Attachment 23: Chesapeake Bay TMDL Action Plan

Town of Ashland
Chesapeake Bay TMDL Action Plan
June 30, 2015

This document is the Town of Ashland's the Chesapeake Bay TMDL Action Plan, which demonstrates that the Town has:

1. Calculated the full scope of offsets for existing development and new sources that are required to be made by the end of the first permit cycle; and,
2. Determined the methods that will be used to meet the reductions required by the end of the first permit cycle.

This the Action Plan also includes:

1. A review of the current MS4 permit authority and implementation capabilities,
2. Existing, new, and modified legal authorities necessary to meet required reductions;
3. An estimate of future grandfathered projects and their acreage, if any;
4. Expected costs for implementing the Action Plan; and,
5. A description of public comment process and period.

This Chesapeake Bay TMDL Action Plans will be submitted to the Virginia Department of Environmental Quality (DEQ) for review and approval with the Town of Ashland's 2014-2015 MS4 Annual Report on or before October 1, 2015. This Action Plan becomes effective 90 days after the date received by DEQ unless specifically denied in writing by DEQ.

Permit Requirements

1. **Current program and existing legal authority** (*General Permit Section I.C.2.a.(1)*) *A review of the current MS4 program implemented as a requirement of this state permit including a review of the existing legal authorities and the operator's ability to ensure compliance with this special condition;*

The following is a list of the Town's legal authorities that enable the Town to ensure compliance with this Action Plan:

a. Ashland, VA, Code of Ordinance Part II, Chapter 4.1, Article I: Stormwater Management, http://www.amlegal.com/nxt/gateway.dll/Virginia/ashland_va/townofashlandvirginia?f=templates$fn=default.htm$3.0$vid=amlegal:ashland_va ;
b. Ashland, VA, Code of Ordinance Part II, Chapter 4.1, Article III: Chesapeake Bay Preservation Area, http://www.amlegal.com/nxt/gateway.dll/Virginia/ashland_va/townofashlandvirginia?f=templates$fn=default.htm$3.0$vid=amlegal:ashland_va ;
c. Ashland, VA, Code of Ordinance Part II, Chapter 4.1, Article V: Water Quality Protection, http://www.amlegal.com/nxt/gateway.dll/Virginia/ashland_va/townofashlandvirginia?f=templates$fn=default.htm$3.0$vid=amlegal:ashland_va ;

d. Ashland, VA, Code of Ordinance Part II, Chapter 4.1, Article VI: Municipal Separate Storm Sewer Systems Management Program, http://www.amlegal.com/nxt/gateway.dll/Virginia/ashland_va/townofashlandvirginia?f=templates$fn=default.htm$3.0$vid=amlegal:ashland_va ;
e. Ashland, VA, Code of Ordinance Part II, Chapter 5: Erosion and Sediment Control, http://www.amlegal.com/nxt/gateway.dll/Virginia/ashland_va/townofashlandvirginia?f=templates$fn=default.htm$3.0$vid=amlegal:ashland_va ;
f. Town of Ashland's MS4 Program Plan, http://www.town.ashland.va.us/DocumentCenter/View/42 ;
g. Town of Ashland Land Disturbance Permit, http://www.town.ashland.va.us/DocumentCenter/Home/View/37; and
h. Town Agreement in Lieu of Erosion & Sediment Control, Water Quality, and Stormwater Management, http://www.town.ashland.va.us/DocumentCenter/Home/View/36 .

2. **New or modified legal authority** (*General Permit Section I.C.2.a.(2)*) *The identification of any new or modified legal authorities such as ordinances, state and other permits, orders, specific contract language, and inter-jurisdictional agreements implemented or needing to be implemented to meet the requirements of this special condition;*

None required.

