculation Sheet	Table 3b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin					
Subsource	Pollutant	Total Existing Acres Served by MS4 (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	New BMP Efficiency	Load Reduction
Regulated Urban Impervious	Total Nitrogen	1.66	16.86	27.99	5.00	1.40
Regulated Urban Pervious		2.6	10.07	26.18	5.00	1.31
Forested (Reg or Unreg)		0	1.16	0.00	5.00	0.00
Regulated Urban Impervious	Total Phosphorus	1.66	1.62	2.69	20.00	0.54
Regulated Urban Pervious		2.6	0.41	1.07	20.00	0.21
Forested (Reg or Unreg)		0	0.07	0.00	20.00	0.00
Regulated Urban Impervious	Total Suspended Solids	1.66	1,171.32	1,944.39	10.00	194.44
Regulated Urban Pervious		2.6	175.80	457.08	10.00	45.71
Forested (Reg or Unreg)		0	57.54	0.00	10.00	0.00
		TN Reduction (lbs/year)	2.71			
		TP Reduction (lbs/year)	0.75			
		TSS Reduction (lbs/year)	240.15			

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Septic Disconnects

There were 365 residential septic disconnects within the County MS4 through FY18.

Septic Conversions Through June 30, 2018

Reduction from Residential Septic Conversions

TN Edge of Stream Loading	3.5	From DEQ.
Average number of people per	2.7	From Loudoun County.
Number of residential conversions:	365	Ensure that all records are captured in the list of conversions.

Residential TN Reduction (lbs/year) = 3449.25

Land Use Changes

There were four land use changes within the County through FY18.

Site	Acres	Type from Table	Inside MS4? (Y or N)	Date Effective	TN Credit	TP Credit	TSS Credit	TN Baseline in Lbs/Ac/Yr # of Acres Applied in Final Credit	TP Baseline in Lbs/Ac/Yr # of Acres Applied in Final Credit	TSS Baseline in Lbs/Ac/Yr # of Acres Applied in Final Credit	Final TN Credit	Final TP Credit	Final TSS Credit	Description
Belle Terra HOA	2.88	TF	N	2017	16.07	4.20	1,604.16	0.6042000	0.0297250	15.3825000	14.33	4.12	1559.86	~984 trees; HOA paid for and maintains
Eagle Ridge Middle School	1.70	TF	Y	2017	9.49	2.48	946.90	0.6042000	0.0297250	15.3825000	9.49	2.48	946.90	~700 hardwood seedlings
Loudoun Landfill	9.00	TF	N	2015	50.22	13.14	5,013.00	0.6042000	0.0297250	15.3825000	44.78	12.87	4874.56	~680 trees per acre (mix of conifer and hardwood)
South Riding	3.00	TF	N	2014	16.74	4.38	1,671.00	0.6042000	0.0297250	15.3825000	14.93	4.29	1624.85	Murrey Drive between Hyland Hills Street and Mink Meadow

Appendix C

Calculations and Supporting Documents for BMPs Implemented and Planned During the Second Permit Cycle

Summary of BMPs Implemented and Planned During the Second Permit Cycle

Cumulative Reductions from Worksheets							Cycle Difference
Through FY18	FY19	FY20	FY21	FY22	FY23		
Over-Treatment							
TN	2,611.42	2,617.88	2,617.88	2,617.88	2,617.88	2,617.88	6.46
TP	516.19	516.07	516.07	516.07	516.07	516.07	(0.12)
TSS	361,670.86	360,556.56	360,556.56	360,556.56	360,556.56	360,556.56	(1,114.30)
Retrofit Projects							
TN	369.44	369.44	635.18	635.18	1,344.36	2,106.51	1,737.06
TP	69.19	69.19	118.90	118.90	361.03	503.02	433.83
TSS	39,862.74	39,862.74	100,226.80	100,226.80	546,395.48	1,049,555.19	1,009,692.45
Nutrient Management Plans							
TN	-	11.96	11.96	11.96	11.96	11.96	11.96
TP	-	0.24	0.24	0.24	0.24	0.24	0.24
TSS	-	-	-	-	-	-	-
Sweeping							
TN	-	-	-	-	-	-	-
TP	-	-	-	-	-	-	-
TSS	-	-	-	-	-	-	-
Septic System Disconnects							
TN	3,449.25	3,987.90	4,536.00	4,696.65	4,696.65	4,696.65	1,247.40
TP	-	-	-	-	-	-	-
TSS	-	-	-	-	-	-	-
Nutrient Purchases							
TN	-	182.66	376.46	550.16	730.16	910.16	910.16
TP	-	30.00	60.00	90.00	120.00	150.00	150.00
TSS	-	3,894.79	6,605.56	9,152.19	12,212.19	15,272.19	15,272.19
Redevelopment							
TN	-	-	-	-	-	-	-
TP	-	-	-	-	-	-	-
TSS	-	-	-	-	-	-	-
Landuse Conversion							
TN	83.53	83.53	87.01	89.50	89.50	139.25	55.73
TP	23.76	23.76	24.77	25.48	25.48	39.78	16.02
TSS	9,006.17	9,006.17	9,385.30	9,656.11	9,656.11	15,072.28	6,066.12
Other BMPs							
TN	-	-	-	-	-	-	-
TP	-	-	-	-	-	-	-
TSS	-	-	-	-	-	-	-
Total Reductions							
TN	6,513.64	7,253.37	8,264.49	8,601.32	9,490.50	10,482.41	3,968.77
TP	609.15	639.27	719.98	750.69	1,022.82	1,209.12	599.97
TSS	410,539.77	413,320.26	476,774.22	479,591.66	928,820.34	1,440,456.22	1,029,916.46

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BMP Under/Over Evaluation

FY2019

Over-Treatment

BMP Type	Date	Post Development TP Load	TP Reduction Required	TP BMP Efficiency	TP Reduction Achieved	TP Credit	Proportion	TN Site Load	TN BMP Efficiency	TN Total Reduction	TN Credit	TSS Site Load	TSS BMP Efficiency	TSS Total Reduction	TSS Credit			
Bioretention 1	7/31/2018	5.86	1.52	55%	3.48	1.96	56.0%	40.43	0%	0.00	0.00	2749.51	0.00	0.00	0.00			
Manufactured Treatment Device - Filtering		13.5	3.51	50%	7.42	3.91	53.0%	93.15	0%	0.00	0.00	6334.20	0.00	0.00	0.00			
Wet Pond 1	10/16/2018	30.29	7.87	50%	3.03	-4.84	-160.0%	209.00	0%	0.00	0.00	14212.07	0.00	0.00	0.00			
Wet Pond 1		6.42	2.76	50%	3.21	0.45	14.0%	44.30	30%	13.29	1.86	3012.26	0.50	1506.13	210.86			
Wet Pond 1		14.26	6.12	50%	7.12	1.00	14.0%	98.39	30%	29.52	4.13	6690.79	0.50	3345.40	468.36			
Grass Channel		3.25	1.40	23%	1.04	-0.36	-34.0%	22.43	28%	6.28	-2.14	1524.90	0.60	914.94	-311.08			
Grass Channel		3.08	1.32	23%	0.99	-0.33	-34.0%	21.25	28%	5.95	-2.02	1445.14	0.60	867.08	-294.81			
Wet Pond 2	8/26/2016	24.6	15.86	75%	18.42	2.56	14.0%	169.74	40%	67.90	9.51	11542.32	0.60	6925.39	969.55			
Bioretention 2		32.38	18.45	90%	16.92	-1.53	-9.0%	223.42	90%	201.08	-18.10	15192.70	0.55	8355.99	-752.04			
Bioretention 1	5/10/2019	1.04	0	55%	0.57	0.57	100.0%	7.18	64%	4.60	4.60	487.97	0.55	268.38	268.38			
Bioretention 1		2.56	0	55%	1.41	1.41	100.0%	17.66	64%	11.30	11.30	1201.15	0.55	660.63	660.63			
Grass Channel		0.9	0	23%	0.21	0.21	100.0%	6.21	28%	1.74	1.74	422.38	0.60	253.37	253.37			
Extended Detention Pond 2	8/2/2018	8.7	4.14	31%	3.05	-1.09	-36.0%	60.03	24%	14.41	-5.19	4082.04	0.60	2449.22	-881.72			
Filtering Practice 2	8/2/2018	24.61	11.73	65%	15.99	4.26	27.0%	169.81	45%	76.41	20.63	11547.01	0.50	5773.51	1558.85			
Extended Detention Pond 2	11/20/2018	27.68	4.37	31%	6.2	1.83	30.0%	190.99	24%	45.84	13.75	12987.46	0.60	7792.48	2337.74			
Bioretention 1	2/22/2019	5.12	1.63	55%	2.81	1.18	42.0%	35.33	64%	22.61	9.50	2402.30	0.55	1321.27	554.93			
Wet Pond 1		11.23	3.58	50%	5.61	2.03	36.0%	77.49	30%	23.25	8.37	5269.12	0.50	2634.56	948.44			
Wet Pond 1	6/14/2018	22.2	12.99	50%	14.43	1.44	10.0%	153.18	30%	45.95	4.60	10416.24	0.50	5208.12	520.81			
								14.66									62.54	6512.27

