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Appendices:
1.0 Introduction

The J. Sargent Reynolds Community College (JSRCC) has prepared this Phase II Chesapeake Bay TMDL Action Plan (Plan) as required by JSRCC’s Municipal Separate Storm Sewer System (MS-4) Permit effective November 1, 2018 through October 31, 2023. To assist with the development of the Plan, JSRCC has utilized Part II.A.11 (TMDL Special Conditions) of the Permit and the Department of Environmental Quality’s (DEQ) Chesapeake Bay TMDL Special Condition Guidance Document (Guidance Memo No. 15-2005). Furthermore, JSRCC utilized the Virginia Geographic Information Network (VGIN), and Virginia Environmental Geographic Information Systems (VEGIS) coupled with campus GIS data to meet the technical requirements of the Plan.

The focus of this Plan is driven by the Chesapeake Bay Total Maximum Daily Load (TMDL), which was approved by the US Environmental Protection Agency (EPA) in December of 2010. Nitrogen, Phosphorous, and Sediment are the Pollutants of Concern (POC) driving the need for required pollutant reductions in the Chesapeake Bay watershed, which includes the entire JSRCC campus. Three five-year permit cycles (Phase I, Phase II, and Phase III) have been proposed to address the percent pollutant reduction required by a Municipal Separate Storm Sewer System (MS4) in Virginia. A 40% POC load reduction is required by the end of this permit cycle.

For the purposes of this Plan, the primary focus will be on Phase I and Phase II and the associated 5% and 35% reduction requirements, although the loadings and reductions have been provided for the 60% cycle for reference. Projects implemented as part of this Plan that exceed the required reductions will be tracked to meet future requirements. JSRCC may modify this Plan to include new opportunities for reductions or address projects that are deemed infeasible. JSRCC also understands that DEQ is preparing modifications to existing agency guidance and JSRCC may update this Plan accordingly once that guidance is published, especially if the modified guidance impacts this Plan or the BMPs to be implemented.

This Plan includes all of the components required by the Permit, as presented in Table 1-1:

<table>
<thead>
<tr>
<th>Component</th>
<th>Permit Section</th>
<th>Plan Section</th>
<th>Plan Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>New or Modified Legal Authorities</td>
<td>II.A.11.a</td>
<td>2.0</td>
<td>2</td>
</tr>
<tr>
<td>Load and Cumulative Reduction Calculations</td>
<td>II.A.11.b</td>
<td>3.0</td>
<td>2</td>
</tr>
<tr>
<td>Total Reductions Achieved as of July 1, 2018</td>
<td>II.A.11.c</td>
<td>1.0</td>
<td>2</td>
</tr>
<tr>
<td>BMPs Implemented prior to July 1, 2018</td>
<td>II.A.11.d</td>
<td>4.0</td>
<td>2</td>
</tr>
<tr>
<td>BMPs to be Implemented prior to Permit Expiration</td>
<td>II.A.11.e</td>
<td>5.0</td>
<td>2</td>
</tr>
<tr>
<td>Summary of Comments Received as a Result of Public Participation</td>
<td>II.A.11.f</td>
<td>6.0</td>
<td>6</td>
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</table>
2.0 New or Modified Legal Authorities

JSRCC’s relevant existing legal authorities and policies are listed below:

- MS4 Program Plan
- Illicit Discharge Detection and Elimination Policy
- Annual Standards and Specifications for Erosion and Sediment Control (through the Virginia Community College System, VCCS)
- JSRCC’s Stormwater Master Plan
- Bacteria TMDL Action Plan
- Stormwater Pollution Prevention Plan for High Priority Facilities

Based on the review of items listed above, JSRCC has no new or modified legal authorities such as ordinances, state and other permits, orders, specific contract language and/or inter-jurisdictional agreements implemented or needing to be implemented to meet the requirements of this special condition.

3.0 Load and Cumulative Reduction Calculations

3.1. 2009 Baseline Land Cover

Land cover types were delineated using JSRCC’s GIS data, construction plans, and 2009 VGIN aerial imagery. Areas that met the tree density requirements of Guidance Memo 15-2005, Appendix V.H (undeveloped and a minimum area of 900 square meters) were considered forested land cover.