3. **Means and methods to address discharges from new sources** *(General Permit Section I.C.2.a.(3)) The means and methods that will be utilized to address discharges into the MS4 from new sources;*

The MS4 General Permit requires post-construction stormwater runoff controls for:

a. New development and development on prior developed lands that are defined as large construction activities or small construction activities in 9VAC25-870-10;
b. New development and development on prior developed lands that disturb greater than or equal to 2,500 square feet, but less than one acre, located in a Chesapeake Bay Preservation Area designated by a local government located in Tidewater, Virginia, as defined in § 62.1-44.15:68 of the Code of Virginia; and
c. New development and development on prior developed lands where an applicable state regulation or local ordinance has designated a more stringent regulatory size threshold than that identified in subdivision "a" or "b" above.

The Town of Ashland's Ordinance requires that stormwater runoff controls be implemented for any land disturbing activity in excess of 2,500 s.f. There is an exception for single family residential development that is not part of a larger plan of development. Requirements for addressing stormwater runoff are described in the following sections of the Town Code:

a. Ashland, VA, Code of Ordinance Part II, Chapter 4.1, Article I: Stormwater Management, http://www.amlegal.com/nxt/gateway.dll/Virginia/ashland_va/townofashlandvirginia?f=templates$fn=default.htm$3.0$vid=amlegal:ashland_va ;
b. Ashland, VA, Code of Ordinance Part II, Chapter 4.1, Article III: Chesapeake Bay Preservation Area,

http://www.amlegal.com/nxt/gateway.dll/Virginia/ashland_va/townofashlandvirginia?f=templates$fn=default.htm$3.0$vid=amlegal:ashland_va ;

c. Ashland, VA, Code of Ordinance Part II, Chapter 4.1, Article V: Water Quality Protection, http://www.amlegal.com/nxt/gateway.dll/Virginia/ashland_va/townofashlandvirginia?f=templates$fn=default.htm$3.0$vid=amlegal:ashland_va ; and
d. Ashland, VA, Code of Ordinance Part II, Chapter 5: Erosion and Sediment Control, http://www.amlegal.com/nxt/gateway.dll/Virginia/ashland_va/townofashlandvirginia?f=templates$fn=default.htm$3.0$vid=amlegal:ashland_va ;

Note that the Town of Ashland does not utilize of an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities. Therefore, there are no New Source 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.

For New Source that did not utilize an average impervious land cover condition greater than 16% for the design of post development stormwater management facilities additional offsets are not required beyond those for existing development. For New Source that disturbed less than 1 acre, additional offsets are also not required beyond those for existing development. However, if additional offsets were implemented, these offsets have been used to address the Town's total pollutant requirement.

4. **Estimated existing source loads and calculated total pollutant of concern (POC) required reductions** *(General Permit Section I.C.2.a.(4) and (General Permit Section I.C.2.a.(5)) An estimate of the annual POC loads discharged from the existing sources as of June 30, 2009, based on the 2009 progress run. The operator shall utilize the applicable [Table/Tables] in this section based on the river basin to which the MS4 discharges by multiplying the total existing acres served by the MS4 on June 30, 2009, and the 2009 Edge of Stream (EOS) loading rate; A determination of the total pollutant load reductions necessary to reduce the annual POC loads from existing sources utilizing the applicable [Table/Tables] in this section based on the river basin to which the MS4 discharges. This shall be calculated by multiplying the total existing acres served by the MS4 by the first permit cycle required reduction in loading rate. For the purposes of this determination, the operator shall utilize those existing acres identified by the 2000 U.S. Census Bureau urbanized area and served by the MS4.*

See Attachment 1 for Estimated Existing Source Loads: Table 2a (James River Basin) and Table 2b (York River Basin).

The regulated area of Town in the James River Basin is 1,633.91 acres. This consists of 639.25 pervious acres, 439.73 impervious acres and excluded areas. Excluded areas for this calculation include 554.93 acres of forested land. Other Excluded areas include Interstate 95 and VDOT facilities, and Hanover County facilities totaling 9.29 acres impervious and 6.21 acres pervious. These facilities will we addressed under the respective MS4s.