Removals

Plan Name	Number	BMP Type	Date	Post Development TP Load	TP Reduction Required	TP BMP Efficiency	TP Reduction Achieved	TP Credit	Proportion	TN Site Load	TN BMP Efficiency	TN Total Reduction	TN Credit	TSS Site Load	TSS BMP Efficiency	TSS Total Reduction	TSS Credit	
True North Data Center	CPAP-2017-0021	Manufactured			8.91	0.45	1.49	1.04	70.0%	61.48	0.30	18.44	12.91	4180.57	0.60	2508.34	1755.84	
Lansdowne Town Center	CPAP-2005-0071 Revised to CPAP-2005-0053 & CPAP-2007-0023	Ex. SMI/BMP pond A & B			29.98		43.73	13.74					43.17			5870.73	5870.73	
Total								14.78									56.08	7626.57

Cumulative Over/Under

Excess Phosphorus Removal	-0.12	lb/year
Excess Nitrogen Removal	6.46	lb/year
Excess Total Suspended Solids Removal	-1114.3	lb/year

County Retrofit Projects

Calculations are based on the best available data as of the date of this plan. Default conversion rates for TN and TP are used for projects in the planning or concept stages. In accordance with the Expert Panel’s “Consensus Recommendations for Improving the Application of the Prevented Sediment Protocol for Urban Stream Restoration Projects Built for Pollutant Removal Credit,” final credits for projects not already in the ground or under contract as of January 1, 2021 will use site-specific measurements. Forest cover is based on the MS4 service area developed in 2019. Some forest cover has been converted to other land uses since that time. This will have a small downward impact on credit calculations, but will not affect overall compliance with the 40% target. The forest cover layer and project-specific pollutant removal calculations will be updated to reflect changes when the MS4 service area is comprehensively updated for the Phase III plan.

Drainage area maps are provided for projects in the planning or concept stages of development and for projects where detailed calculations were not included in the original Phase II plan.

New County Project	TN Credit	TP Credit	TSS Credit	FY
Loudoun Valley Estates	208.86	23.50	10,465.27	2020
Goose Creek Debris Removal	56.88	26.20	49,898.80	2020
Yorktown Court Pond Retrofit	73.78	3.76	9,468.56	2022
Countryside/Riverbend Stream Restoration	408.87	188.30	372,452.11	2022
Countryside/Riverbend Outfall Restorations	32.65	17.59	34,493.86	2022
Sterling Commercial Retrofit - MD1745	193.88	32.48	29,754.15	2022
Confluence Park Outfall	25.07	10.11	23,880.00	2023
Conklin Park - Stream Restoration	89.39	39.99	172,205.66	2023
Conklin Park - JC77 Retrofit	29.64	4.54	3,809.83	2023
Conklin Park - XX267 Retrofit	36.07	5.89	5,129.75	2023
Rose Hill Estates/Bettis Drive Channel Repair	21.24	1.00	158,024.49	2023
Rostormel Outfall Restoration	302.71	48.19	104,057.31	2023
Willow Lake Pond Retrofit	232.02	20.29	13,236.76	2023
Willow Lake Outfalls	26.02	11.98	22,815.91	2023
Subtotal	2,106.51	503.02	1,049,555.19	

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Loudoun Valley Estates

Project	Loudoun Valley Estates					
Description:	Existing extended detention pond converted to a constructed wetland.					
Completion Date:	May-20	Watershed:	Broad Run			
Latitude:	38.975131	Longitude:	-77.494509			
Methodology:	DEQ Guidance Memo No 20-2003 - Chesapeake Bay TMDL Special Condition (2/6/2021)					
Efficiencies:	Appendix V.D - BMP Enhancement, Conversion, and Restoration					
	TN, TP, and TSS = Appendix V.B - Bay Program Retrofit Curves, Runoff Depth at 1.69 Inches					
Downward Modification Table	Applies to retrofit of existing facilities only - 50% maximum.					
BMP Type	Modification Type	Downward Modification (%)				
Extended Detention Pond	Lack of Forebay	10				
	Insufficient WQ Volume	10				
	Length of Longest Flow Path	10				
	Total %	30				
Efficiency for New Facility						
Pollutant	Existing Facility Efficiency	Downward Modification * Existing Pond Efficiency	New Facility Efficiency	Total Efficiency		
TN	20	14	38.6	24.60		
TP	20	14	60.6	46.60		
TSS	60	42	77.2	35.20		
Calculation Sheet	Table 3b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin					
Subsource	Pollutant	Total Existing Acres Served by MS4 (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	New BMP Efficiency	Load Reduction
Regulated Urban Impervious	Total Nitrogen	17	16.86	286.62	24.60	70.51
Regulated Urban Pervious		55.85	10.07	562.41	24.60	138.35
Forested (Reg or Unreg)		0	1.16	0.00	24.60	0.00
Regulated Urban Impervious	Total Phosphorus	17	1.62	27.54	46.60	12.83
Regulated Urban Pervious		55.85	0.41	22.90	46.60	10.67
Forested (Reg or Unreg)		0	0.07	0.00	46.60	0.00
Regulated Urban Impervious	Total Suspended Solids	17	1,171.32	19,912.44	35.20	7,009.18
Regulated Urban Pervious		55.85	175.80	9,818.43	35.20	3,456.09
Forested (Reg or Unreg)		0	57.54	0.00	35.20	0.00
			TN Reduction (lbs/year)	208.86		
			TP Reduction (lbs/year)	23.50		
			TSS Reduction (lbs/year)	10,465.27		

Goose Creek Debris Removal

Stream Restoration		Goose Creek Debris Removal	
Latitude	39.085456	Watershed	Goose Creek
Longitude	-77.51109	Length (LF)	84
Completion Year	2021		

Step 1		Calculate POC Reductions with BANCS	
TSS/Year in Tons	68.93		
Site-Specific Nutrients or Default Rates?	Default		
	TN	TP	TSS
Site-Specific Nutrients in Pounds/Year			137,860.00
Default Conversion	157.16	72.38	137,860.00
Selected POC Reductions	157.16	72.38	137,860.00
Effectiveness	0.5		
Total Reduction	78.58	36.19	68,930.00

Step 2		Calculate the Project Credit Ratio	
	Impervious	Pervious	Total Urban
Regulated Land	1755.07	3284.96	5040.03
Unregulated Land	4424.94	130196.86	134621.8
		Subtotal	139661.83
		Total Urban and Forested	243796.52
Regulated Urban	0.021		
Unregulated Urban	0.552		
Forest	0.427		