The regulated area of Town in the York River Basin is 2,973.94 acres. This consists of 1,079.12 pervious acres, 732.04 impervious acres and excluded areas. Excluded areas for this calculation include 1,162.77 acres of forested land. Other Excluded areas may include Interstate 95 and VDOT facilities, and Hanover County facilities totaling 73.76 acres impervious and 74.48 acres pervious. These facilities will we addressed under the respective MS4s.

The impervious, pervious and forested land covers were calculated as follows. The Town began with the GIS dataset representing land cover (impervious, pervious, and forest) developed by the Richmond Regional Planning District Commission (RRPDC). Next, the Town asked its consultant, Timmons Group to review and verify the data. Timmons Group performed a desktop analysis of the land cover data, comparing it with the Town boundary and with the most current aerial imagery. Discrepancies between the RRPDC land cover data and the Town boundary were corrected by editing the shape file to reflect the actual Town boundary and the most current aerial imagery. To ensure that the topology of the data was clean and accurate, a summation of the area for impervious, pervious, and forest was compared to the area encompassed by the Town. The analysis resulted in the following break-down of land cover: 23% impervious cover, 26% pervious cover, and 51% forested cover.

To further refine the RRPDC information, the forested area was digitized by hand using aerial photography. Hanover County impervious planimetric data generated in 2008, including road edge and building outlines, was then processed against the updated land cover data to provide better connectivity of impervious surfaces. Finally, the data was visually analyzed for errors and discrepancies against aerial imagery to produce the final breakdown of present land cover in the Town of Ashland.

See Attachment 2 for Total POC Reductions Required During this Permit Cycle: Tables 3a (James River Basin) Table 3d (York River Basin).

5. **Means and methods to meet the required reductions and schedule** *(General Permit Section I.C.2.a.(6)) The means and methods, such as management practices and retrofit programs that will be utilized to meet the required reductions included in subdivision 2 a (5) of this subsection, and a schedule to achieve those reductions. The schedule should include annual benchmarks to demonstrate the ongoing progress in meeting those reductions;*

Attachment 3 shows the management practices and retrofit programs (including improvements from redevelopment) that have or will be implemented between July 1, 2009 and the end of the first permit cycle to achieve the 5.0% reductions required for existing development.

An electronic version of the spreadsheet will be provided to DEQ with the submittal of this Action Plan.

6. **Means and methods to offset increased loads from new sources initiating construction between July 1, 2009 and June 30, 2014** *(General Permit Section I.C.2.a.(7)) The means and methods to offset the increased loads 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 operator shall utilize the [applicable table] in this section to develop the equivalent pollutant load for nitrogen and total suspended solids. The operator shall offset 5.0% of the calculated increased load from these new sources during the permit cycle.

The Town of Ashland only uses an average land cover condition of 16% impervious cover. The Town has no "in-lieu of" fees for stormwater.

7. **Means and methods to offset increased loads from grandfathered projects that begin construction after July 1, 2014** (*General Permit Section I.C.2.a.(8)*) *The means and methods to offset the increased loads from projects as grandfathered in accordance with 9VAC25-870-48, that disturb one acre or greater that begin construction after July 1, 2014, where the project utilizes an average land cover condition greater than 16% impervious cover in the design of post-development stormwater management facilities. The operator shall utilize Table 4 in this section to develop the equivalent pollutant load for nitrogen and total suspended solids.*

There are no grandfathered projects in the Town of Ashland.

8. **A list of future projects, and associated acreage that qualify as grandfathered** *(General Permit Section I.C.2.a.(10))* *A list of future projects and associated acreage that qualify as grandfathered in accordance with 9VAC25-870-48*

There are no grandfathered projects in the Town of Ashland.

9. **An estimate of the expected cost to implement the necessary reductions** *(General Permit Section I.C.2.a.(11)) An estimate of the expected costs to implement the requirements of this special condition during the state permit cycle;*

The Town of Ashland drains to the James River Basin and the York River Basin. For the York River Basin, the required 5.0% reductions have been exceeded.

For the James River Basin, the Town plans to add Filterra (or equivalent) units to treat up to 3 acres of impervious area. The cost for this installation of these BMPS is projected to be $360,000.

For the next permit cycle, the Town of Ashland is considering performing a stream restoration Stony Run, which is the primary tributary to the James River basin in Ashland. We project this stream restoration project will cost approximately $500,000 to $900,000 to design and construct.

Attachment 4 includes an estimate of expected costs to achieve:

- 5.0% reductions for the existing sources, and
- 5.0% reductions for the new sources that disturb one acre or greater and have an average impervious land cover condition greater than 16% for the design of post-development stormwater management facilities.

Because there are no grandfathered projects in the Town of Ashland, no estimate for offsetting grandfathered projects was developed.

The Town continues to plan for the full reductions that are required by the end of three permit cycles. A general project is included in Attachment 4.

10. Public comments on draft Action Plan (GENERAL PERMIT REQUIREMENTS)
(General Permit Section I.C.2.a.(12)) An opportunity for receipt and consideration of public comment regarding the draft Chesapeake Bay TMDL Action Plan.

The draft Chesapeake Bay TMDL Action Plan was posted on the Town's website for public comment for 30 days. At the conclusion of the 30 days, no comments had been received. The Town will continue to post the Action Plan on the website, and will give consideration to any comments received.

Attachment 1

Town of Ashland

Table 2 a: Calculation Sheet for Estimating Existing Source Loads for the James River Basin

***Based on Chesapeake Bay Program Watershed Model Phase 5.3.2**

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
Regulated Urban Impervious	Nitrogen	430.33	9.39	4,040.80
Regulated Urban Pervious		632.93	6.99	4,424.18
Regulated Urban Impervious	Phosphorus	430.33	1.76	757.38
Regulated Urban Pervious		632.93	0.5	316.47
Regulated Urban Impervious	Total Suspended Solids	430.33	676.94	291,307.59
Regulated Urban Pervious		632.93	101.08	63,976.56

Table 2 d: Calculation Sheet for Estimating Existing Source Loads for the York River Basin

***Based on Chesapeake Bay Program Watershed Model Phase 5.3.2**

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
Regulated Urban Impervious	Nitrogen	658.37	7.31	4,812.68
Regulated Urban Pervious		1004.57	7.65	7,684.96
Regulated Urban Impervious	Phosphorus	658.37	1.51	994.14
Regulated Urban Pervious		1004.57	0.51	512.33
Regulated Urban Impervious	Total Suspended Solids	658.37	456.68	300,664.41
Regulated Urban Pervious		1004.57	72.78	73,112.60

Attachment 2

Town of Ashland

Table 3 a: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the James River Basin

***Based on Chesapeake Bay Program Watershed Model Phase 5.3.2**

Subsource	Pollutant	Total Existing Acres Served by MS4 (6/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre)	Total Reduction Required First Permit Cycle (lbs)	Totals (lbs)
Regulated Urban Impervious	Nitrogen	430.33	0.04	18.18	31.46
Regulated Urban Pervious		632.93	0.02	13.27	
Regulated Urban Impervious	Phosphorus	430.33	0.01	6.06	7.21
Regulated Urban Pervious		632.93	0.002	1.15	
Regulated Urban Impervious	Total Suspended Solids	430.33	6.77	2,913.08	3,192.99
Regulated Urban Pervious		632.93	0.44	279.91	

Table 3 d: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the York River Basin

***Based on Chesapeake Bay Program Watershed Model Phase 5.3.2**

Subsource	Pollutant	Total Existing Acres Served by MS4 (6/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre)	Total Reduction Required First Permit Cycle (lbs)	Totals (lbs)
Regulated Urban Impervious	Nitrogen	658.37	0.03	21.66	44.71
Regulated Urban Pervious		1004.57	0.02	23.05	
Regulated Urban Impervious	Phosphorus	658.37	0.01	7.95	9.81
Regulated Urban Pervious		1004.57	0.002	1.86	
Regulated Urban Impervious	Total Suspended Solids	658.37	4.57	3,006.64	3,326.51
Regulated Urban Pervious		1004.57	0.32	319.87	