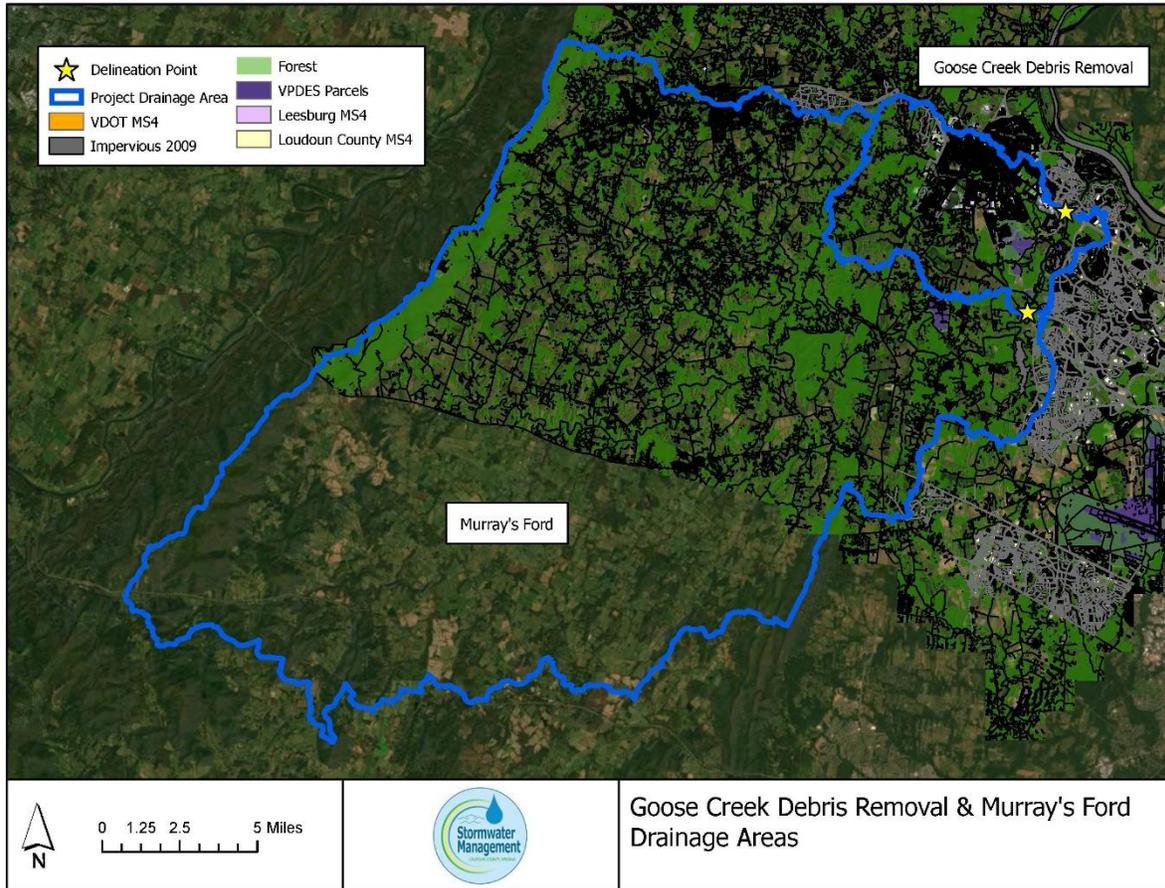
Step 3		Calculate Total Reductions Before Baseline	
	TN	TP	TSS
Regulated Urban	1.62	0.75	1,425.00
Unregulated Urban	43.39	19.98	38,062.40
Forest	33.56	15.46	29,442.60

Step 4		Account for Unregulated Baseline	
	TN	TP	TSS
Unregulated Urban at 50%	21.70	9.99	19,031.20
Unregulated Urban at L2	85,379.35	5,017.05	3,039,357.34
Less Stringent Baseline	21.70	9.99	19,031.20

Step 5		Total Credit	
Regulated and Forest	35.18	16.21	30,867.60
Unregulated Urban Minus Less Stringent Baseline	21.70	9.99	19,031.20
Total Credit	56.88	26.20	49,898.80

Notes	
Enter data into green cells only.	
Tons TSS/year per BANCS assessment.	
Choose site-specific nutrient analysis or default rates. Site-specific required after July 1, 2021.	
Prompts to enter pounds TN and TP if "Site-Specific" is selected.	
Default is 50%. Modify up to 80% using BANCS recalculation at three years after completion.	
Table 3b of MS4 permit; acres of each unregulated land use by the basin loading rate and L2 required reductions.	
Calculation set so that it does not result in negative credit.	

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Countryside/Riverbend Stream Restoration

Project		Countryside/Riverbend Stream Restoration	
Latitude	39.056191	Watershed	Potomac River
Longitude	-77.396533	Length (LF)	3000
Completion Year	2022		

Step 1 Calculate POC Reductions with BANCS			
TSS/Year in Tons	396.34		
Site-Specific Nutrients or Default Rates?	Default		
	TN	TP	TSS
Site-Specific Nutrients in Pounds/Year			792,680.00
Default Conversion	903.66	416.16	792,680.00
Selected POC Reductions	903.66	416.16	792,680.00
Effectiveness	0.5		
Total Reduction	451.83	208.08	396,340.00

Step 2 Calculate the Project Credit Ratio				
	Impervious	Pervious	Total Urban	Forested
Regulated Land	548.61	533.98	1082.59	7.83
Unregulated Land	86.57	234.53	321.1	277.04
		Subtotal	1403.69	284.87
		Total Urban and Forested	1688.56	
Regulated Urban	0.641			
Unregulated Urban	0.190			
Forest	0.169			

Step 3 Calculate Total Reductions Before Baseline			
	TN	TP	TSS
Regulated Urban	289.68	133.41	254,106.29
Unregulated Urban	85.92	39.57	75,368.82
Forest	76.23	35.10	66,864.89

Step 4 Account for Unregulated Baseline			
	TN	TP	TSS
Unregulated Urban at 50%	42.96	19.79	37,684.41
Unregulated Urban at L2	273.06	29.41	23,887.89
Less Stringent Baseline	42.96	19.79	23,887.89

Step 5 Total Credit			
Regulated and Forest	365.91	168.51	320,971.18
Unregulated Urban Minus Less Stringent Baseline	42.96	19.79	51,480.93
Total Credit	408.87	188.30	372,452.11

Notes	
Enter data into green cells only.	
Tons TSS/year per BANCS assessment.	
Choose site-specific nutrient analysis or default rates. Site-specific required after July 1, 2021.	
Prompts to enter pounds TN and TP if "Site-Specific" is selected.	
Default is 50%. Modify up to 80% using BANCS recalculation at three years after completion.	

Table 3b of MS4 permit; acres of each unregulated land use by the basin loading rate and L2 required reductions.			
Calculation set so that it does not result in negative credit.			



Countryside/Riverbend Outfall Restoration

Project		Countryside/Riverbend Outfall Restorations		
Latitude	39.052719	Watershed	Potomac River	
Longitude	-77.394819	Length (LF)		
Completion Year	2022			

Step 1		Calculate POC Reductions with BANCS		
TSS/Year in Tons	34.95616			
Site-Specific Nutrients or Default Rates?	Default			
	TN	TP	TSS	
Site-Specific Nutrients in Pounds/Year			69,912.32	
Default Conversion	79.70	36.70	69,912.32	
Selected POC Reductions	79.70	36.70	69,912.32	
Effectiveness	0.5			
Total Reduction	39.85	18.35	34,956.16	

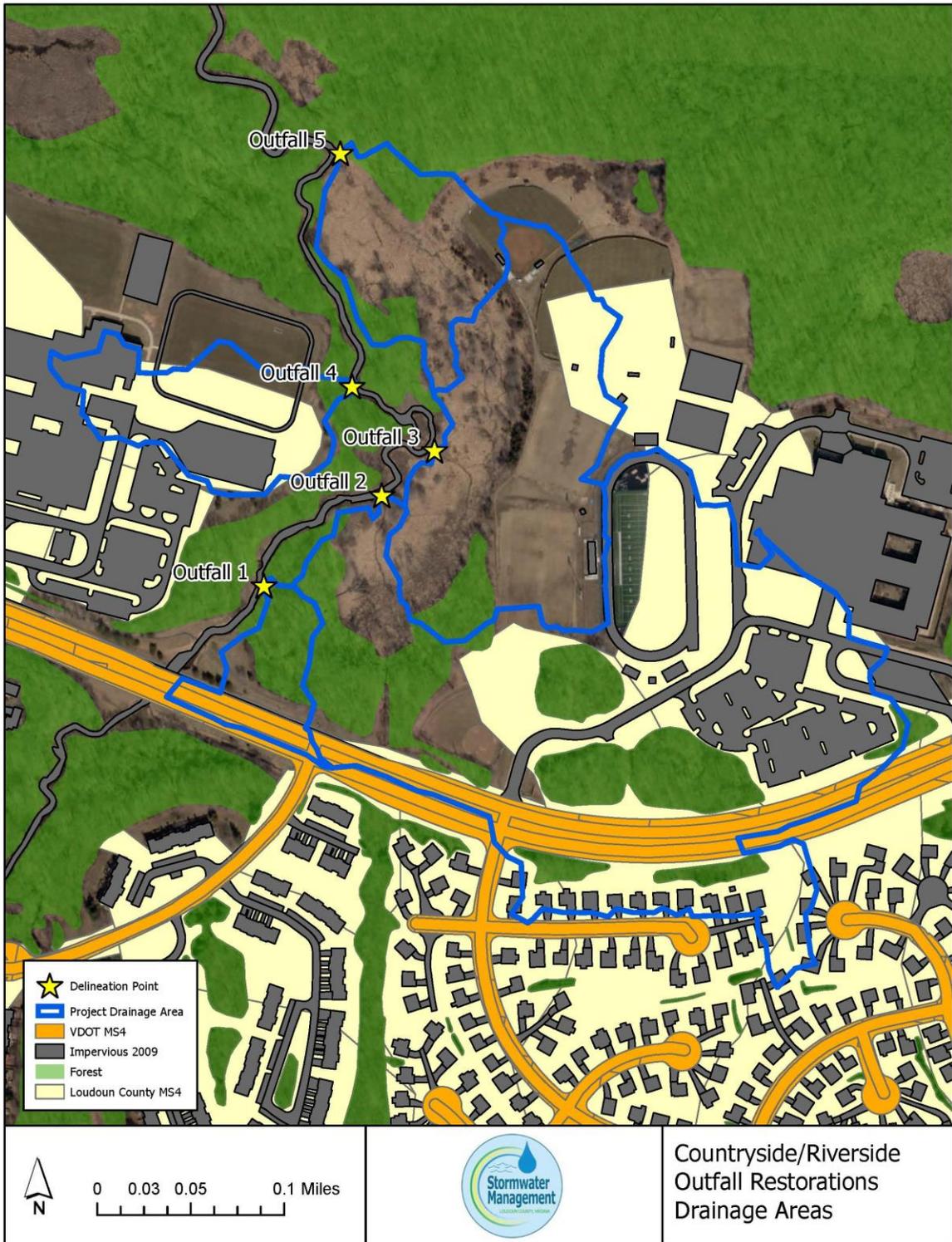
Step 2		Calculate the Project Credit Ratio			
	Impervious	Pervious	Total Urban	Forested	
Regulated Land	9.51	15.68	25.19	0	
Unregulated Land	0.71	19.24	19.95	10.05	
		Subtotal	45.14	10.05	
		Total Urban and Forested	55.19		
Regulated Urban	0.456				
Unregulated Urban	0.361				
Forest	0.182				