Attachment 3
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Attachment 3: Means and Method Completed or Under Way

Credits for BMPs in Regulated Urban Areas for the James River Basin

BMPs	Date Installed or Planned	Location or Project	Subsource	Pollutant	Drainage Area to BMP	2009 EOS Loading Rate (lbs/acre)	Estimated POC Load to BMP	BMP Removal Efficiency for POC	Estimated Removal of POC	Total POC Removal by BMP	Status
Retro-Fits											
Filterra	By 2018	Throughout Town	Impervious	Nitrogen	3.00	9.39	28.17	43%	12.1131	12.11	Future
			Pervious			6.99	0.00	43%	0		
			Impervious	Phosphorus	3.00	1.76	5.28	70%	3.696	3.70	
			Pervious			0.5	0.00	70%	0		
			Impervious	TSS	3.00	676.94	2,030.82	85%	1726.197	1,726.20	
			Pervious			101.08	0.00	85%	0		
Permeable Paver & Rain Garden Treatment Train	2012	Town of Ashland Municipal Parking Lot	Impervious	Nitrogen	1.00	9.39	9.39	VRRM	13.18	9.39	Completed
			Pervious			6.99	0.00		0		
			Impervious	Phosphorus	1.00	1.76	1.76	VRRM	1.76	1.76	
			Pervious			0.5	0.00		0		
			Impervious	TSS	1.00	676.94	676.94	VRRM		676.94	
			Pervious			101.08	0.00		0		
Grass Strip	2012	Adjacent to Town of Ashland Municipal Parking Lot	Impervious	Nitrogen	0.30	9.39	2.82	25%	0.70425	0.70	Completed
			Pervious			6.99	0.00	25%	0		
			Impervious	Phosphorus	0.30	1.76	0.53	25%	0.132	0.13	
			Pervious			0.5	0.00	25%	0		
			Impervious	TSS	0.30	676.94	203.08	50%	101.541	101.54	
			Pervious			101.08	0.00	50%	0		
Permeable Paver	2014	Railroad Ave Street-scape Phase 1	Impervious	Nitrogen	0.48	9.39	4.51	59%	2.659248	2.66	Completed
			Pervious			6.99	0.00	59%	0		
			Impervious	Phosphorus	0.48	1.76	0.84	59%	0.498432	0.50	
			Pervious			0.5	0.00	59%	0		
			Impervious	TSS	0.48	676.94	324.93	55%	178.71216	178.71	
			Pervious			101.08	0.00	55%	0		
Rain Garden Treatment	2014	Railroad Ave Street-scape Phase 1	Impervious	Nitrogen	0.15	9.39	1.41	64%	0.90144	0.90	Completed
			Pervious			6.99	0.00	64%	0		
			Impervious	Phosphorus	0.15	1.76	0.26	55%	0.1452	0.15	
			Pervious			0.5	0.00	55%	0		
			Impervious	TSS	0.15	676.94	101.54	55%	55.84755	55.85	
			Pervious			101.08	0.00	55%	0		

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Attachment 3: Means and Method Completed or Under Way

Bioretention area	2009	Hanover Ave	Impervious	Nitrogen	0.12	9.39	1.13	64%	0.721152	2.38	Completed
			Pervious		0.37	6.99	2.59	64%	1.655232		
			Impervious	Phosphorus	0.12	1.76	0.21	55%	0.11616	0.22	
			Pervious		0.37	0.5	0.19	55%	0.10175		
			Impervious	TSS	0.12	676.94	81.23	55%	44.67804	65.25	
			Pervious		0.37	101.08	37.40	55%	20.56978		
Redevelopment											
Dry Pond	2012	Kempsville/ Carter Lumber	Impervious	Nitrogen	1.01	9.39	9.48	10%	0.94839	3.16	Completed
			Pervious		3.17	6.99	22.16	10%	2.21583		
			Impervious	Phosphorus	1.01	1.76	1.78	15%	0.26664	0.50	
			Pervious		3.17	0.5	1.59	15%	0.23775		
			Impervious	TSS	1.01	676.94	683.71	10%	68.37094	100.41	
			Pervious		3.17	101.08	320.42	10%	32.04236		
Filterra	2015	Duncan Street SRTS Project	Impervious	Nitrogen	0.12	9.39	1.13	43%	0.484524	1.60	Completed
			Pervious		0.37	6.99	2.59	43%	1.112109		
			Impervious	Phosphorus	0.12	1.76	0.21	70%	0.14784	0.28	
			Pervious		0.37	0.5	0.19	70%	0.1295		
			Impervious	TSS	0.12	676.94	81.23	85%	69.04788	100.84	
			Pervious		0.37	101.08	37.40	85%	31.78966		
Additional Reductions											
Chenault Veterinary Dry Pond BMP	2009	Hill Carter Parkway at Ashcake Road	Impervious	Nitrogen	1.07	9.39	10.05	10%	1.00473	1.49	Completed
			Pervious		0.70	6.99	4.89	10%	0.4893		
			Impervious	Phosphorus	1.07	1.76	1.88	15%	0.28248	0.33	
			Pervious		0.70	0.5	0.35	15%	0.0525		
			Impervious	TSS	1.07	676.94	724.33	10%	72.43258	143.19	
			Pervious		7.00	101.08	707.56	10%	70.756		
											Remaining
				Total Required N Removal by 2018			31.46		**Total N Removed**	34.40	-2.94
				Total Required P Removal by 2018			7.21		**Total P Removed**	7.57	-0.36
				Total Required TSS Removal by 2018			3,192.99		**Total TSS Removed**	3,148.92	44.06

Attachment 3
Town of Ashland
Attachment 3: Means and Method Completed or Under Way

Credits for BMPs in Regulated Urban Areas for the York River Basin

BMPs	Date Installed or Planned	Location or Project	Subsource	POC	Drainage Area to BMP (ac)	2009 EOS Loading Rate (lbs/acre)	Estimated POC Load to BMP	BMP Removal Efficiency for POC	Estimated Removal of POC	Total POC Removal	Status
Retro-Fits											
Permeable Pavers & Rain Garden Treatment Train	2013	College Park	Impervious	Nitrogen	4.86	7.31	35.53	VRRM	35.53	59.55	Completed
			Pervious		3.14	7.65	24.02	VRRM	24.02		
			Impervious	Phosphorus	4.86	1.51	7.34	VRRM	7.34	8.94	
			Pervious		3.14	0.51	1.60	VRRM	1.6		
			Impervious	TSS	4.86	456.68	2,219.46	VRRM	2219.46	2,447.99	
			Pervious		3.14	72.78	228.53	VRRM	228.53		
Permeable Paver	2015	APD Parking Lot	Impervious	Nitrogen	0.08	7.31	0.58	59%	0.345032	1.70	Completed
			Pervious		0.30	7.65	2.30	59%	1.35405		
			Impervious	Phosphorus	0.08	1.51	0.12	59%	0.071272	0.16	
			Pervious		0.30	0.51	0.15	59%	0.09027		
			Impervious	Total Suspended	0.08	456.68	36.53	55%	20.09392	32.10	
			Pervious		0.30	72.78	21.83	55%	12.0087		
Permeable Pavers	2015	Railroad Ave Street-scape Phase 2	Impervious	Nitrogen	0.27	7.31	1.97	59%	1.164483	1.16	Completed
			Pervious			7.65	0.00	59%	0		
			Impervious	Phosphorus	0.27	1.51	0.41	59%	0.240543	0.24	
			Pervious			0.51	0.00	59%	0		
			Impervious	TSS	0.27	456.68	123.30	55%	67.81698	67.82	
			Pervious			72.78	0.00	55%	0		
Redevelopment											
Dry Pond	2010	RMC Soccer Field Restrooms	Impervious	Nitrogen	0.73	9.39	6.85	10%	0.68547	1.72	Completed
			Pervious		1.48	6.99	10.35	10%	1.03452		
			Impervious	Phosphorus	0.73	1.76	1.28	15%	0.19272	0.30	
			Pervious		1.48	0.5	0.74	15%	0.111		
			Impervious	TSS	0.73	676.94	494.17	10%	49.41662	64.38	
			Pervious		1.48	101.08	149.60	10%	14.95984		
Rainwater Harvesting	2011	RMC Freshman Dorms	Impervious	Nitrogen	0.43	9.39	4.04	43%	1.736211	1.74	Completed
			Pervious		0.00	6.99	0.00	43%	0		
			Impervious	Phosphorus	0.43	1.76	0.76	70%	0.52976	0.53	
			Pervious		0.00	0.5	0.00	70%	0		
			Impervious	TSS	0.43	676.94	291.08	85%	247.42157	247.42	
			Pervious		0.00	101.08	0.00	85%	0		