Step 3		Calculate Total Reductions Before Baseline		
	TN	TP	TSS	
Regulated Urban	18.19	8.38	15,954.80	
Unregulated Urban	14.40	6.63	12,635.90	
Forest	7.26	3.34	6,365.45	

Step 4		Account for Unregulated Baseline		
	TN	TP	TSS	
Unregulated Urban at 50%	7.20	3.32	6,317.95	
Unregulated Urban at L2	12.70	0.76	462.29	
Less Stringent Baseline	7.20	0.76	462.29	

Step 5		Total Credit		
Regulated and Forest	25.45	11.72	22,320.25	
Unregulated Urban Minus Less Stringent Baseline	7.20	5.87	12,173.61	
Total Credit	32.65	17.59	34,493.86	

Notes	
Enter data into green cells only.	
Tons TSS/year per BANCS assessment.	
Choose site-specific nutrient analysis or default rates. Site-specific required after July 1, 2021.	
Prompts to enter pounds TN and TP if "Site-Specific" is selected.	
Default is 50%. Modify up to 80% using BANCS recalculation at three years after completion.	
Table 3b of MS4 permit; acres of each unregulated land use by the basin loading rate and L2 required reductions.	
Calculation set so that it does not result in negative credit.	



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Sterling Commercial Retrofit (MD1745)

Project	Sterling Commercial Retrofit - MD1745					
Description:	Existing dry pond converted to a constructed wetland.					
Completion Date:	2022	Watershed:	Broad Run			
Latitude:	38.987438	Longitude:	-77.443428			
Methodology:	DEQ Guidance Memo No 20-2003 - Chesapeake Bay TMDL Special Condition (2/6/2021)					
	Appendix V.D - BMP Enhancement, Conversion, and Restoration					
Efficiencies:	Existing Efficiencies = Appendix V.C - Chesapeake Bay Program, Established Efficiencies					
	Retrofit Efficiencies = Appendix V.C - Chesapeake Bay Program, Established Efficiencies					
Downward Modification Table	Applies to retrofit of existing facilities only - 50% maximum.					
BMP Type	Modification Type	Downward Modification (%)				
Dry Detention Pond	Absense of Forebay	10				
	Absense of Micropool	10				
	Short Circuiting (<2:1)	10				
	Total %	30				
Efficiency for New Facility						
Pollutant	Existing Facility Efficiency	Downward Modification * Existing Pond Efficiency	New Facility Efficiency	Total Efficiency		
TN	5	3.5	20	16.50		
TP	10	7	45	38.00		
TSS	10	7	60	53.00		
Calculation Sheet	Table 3b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin					
Subsource	Pollutant	Total Existing Acres Served by MS4 (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	New BMP Efficiency	Load Reduction
Regulated Urban Impervious	Total Nitrogen	39.9	16.86	672.71	16.50	111.00
Regulated Urban Pervious		47.92	10.07	482.55	16.50	79.62
Forested (Reg or Unreg)		17.03	1.16	19.75	16.50	3.26
Regulated Urban Impervious	Total Phosphorus	39.9	1.62	64.64	38.00	24.56
Regulated Urban Pervious		47.92	0.41	19.65	38.00	7.47
Forested (Reg or Unreg)		17.03	0.07	1.19	38.00	0.45
Regulated Urban Impervious	Total Suspended Solids	39.9	1,171.32	46,735.67	53.00	24,769.90
Regulated Urban Pervious		47.92	175.80	8,424.34	53.00	4,464.90
Forested (Reg or Unreg)		17.03	57.54	979.91	53.00	519.35
			TN Reduction (lbs/year)	193.88		
			TP Reduction (lbs/year)	32.48		
			TSS Reduction (lbs/year)	29,754.15		



Confluence Park Outfall

Project		Confluence Park Outfall		
Latitude	39.1013	Watershed	Goose Creek	
Longitude	-77.480327	Length (LF)	123.2	
Completion Year				

Step 1		Calculate POC Reductions with BANCS		
TSS/Year in Tons	23.88			
Site-Specific Nutrients or Default Rates?	Site-Specific			
		TN	TP	TSS
Site-Specific Nutrients in Pounds/Year	50.148	20.223972		47,760.00
Default Conversion	54.45	25.07		47,760.00
Selected POC Reductions	50.15	20.22		47,760.00
Effectiveness	0.5			
Total Reduction	25.07	10.11		23,880.00

Step 2		Calculate the Project Credit Ratio			
		Impervious	Pervious	Total Urban	Forested
Regulated Land	26.58	27.58		54.16	4.42
Unregulated Land	0	0		0	0
			Subtotal	54.16	4.42
			Total Urban and Forested	58.58	
Regulated Urban	0.925				
Unregulated Urban	0.000				
Forest	0.075				

Step 3		Calculate Total Reductions Before Baseline		
		TN	TP	TSS
Regulated Urban	23.18	9.35		22,078.20
Unregulated Urban	-	-		-
Forest	1.89	0.76		1,801.80

Step 4		Account for Unregulated Baseline		
		TN	TP	TSS
Unregulated Urban at 50%	-	-		-
Unregulated Urban at L2	-	-		-
Less Stringent Baseline	-	-		-

Step 5		Total Credit		
Regulated and Forest	25.07	10.11		23,880.00
Unregulated Urban Minus Less Stringent Baseline	-	-		-
Total Credit	25.07	10.11		23,880.00

Notes	
Enter data into green cells only.	
Tons TSS/year per BANCS assessment.	
Choose site-specific nutrient analysis or default rates. Site-specific required after July 1, 2021.	
Prompts to enter pounds TN and TP if "Site-Specific" is selected.	
Default is 50%. Modify up to 80% using BANCS recalculation at three years after completion.	
Table 3b of MS4 permit; acres of each unregulated land use by the basin loading rate and L2 required reductions.	
Calculation set so that it does not result in negative credit.	

Conklin Park – Stream Restoration

Project		Conklin Park - Stream Restoration		
Latitude	38.908017	Watershed	Bull Run	
Longitude	-77.521266	Length (LF)	2200	
Completion Year	2023			

Step 1		Calculate POC Reductions with BANCS		
TSS/Year in Tons	181.342345			
Site-Specific Nutrients or Default Rates?	Site-Specific			
	TN	TP	TSS	
Site-Specific Nutrients in Pounds/Year	206.73	92.48	362,684.69	
Default Conversion	413.46	190.41	362,684.69	
Selected POC Reductions	206.73	92.48	362,684.69	
Effectiveness	0.5			
Total Reduction	103.37	46.24	181,342.35	

Step 2		Calculate the Project Credit Ratio			
	Impervious	Pervious	Total Urban	Forested	
Regulated Land	73.24	114.97	188.21	0.09	
Unregulated Land	28.25	163.74	191.99	329.91	
		Subtotal	380.2	330	
		Total Urban and Forested	710.2		
Regulated Urban	0.265				
Unregulated Urban	0.270				
Forest	0.465				

Step 3		Calculate Total Reductions Before Baseline		
	TN	TP	TSS	
Regulated Urban	27.39	12.25	48,057.51	
Unregulated Urban	27.94	12.50	49,022.69	
Forest	48.03	21.49	84,262.15	

Step 4		Account for Unregulated Baseline		
	TN	TP	TSS	
Unregulated Urban at 50%	13.97	6.25	24,511.35	
Unregulated Urban at L2	141.80	12.19	9,136.69	
Less Stringent Baseline	13.97	6.25	9,136.69	

Step 5		Total Credit		
Regulated and Forest	75.42	33.74	132,319.66	
Unregulated Urban Minus Less Stringent Baseline	13.97	6.25	39,886.00	
Total Credit	89.39	39.99	172,205.66	

Notes	
Enter data into green cells only.	
Tons TSS/year per BANCS assessment.	
Choose site-specific nutrient analysis or default rates. Site-specific required after July 1, 2021.	
Prompts to enter pounds TN and TP if "Site-Specific" is selected.	
Default is 50%. Modify up to 80% using BANCS recalculation at three years after completion.	
Table 3b of MS4 permit; acres of each unregulated land use by the basin loading rate and L2 required reductions.	
Calculation set so that it does not result in negative credit.	



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Conklin Park – JC77 Retrofit

Project	Conklin Park - JC77 Retrofit					
Description:	Convert wet pond to constructed wetland.					
Completion Date:	2023	Watershed:	Bull Run			
Latitude:	38.908017	Longitude:	-77.521266			
Methodology:	DEQ Guidance Memo No 20-2003 - Chesapeake Bay TMDL Special Condition (2/6/2021)					
	Appendix V.D - BMP Enhancement, Conversion, and Restoration					
Efficiencies:	Existing Efficiencies = Appendix V.C - Chesapeake Bay Program, Established Efficiencies Wet Ponds					
	Retrofit Efficiencies = Appendix V.C - Chesapeake Bay Program, Established Efficiencies Wet Ponds and Wetlands					
Downward Modification Table	Applies to retrofit of existing facilities only - 50% maximum.					
BMP Type	Modification Type	Downward Modification (%)				
Wet Pond	Absence of Forebay	10				
	Absence of Aquatic Bench	10				
	Inadequate Floorpath	10				
	Total %	30				
Efficiency for New Facility						
Pollutant	Existing Facility Efficiency	Downward Modification * Existing Pond Efficiency	New Facility Efficiency	Total Efficiency		
TN	20	14	20	6.00		
TP	45	31.5	45	13.50		
TSS	60	42	60	18.00		
Calculation Sheet	Table 3b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin					
Subsource	Pollutant	Total Acres Served (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	New BMP Efficiency	Load Reduction
Urban Impervious	Total Nitrogen	16.05	16.86	270.60	6.00	16.24
Urban Pervious		29.39	10.07	295.96	6.00	17.76
Forested (Reg or Unreg)		7.52	1.16	8.72	6.00	0.52
Urban Impervious	Total Phosphorus	16.05	1.62	26.00	13.50	3.51
Urban Pervious		29.39	0.41	12.05	13.50	1.63
Forested (Reg or Unreg)		7.52	0.07	0.53	13.50	0.07
Urban Impervious	Total Suspended Solids	16.05	1,171.32	18,799.69	18.00	3,383.94
Urban Pervious		29.39	175.80	5,166.76	18.00	930.02
Forested (Reg or Unreg)		7.52	57.54	432.70	18.00	77.89
Baseline Reduction	Applies only where facility is not completely within the MS4 service area.					
Subsource	Pollutant	Acres in Unregulated Area (6/30/09)	2009 EOS Loading Rate (lbs/acre)	L2 Load Reduction Percent	Baseline	
Unregulated Impervious	Total Nitrogen	2.34	16.86	0.0900	3.55	
Unregulated Pervious		2.2	10.07	0.0600	1.33	
Unregulated Impervious		2.34	1.62	0.1600	0.61	
Unregulated Pervious	Total Phosphorus	2.2	0.41	0.0725	0.07	
Unregulated Impervious		2.34	1,171.32	0.2000	548.18	
Unregulated Pervious		2.2	175.80	0.0875	33.84	
			TN Reduction (lbs/year)	29.64		
			TP Reduction (lbs/year)	4.54		
			TSS Reduction (lbs/year)	3,809.83		



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Conklin Park – XX267 Retrofit

Project	Conklin Park - XX267 Retrofit					
Description:	Convert farm pond with no efficiency to Constructed Wetland Level 2. Chesapeake Bay Program, Established Efficiencies used for calculations to be conservative. Re-calculate if Level 2 is achieved.					
Completion Date:	2023	Watershed:	Bull Run			
Latitude:	38.908017	Longitude:				-77.521266
Methodology:	DEQ Guidance Memo No 20-2003 - Chesapeake Bay TMDL Special Condition (2/6/2021)					
	Appendix V.D - BMP Enhancement, Conversion, and Restoration					
Efficiencies:	Existing Efficiencies = None, New Construction					
	Retrofit Efficiencies = Appendix V.C - Chesapeake Bay Program, Established Efficiencies Wet Ponds and Wetlands					
Downward Modification Table	Applies to retrofit of existing facilities only - 50% maximum.					
BMP Type	Modification Type	Downward Modification (%)				
NA						
		Total %				0
Efficiency for New Facility						
Pollutant	Existing Facility Efficiency	Downward Modification * Existing Pond Efficiency	New Facility Efficiency	Total Efficiency		
TN	0	0	20	20.00		
TP	0	0	45	45.00		
TSS	0	0	60	60.00		
Calculation Sheet	Table 3b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin					
Subsource	Pollutant	Total Acres Served (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	New BMP Efficiency	Load Reduction
Urban Impervious	Total Nitrogen	6.32	16.86	106.56	20.00	21.31
Urban Pervious		7.86	10.07	79.15	20.00	15.83
Forested (Reg or Unreg)		0.47	1.16	0.55	20.00	0.11
Urban Impervious	Total Phosphorus	6.32	1.62	10.24	45.00	4.61
Urban Pervious		7.86	0.41	3.22	45.00	1.45
Forested (Reg or Unreg)		0.47	0.07	0.03	45.00	0.01
Urban Impervious	Total Suspended Solids	6.32	1,171.32	7,402.74	60.00	4,441.65
Urban Pervious		7.86	175.80	1,381.79	60.00	829.07
Forested (Reg or Unreg)		0.47	57.54	27.04	60.00	16.23
Baseline Reduction	Applies only where facility is not completely within the MS4 service area.					
Subsource	Pollutant	Acres in Unregulated Area (6/30/09)	2009 EOS Loading Rate (lbs/acre)	L2 Load Reduction Percent	Baseline	
Unregulated Impervious	Total Nitrogen	0.65	16.86	0.0900	0.99	
Unregulated Pervious		0.32	10.07	0.0600	0.19	
Unregulated Impervious		0.65	1.62	0.1600	0.17	
Unregulated Pervious	Total Phosphorus	0.32	0.41	0.0725	0.01	
Unregulated Impervious		0.65	1,171.32	0.2000	152.27	
Unregulated Pervious		0.32	175.80	0.0875	4.92	
			TN Reduction (lbs/year)	36.07		
			TP Reduction (lbs/year)	5.89		
			TSS Reduction (lbs/year)	5,129.75		



Rose Hill Estates/Bettis Drive Channel Repair

Project		Rose Hill Estates/Bettis Drive Channel Repair		
Latitude	39.141375	Watershed	Catoctin	
Longitude	-77.65993	Length (LF)	264	
Completion Year	2022			
Step 1		Calculate POC Reductions with BANCS		
TSS/Year in Tons	158.54632			
Site-Specific Nutrients or Default Rates?	Site-Specific			
	TN	TP	TSS	
Site-Specific Nutrients in Pounds/Year	65.7967228	3.32947272	317,092.64	
Default Conversion	361.49	166.47	317,092.64	
Selected POC Reductions	65.80	3.33	317,092.64	
Effectiveness	0.5			
Total Reduction	32.90	1.66	158,546.32	
Step 2		Calculate the Project Credit Ratio		
	Impervious	Pervious	Total Urban	Forested
Regulated Land	0.79	0.82	1.61	0.03
Unregulated Land	1.15	16.41	17.56	2.96
		Subtotal	19.17	2.99
		Total Urban and Forested	22.16	
Regulated Urban	0.073			
Unregulated Urban	0.792			
Forest	0.135			
Step 3		Calculate Total Reductions Before Baseline		
	TN	TP	TSS	
Regulated Urban	2.39	0.12	11,518.93	
Unregulated Urban	26.07	1.32	125,635.08	
Forest	4.44	0.22	21,392.31	
Step 4		Account for Unregulated Baseline		
	TN	TP	TSS	
Unregulated Urban at 50%	13.04	0.66	62,817.54	
Unregulated Urban at L2	11.66	0.79	521.83	
Less Stringent Baseline	11.66	0.66	521.83	
Step 5		Total Credit		
Regulated and Forest	6.83	0.34	32,911.24	
Unregulated Urban Minus Less Stringent Baseline	14.41	0.66	125,113.25	
Total Credit	21.24	1.00	158,024.49	

Notes
Enter data into green cells only.
Tons TSS/year per BANCS assessment.
Choose site-specific nutrient analysis or default rates. Site-specific required after July 1, 2021.