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Filterra	2011	RMC Freshman Dorms	Impervious	Nitrogen	0.35	9.39	3.29	43%	1.413195	1.59	Completed
			Pervious		0.06	6.99	0.42	43%	0.180342		
			Impervious	Phosphorus	0.35	1.76	0.62	70%	0.4312	0.45	
			Pervious		0.06	0.5	0.03	70%	0.021		
			Impervious	TSS	0.35	676.94	236.93	85%	201.38965	206.54	
			Pervious		0.06	101.08	6.06	85%	5.15508		
Wet Pond	2012	Chick-Fil-A	Impervious	Nitrogen	9.13	9.39	85.73	30%	25.71921	33.54	Completed
			Pervious		3.73	6.99	26.07	30%	7.82181		
			Impervious	Phosphorus	9.13	1.76	16.07	50%	8.0344	8.97	
			Pervious		3.73	0.5	1.87	50%	0.9325		
			Impervious	TSS	9.13	676.94	6,180.46	60%	3708.27732	3,934.49	
			Pervious		3.73	101.08	377.03	60%	226.21704		
Bioretention	2012	RMC Brock Commons	Impervious	Nitrogen	0.03	9.39	0.28	30%	0.08451	0.80	Completed
			Pervious		0.34	6.99	2.38	30%	0.71298		
			Impervious	Phosphorus	0.03	1.76	0.05	60%	0.03168	0.12	
			Pervious		0.34	0.5	0.17	50%	0.085		
			Impervious	TSS	0.03	676.94	20.31	80%	16.24656	43.74	
			Pervious		0.34	101.08	34.37	80%	27.49376		
Stream Restorations	**Date Installed or Planned**	**Location or Project**	**Length (LF)**	**POC**	**Removal Rate (lbs/LF)**				**Estimated Removal of POC**	**Total POC Removal**	**Status**
Mechumps Creek 1	2010	Cottage Green Dr to Hill Carter Pkwy	1204	Nitrogen	0.075				90.30	90.30	Completed
			1204	Phosphorus	0.068				81.87	81.87	
			1204	TSS	444.88				535,635.52	535,635.52	
Mechumps Creek by APD	2015	Adjacent to APD	210	Nitrogen	0.075				15.75	15.75	Completed
			210	Phosphorus	0.068				14.28	14.28	
			210	TSS	444.88				93,424.80	93,424.80	
											Remaining
				Total Required N Removal by 2018			44.71		**Total N Removed**	207.85	-163.14
				Total Required P Removal by 2018			9.81		**Total P Removed**	115.86	-106.05
				Total Required TSS Removal by 2018			3,326.51		**Total TSS Removed**	636,104.81	-632,778.30

Town of Ashland
Attachment 4: Cost Estimate

Type of BMP	Number Required	Unit Cost + Installation	Total Cost	Install no Later Than
Filterrra - 13x7	12	$ 30,000.00	$ 360,000.00	6/1/2018
Stream Restoration -Stony Run	1	$ 900,000.00	$ 900,000.00	6/1/2023