Prompts to enter pounds TN and TP if "Site-Specific" is selected.

Default is 50%. Modify up to 80% using BANCS recalculation at three years after completion.

Table 3b of MS4 permit; acres of each unregulated land use by the basin loading rate and L2 required reductions.

Calculation set so that it does not result in negative credit.



Rostormel Outfall Restoration

Project		Rostormel Outfall Restoration		
Latitude	39.035412	Watershed	Broad Run	
Longitude	-77.49038	Length (LF)	340	
Completion Year	2023			

Step 1		Calculate POC Reductions with BANCS		
TSS/Year in Tons	104.3265932			
Site-Specific Nutrients or Default Rates?	Site-Specific			
	TN	TP	TSS	
Site-Specific Nutrients in Pounds/Year	611.3538362	97.02373168	208,653.19	
Default Conversion	237.86	109.54	208,653.19	
Selected POC Reductions	611.35	97.02	208,653.19	
Effectiveness	0.5			
Total Reduction	305.68	48.51	104,326.60	

Step 2		Calculate the Project Credit Ratio			
	Impervious	Pervious	Total Urban	Forested	
Regulated Land	0.57	0.7	1.27	0	
Unregulated Land	0.99	2.43	3.42	1.49	
		Subtotal	4.69	1.49	
		Total Urban and Forested	6.18		
Regulated Urban	0.206				
Unregulated Urban	0.553				
Forest	0.241				

Step 3		Calculate Total Reductions Before Baseline		
	TN	TP	TSS	
Regulated Urban	62.82	9.97	21,439.29	
Unregulated Urban	169.16	26.85	57,734.14	
Forest	73.70	11.70	25,153.18	

Step 4		Account for Unregulated Baseline		
	TN	TP	TSS	
Unregulated Urban at 50%	84.58	13.43	28,867.07	
Unregulated Urban at L2	2.97	0.33	269.30	
Less Stringent Baseline	2.97	0.33	269.30	

Step 5		Total Credit		
Regulated and Forest	136.52	21.67	46,592.47	
Unregulated Urban Minus Less Stringent Baseline	166.19	26.52	57,464.84	
Total Credit	302.71	48.19	104,057.31	

Notes	
Enter data into green cells only.	
Tons TSS/year per BANCS assessment.	
Choose site-specific nutrient analysis or default rates. Site-specific required after July 1, 2021.	
Prompts to enter pounds TN and TP if "Site-Specific" is selected.	
Default is 50%. Modify up to 80% using BANCS recalculation at three years after completion.	

Table 3b of MS4 permit; acres of each unregulated land use by the basin loading rate and L2 required reductions.	
Calculation set so that it does not result in negative credit.	



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Willow Lake Pond Retrofit

Project	Willow Lake Pond Retrofit					
Description:	Convert existing wet pond to a Clearinghouse Level 1 Wet Pond					
Completion Date:	2023	Watershed:	Sugarland Run			
Latitude:	39.038918	Longitude:	-77.376564			
Methodology:	DEQ Guidance Memo No 20-2003 - Chesapeake Bay TMDL Special Condition (2/6/2021) Appendix V.D - BMP Enhancement, Conversion, and Restoration					
Efficiencies:	Existing Efficiencies = Appendix V.C - Chesapeake Bay Program, Established Efficiencies Wet Ponds					
	Retrofit Efficiencies = Appendix V.A - Virginia Stormwater Clearinghouse BMPs					
Downward Modification Table	Applies to retrofit of existing facilities only - 50% maximum.					
BMP Type	Modification Type	Downward Modification (%)				
Wet Pond	Undersize/Blockage	10				
	Absence of Forebay	10				
	Absence of Aquatic Bench	10				
	Inadequate Flow Path	5				
	Total %	35				
Efficiency for New Facility						
Pollutant	Existing Facility Efficiency	Downward Modification * Existing Pond Efficiency	New Facility Efficiency	Total Efficiency		
TN	20	13	30	17.00		
TP	45	29.25	50	20.75		
TSS	60	39	60	21.00		
Calculation Sheet	Table 3b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin					
Subsource	Pollutant	Total Acres Served (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	New BMP Efficiency	Load Reduction
Urban Impervious	Total Nitrogen	49.11	16.86	827.99	17.00	140.76
Urban Pervious		57.53	10.07	579.33	17.00	98.49
Forested (Reg or Unreg)		7.68	1.16	8.91	17.00	1.51
Urban Impervious	Total Phosphorus	49.11	1.62	79.56	20.75	16.51
Urban Pervious		57.53	0.41	23.59	20.75	4.89
Forested (Reg or Unreg)		7.68	0.07	0.54	20.75	0.11
Urban Impervious	Total Suspended Solids	49.11	1,171.32	57,523.53	21.00	12,079.94
Urban Pervious		57.53	175.80	10,113.77	21.00	2,123.89
Forested (Reg or Unreg)		7.68	57.54	441.91	21.00	92.80
Baseline Reduction	Applies only where facility is not completely within the MS4 service area.					
Subsource	Pollutant	Acres in Unregulated Area (6/30/09)	2009 EOS Loading Rate (lbs/acre)	L2 Load Reduction Percent	Baseline	
Unregulated Impervious	Total Nitrogen	4.28	16.86	0.0900	6.49	
Unregulated Pervious		3.72	10.07	0.0600	2.25	
Unregulated Impervious		4.28	1.62	0.1600	1.11	
Unregulated Pervious	Total Phosphorus	3.72	0.41	0.0725	0.11	
Unregulated Impervious		4.28	1,171.32	0.2000	1,002.65	
Unregulated Pervious		3.72	175.80	0.0875	57.22	
			TN Reduction (lbs/year)	232.02		
			TP Reduction (lbs/year)	20.29		
			TSS Reduction (lbs/year)	13,236.76		



Willow Lake Outfall Restoration

Project		Willow Lake Outfalls	
Latitude	39.038918	Watershed	Sugarland Run
Longitude	-77.376564	Length (LF)	220
Completion Year	2023		

Step 1		Calculate POC Reductions with BANCS		
TSS/Year in Tons	23.46			
Site-Specific Nutrients or Default Rates?	Default			
		TN	TP	TSS
Site-Specific Nutrients in Pounds/Year	0	0	0	46,920.00
Default Conversion	53.49	24.63	24.63	46,920.00
Selected POC Reductions	53.49	24.63	24.63	46,920.00
Effectiveness	0.5			
Total Reduction	26.75	12.32	12.32	23,460.00

Step 2		Calculate the Project Credit Ratio			
		Impervious	Pervious	Total Urban	Forested
Regulated Land		62.95	75.36	138.31	0.19
Unregulated Land		4.43	4.55	8.98	16.06
			Subtotal	147.29	16.25
			Total Urban and Forested	163.54	
Regulated Urban		0.846			
Unregulated Urban		0.055			
Forest		0.099			

Step 3		Calculate Total Reductions Before Baseline		
		TN	TP	TSS
Regulated Urban		22.62	10.42	19,840.73
Unregulated Urban		1.47	0.68	1,288.19
Forest		2.66	1.22	2,331.08

Step 4		Account for Unregulated Baseline		
		TN	TP	TSS
Unregulated Urban at 50%		0.74	0.34	644.10
Unregulated Urban at L2		9.47	1.28	1,107.78
Less Stringent Baseline		0.74	0.34	644.10

Step 5		Total Credit		
Regulated and Forest		25.28	11.64	22,171.81
Unregulated Urban Minus Less Stringent Baseline		0.74	0.34	644.10
Total Credit		26.02	11.98	22,815.91

Notes
Enter data into green cells only.
Tons TSS/year per BANCS assessment.
Choose site-specific nutrient analysis or default rates. Site-specific required after July 1, 2021.
Prompts to enter pounds TN and TP if "Site-Specific" is selected.
Default is 50%. Modify up to 80% using BANCS recalculation at three years after completion.
Table 3b of MS4 permit; acres of each unregulated land use by the basin loading rate and L2 required reductions.
Calculation set so that it does not result in negative credit.



Phase II Loudoun County Chesapeake Bay TMDL Action Plan
2022 Update

Septic Conversions in FY21

Reduction from Residential Septic Conversions

TN Edge of Stream Loading	3.5	From DEQ.
Average number of people per	2.7	From Loudoun County.
Number of residential conversions:	17	Ensure that all records are captured in the list of conversions.

Residential TN Reduction (lbs/year) = 160.65

Land Use Changes

Site	Acres	Type from Table	Inside MS4? (Y or N)	Date Effective	TN Credit	TP Credit	TSS Credit	TN Baseline in Lbs/Ac/Yr # of Acres Applied in Final Credit	TP Baseline in Lbs/Ac/Yr # of Acres Applied in Final Credit	TSS Baseline in Lbs/Ac/Yr # of Acres Applied in Final Credit	Final TN Credit	Final TP Credit	Final TSS Credit	Description
Loudoun Valley Estates III	0.50	TF	N	2021	2.79	0.73	278.50	0.6042000	0.0297250	15.3825000	2.49	0.72	270.81	~260 saplings
River Creek Meadow	0.70	TF	N	2020	3.91	1.02	389.90	0.6042000	0.0297250	15.3825000	3.48	1.00	379.13	HOA project at PIN 111-49-2103 (Goose Creek and
Generic Placeholder	10.00	TF	N	2023	55.80	14.60	5,570.00	0.6042000	0.0297250	15.3825000	49.76	14.30	5416.18	Generic placeholder for Phase II plan

Nutrient Credit Purchases

Affidavits of Nutrient Offset Sale to-date are included in this section. The County will provide additional certifications of nutrient credit purchases in the MS4 annual reports.

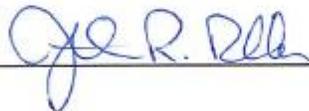
AFFIDAVIT OF NUTRIENT OFFSET SALE

Ecosystem Services, LLC, [broker] (the "Company") on behalf of Reeves Mitigation Services, LLC, hereby certifies the following:

1. Pursuant to the Agreement, between the Company (as Seller) and Loudoun County ("Acquirer"), the Company, for the benefit of the Acquirer, agreed to sell 10.00 pounds of phosphorus offsets and 34.14 pounds of nitrogen (representing the ratio of nitrogen offsets to the phosphorus offsets at the offset generating facility) offsets to Acquirer;

2. The Company and the Acquirer, as of the date hereof, have closed the transaction contemplated by the Agreement and the Company has sold to Acquirer phosphorus and nitrogen offsets and 3,894.79 pounds of sediment (representing the ratio of nitrogen offsets to the phosphorus offsets at the offset generating facility) offsets.

WITNESS the following signature:



By: Jonathan R. Roller
Manager

Date: 7/26/19

Sworn to and subscribed before me this 26th day of JULY, 2019, by Jon Roller, Manager, on behalf of Ecosystem Services, LLC

My commission expires: 8/31/2021


Notary Public

WILLIAM JACKSON SIMMONS
NOTARY PUBLIC
REGISTRATION # 7737689
COMMONWEALTH OF VIRGINIA
MY COMMISSION EXPIRES
AUGUST 31, 2021

Acquirer: County of Loudoun

Nutrient Offset Bank: Mossy Creek Nutrient Bank

Name of Project: Municipal Separate Storm Sewer System (MS4) Permit Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan

Phosphorus Offsets: 10.00 pounds

Nitrogen Offsets: 34.14 pounds

Sediment Offsets: 3,894.79 pounds



AFFIDAVIT OF NUTRIENT OFFSET SALE

Ecosystem Services, L.L.C., [broker] (the "Company") on behalf of Boone's Run Farm, L.L.C., hereby certifies the following:

1. Pursuant to that certain Acquisition and Sale Agreement dated June 21, 2019 (the "Agreement"), between the Company (as Seller) and Loudoun County ("Acquirer"), the Company, for the benefit of the Acquirer, agreed to sell 20.00 pounds of phosphorus offsets and 148.52 pounds of nitrogen (representing the ratio of nitrogen offsets to the phosphorus offsets at the offset generating facility) offsets to Acquirer;

2. The Company and the Acquirer, as of the date hereof, have closed the transaction contemplated by the Agreement and the Company has sold to Acquirer phosphorus offsets and 148.52 pounds of nitrogen (representing the ratio of nitrogen offsets to the phosphorus offsets at the offset generating facility) offsets.

WITNESS the following signature:



By: Jonathan R. Roller
Manager

Date: 7/26/19

Sworn to and subscribed before me this 26th day of July, 2019, by Jon Roller, Manager, on behalf of Ecosystem Services, LLC

My commission expires: 8/31/2021


Notary Public

WILLIAM JACKSON SIMMONS
NOTARY PUBLIC
REGISTRATION # 7737689
COMMONWEALTH OF VIRGINIA
MY COMMISSION EXPIRES
AUGUST 31, 2021

Acquirer: Loudoun County

Nutrient Offset Bank: Boones Run Farm Nutrient Bank

Name of Project: Municipal Separate Storm Sewer System (MS4) Permit Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan

Phosphorus Offsets: 20.00 pounds

Nitrogen Offsets: 148.52 pounds



BILL OF SALE

THIS BILL OF SALE is made as of the 13th day of February, 2020 by Boone's Run Farm, L.L.C., a Virginia Limited Liability Company ("Seller") and County of Loudoun, Virginia ("Purchaser").

Seller and Purchaser have entered into that certain Agreement for Purchase and Sale of Nutrient Offset Credits, dated January 16th, 2020 (the "Purchase Agreement"), the terms of which are incorporated herein by reference and made a part hereof, with respect to the sale by Seller and the purchase by Purchaser of nutrient offset credits generated by Seller's Boone's Run Farm Nutrient Bank located in Rockingham County, VA.

In consideration of the payment of the Purchase Price (as defined in the Purchase Agreement) and other good and valuable consideration, the receipt and sufficiency of which are mutually acknowledged, Seller hereby sells, transfers, assigns, conveys, delivers, and sets over to Purchaser, its successors or assigns the following nutrient offset credits (as defined in the Purchase Agreement):

Nitrogen: 170.10 lbs. and

Phosphorus: 23.04 lbs.

WITNESS the following authorized signature:

Ecosystem Services, LLC,
a Virginia limited liability company
Authorized Broker and Representative



By: _____
Name: Jonathan R. Roller
Title: Manager

BILL OF SALE

THIS BILL OF SALE is made as of the 13th day of February, 2020 by Reeves Mitigation Services, L.L.C., a Virginia Limited Liability Company (“Seller”) and County of Loudoun, Virginia (“Purchaser”).

Seller and Purchaser have entered into that certain Agreement for Purchase and Sale of Nutrient Offset Credits, dated January 16th, 2020 (the “Purchase Agreement”), the terms of which are incorporated herein by reference and made a part hereof, with respect to the sale by Seller and the purchase by Purchaser of nutrient offset credits generated by Seller’s Mossy Creek Nutrient Bank located in Augusta County, VA.

In consideration of the payment of the Purchase Price (as defined in the Purchase Agreement) and other good and valuable consideration, the receipt and sufficiency of which are mutually acknowledged, Seller hereby sells, transfers, assigns, conveys, delivers, and sets over to Purchaser, its successors or assigns the following nutrient offset credits (as defined in the Purchase Agreement):

Phosphorus: 6.96 lbs.,

Nitrogen: 23.70 lbs. and

Sediment: 2,710.77 lbs.

WITNESS the following authorized signature:

Ecosystem Services, LLC,
a Virginia limited liability company
Authorized Broker and Representative

By:



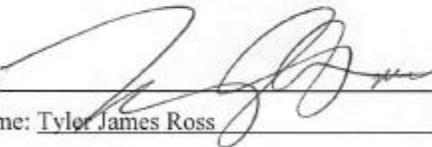
AFFIDAVIT OF PHOSPHOROUS OFFSET SALE

PAPER STREET SOAP COMPANY, LLC, a Virginia limited liability company ("Seller"), hereby certifies the following:

1. Pursuant to that that certain Agreement for Purchase and Sale of Nonpoint Nutrient Offset Credits, dated as of the 15th day of June 2021 (the "Agreement"), the terms of which are incorporated herein by reference and made a part hereof) between Seller and **COUNTY OF LOUDOUN, VIRGINIA**, a political subdivision of the Commonwealth of Virginia ("Purchaser"), Seller, for the benefit of the Purchaser, agreed to sell 30.00 pounds of nonpoint source phosphorus offset credits to Purchaser and the associated ratio of nonpoint source nitrogen credits in the amount of 173.696 pounds and nonpoint source sediment credits in the amount of 2,546.631 pounds at the offset generating facility named the Smith Creek Nutrient Offset and Trading Bank (Potomac-037).
2. Seller and Purchaser, as of the date hereof, have closed the transaction contemplated by the Agreement and the Seller has sold to Purchaser 30.00 pounds of nonpoint source phosphorus offset credits and the associated ratio of nonpoint source nitrogen offsets in the amount of 173.696 pounds and nonpoint source sediment credits in the amount of 2,546.631 pounds.

WITNESS the following signature:

PAPER STREET SOAP COMPANY, LLC
a Virginia limited liability company

By: 
Name: Tyler James Ross
Title: Manager
Date: 7/14/21

Sworn to and subscribed before me this 14th day of July, 2021, by Tyler James Ross, its Manager on behalf of the **PAPER STREET SOAP COMPANY, LLC**, a Virginia limited liability company.

My commission expires: _____
City/County of: _____

Notary Public



Project Name: TMDL Action Plan
Applicant: County of Loudoun, VA
Phosphorous Offsets: 30.00 pounds
Associated Nitrogen Offsets: 173.696 pounds

NUTRIENT CREDIT BILL OF SALE
Nonpoint Nutrient Offset Credits

BILL OF SALE, made as of the 14th day of June 2021 by **PAPER STREET SOAP COMPANY, LLC**, a Virginia limited liability company ("Seller"), to **COUNTY OF LOUDOUN, VIRGINIA**, a political subdivision of the Commonwealth of Virginia ("Purchaser").

WHEREAS, Seller and Purchaser have entered into that certain Agreement for Purchase and Sale of Nonpoint Nutrient Offset Credits, dated as of the 15th day of June 2021 (the "Agreement"), the terms of which are incorporated herein by reference and made a part hereof), with respect to the sale from Seller and purchase by Purchaser of the Credits (defined below) from Seller's Smith Creek Nutrient Offset and Trading Bank located in Shenandoah County, Virginia, and within the Potomac River Basin Watershed identified with HUC 02070006.

NOW THEREFORE, for and in consideration of the payment of the Purchase Price (as defined in the Agreement) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Seller hereby sells, transfers, assigns, conveys, delivers and sets over to Purchaser, its successors and assigns **30.00** pounds of nonpoint source phosphorus offset credits (consisting of 30.00 pounds of nonpoint source phosphorus offset credits and the retirement by Seller of the associated ratio of nonpoint source nitrogen credits in the amount of 173.696 pounds and nonpoint source sediment credits in the amount of 2,546.631 pounds (collectively, the "Credits") as such are described in the Agreement.

TO HAVE AND TO HOLD all such Credits hereby sold and transferred to Purchaser and its successors and assigns forever.

IN WITNESS WHEREOF, Seller has caused this Bill of Sale to be executed by its duly authorized representative as of the date first above written.

PAPER STREET SOAP COMPANY, LLC
a Virginia limited liability company

By: 

Name: Tyler James Ross

Its: Manager

Project Name: TMDL Action Plan
Applicant: County of Loudoun, Virginia
Phosphorous Offsets: 30.00 pounds
Associated Nitrogen Offsets: 173.696 pounds

Appendix D

Public Comments

The following is a snapshot of the notice offering an opportunity for the public to comment on the updated Phase II plan. Two comments were received by the February 28, 2022 deadline and are summarized below.

The screenshot shows the Loudoun County Virginia website. The header includes the county logo and navigation links for Government, Services, Residents, and Departments. The main content area features a news article titled "Comments Sought on Revised Stormwater Management Plan for Reducing Pollutants" posted on February 1, 2022. The article text states that Loudoun County is seeking public comments on a revised draft plan for reducing pollutants entering the Chesapeake Bay. It details the updated "Phase II Chesapeake Bay TMDL Action Plan" and the county's municipal separate storm sewer system (MS4). A sidebar on the right contains a graphic with the text "Comments Sought on Draft Plan to Reduce Pollutants Entering Chesapeake Bay" and "Comments due: February 18, 2022", along with the website URL loudoun.gov/stormwater.

Home > News & Announcements

County News

Posted on: February 1, 2022

Comments Sought on Revised Stormwater Management Plan for Reducing Pollutants

Loudoun County is seeking public comments on a revised draft plan for reducing pollutants entering the Chesapeake Bay.

The updated "Phase II Chesapeake Bay TMDL Action Plan" outlines ways that the county intends to meet requirements for reducing the quantity of pollutants entering the Chesapeake Bay via the county's municipal separate storm sewer system (MS4). The county operates the MS4 under a permit from the state of Virginia and the permit requires the development and implementation of action plans for impaired waterways. TMDL refers to the allowed "Total Maximum Daily Load" of the pollutants allowed to enter a water body without violating water quality standards.

The revised plan provides an update on the actions that the county has achieved to date and outlines projects that are planned for the future.

The updated draft plan is posted online at loudoun.gov/stormwater. The deadline to submit comments on the plan is Friday, February 18, 2022. Comments can be directed to the Stormwater Management Program by [email](mailto:) or by phone at 703-777-0117.

More information about Loudoun County's Stormwater Management Program is available at loudoun.gov/stormwater.

Comments Sought on Draft Plan to Reduce Pollutants Entering Chesapeake Bay
Comments due: February 18, 2022
loudoun.gov/stormwater

Phase II Loudoun County Chesapeake Bay TMDL Action Plan
2022 Update

Date	Source	Summary of Comment
2/4/2022	Dan Saunasee	Overall, the plan is well done. Suggest adding a glossary of acronyms and industry terms to make it easier for the public to understand. (Note, the County added an acronym page to the plan).
2/17/2022	Gem Bingol, Loudoun Land Use Representative, Piedmont Environmental Council	Support the County in its efforts to partner with local homeowners associations on projects and to encourage private initiatives to improve water quality. The completed projects listed are excellent examples of such efforts. Projects that improve water quality in Loudoun are strongly preferred, but the need to purchase credit offsets to meet deadlines is understood. Encourage any nutrient credit purchases to be made from Loudoun nutrient banks whenever possible.

Appendix E

Summary of Plan Changes

The following provides an overview of the significant changes made to this document compared to the November 1, 2019 version submitted to DEQ.

Topic Area	Reference	Description
Updated DEQ Guidance	General	<ul style="list-style-type: none"> Removed 50% reduction factor from land use change (included in 2019 draft guidance but removed in final 2021 guidance). Adjusted septic disconnect net reduction from 3.6 to 3.5 lbs/TN/person/year. Removed TSS delivery factor for stream restoration projects (planned projects only). Adjusted baseline for stream restoration to the more advantageous of 50% or L2 (planned projects only).
Over/Under Treatment	Section 6.1	<ul style="list-style-type: none"> Reduced assumed pollutant reductions to 0 lbs/year for all pollutants starting FY2020.
Retrofit Projects Completed – Included in 2019 Plan	Section 6.2	<ul style="list-style-type: none"> Loudoun Valley Estates
Retrofit Projects Completed – Added in 2022 Plan	Section 6.2	<ul style="list-style-type: none"> Goose Creek Dam Removal
Retrofit Projects Planned – Added in 2022 Plan	Section 6.2	<ul style="list-style-type: none"> Yorktown Court Pond Retrofit Countryside/Riverbend Outfall Restoration Confluence Park Outfall Restoration Conklin Park Stream Restoration Conklin Park Retrofits (JC77 and XX267) Rose Hill Estates/Bettis Drive Channel Repair Rostormel Outfall Restoration Willow Lake Pond Retrofit Willow Lake Outfall Restoration
Projects Deleted	Section 6.2	<ul style="list-style-type: none"> Phil Bolen Park Stream Restoration Trailside Park Stream Restoration Bles Park Stream Restoration Dulles South Retrofit

Phase II Loudoun County Chesapeake Bay TMDL Action Plan
2022 Update

Topic Area	Reference	Description
Nutrient Management Plans	Section 6.3	<ul style="list-style-type: none"> • Updated NMPs based on those provided to DEQ in the FY2021 annual report.
Septic Disconnects	Section 5.5 and Section 6.5	<ul style="list-style-type: none"> • Updated first and second permit cycle septic disconnects based on data provided by the Loudoun County Health Department. • Total number of septic system disconnects for which credit is taken increased from six to 497.
Nutrient Purchases	Section 6.6	<ul style="list-style-type: none"> • Added credit purchases through FY2021. • Adjusted anticipated ratios of TP to TN and TSS based on actual credits purchased. TN adjusted from 1:7 to 1:6; TSS adjusted from 1:370 to 1:102.
Land Use Change	Section 5.7 and Section 6.7	<ul style="list-style-type: none"> • Added South Riding land use conversion to first permit cycle. • Completed two additional conversions in second permit cycle (River Creek and Loudoun Valley Estates). • Added 10 acres of additional conversion to be completed by FY2023.