Figure 3-1 shows JSRCC’s property boundary and regulated MS4 area. Lands outside of the regulated area are operated by Henrico County and will be included as part of their MS4 regulated area. The Figure also shows the 2009 baseline land cover types within the regulated area of the JSRCC Parham campus and includes a table with the acreage and overall percentage of each land cover type (impervious, pervious, forested, and open water).
Figure 3-1: Regulated MS4 Area and 2009 Baseline Land Cover
3.2. Calculations

Table 3-1 presents the pollutant load based on JSRCC’s 2009 baseline cover and the required reductions to meet 40% of the requirements.

Table 3-1: Calculation for Estimating Total Reduction Required at 40% (Table 3a from the Permit)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Regulated Urban Subsource</th>
<th>Loading Rate (lbs/ac/yr)</th>
<th>Existing Developed Lands as of 6/30/09 Served by the MS4 within the 2010 CUA (acres)</th>
<th>Load (lbs/yr)</th>
<th>Percentage of MS4 Required Chesapeake Bay Total L2 Loading</th>
<th>Percentage of L2 Required Reduction by 6/30/2023</th>
<th>40% Cumulative Reduction Required by 6/30/2023 (lbs/yr)</th>
<th>Sum of 40% Cumulative Reduction (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>Impervious</td>
<td>9.39</td>
<td>24.47</td>
<td>230</td>
<td>9%</td>
<td>40%</td>
<td>7.3</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Pervious</td>
<td>6.99</td>
<td>26.03</td>
<td>182</td>
<td>6%</td>
<td>40%</td>
<td>4.4</td>
<td></td>
</tr>
<tr>
<td>Phosphorus</td>
<td>Impervious</td>
<td>1.76</td>
<td>24.47</td>
<td>43</td>
<td>16%</td>
<td>40%</td>
<td>2.8</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>Pervious</td>
<td>0.50</td>
<td>26.03</td>
<td>13</td>
<td>7.25%</td>
<td>40%</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Sediment</td>
<td>Impervious</td>
<td>676.94</td>
<td>24.47</td>
<td>16,533</td>
<td>20%</td>
<td>40%</td>
<td>1,323</td>
<td>1,415</td>
</tr>
<tr>
<td></td>
<td>Pervious</td>
<td>101.08</td>
<td>26.03</td>
<td>2,631</td>
<td>8.75%</td>
<td>40%</td>
<td>92</td>
<td></td>
</tr>
</tbody>
</table>

1 – Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2.
2 – To determine the existing developed areas required in Column B, first determine the extent of the regulated service area based on the 2010 Census Urbanized Area (CUA). Next, delineate the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline data of June 30, 2009.
3 – Column C = Column A x Column B.
4 – Column F = Column C x Column D x Column E.
5 – Column G = the sum of the subsource cumulative reduction required by 6/30/23 (lbs/yr) as calculated in Column F.
6 – Per MS4 permit requirements, loading and reduction values greater than or equal to 10 pounds have been calculated and reported to the nearest pound. Loading and reduction values less than 10 pounds have been calculated and reported to two significant digits.
Table 3-2 presents the pollutant load based on JSRCC’s 2009 baseline cover and the reductions anticipated to meet 100% of the stated goals under the current Watershed Implement Plan.

Table 3-2: Calculation for Estimating Total Reduction Anticipated to Meet 100% of the WIP goals for POC Reduction

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Regulated Urban Subsource</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loading Rate (lbs/ac/yr)1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen</td>
<td>Impervious</td>
<td>9.39</td>
<td>24.47</td>
<td>230</td>
<td>9%</td>
<td>100%</td>
<td>21</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Pervious</td>
<td>6.99</td>
<td>26.03</td>
<td>182</td>
<td>6%</td>
<td>100%</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Phosphorus</td>
<td>Impervious</td>
<td>1.76</td>
<td>24.47</td>
<td>43</td>
<td>16%</td>
<td>100%</td>
<td>6.9</td>
<td>7.8</td>
</tr>
<tr>
<td></td>
<td>Pervious</td>
<td>0.50</td>
<td>26.03</td>
<td>13</td>
<td>7.25%</td>
<td>100%</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Sediment</td>
<td>Impervious</td>
<td>676.94</td>
<td>24.47</td>
<td>16,533</td>
<td>20%</td>
<td>100%</td>
<td>3,306</td>
<td>3,536</td>
</tr>
<tr>
<td></td>
<td>Pervious</td>
<td>101.08</td>
<td>26.03</td>
<td>2,631</td>
<td>8.75%</td>
<td>100%</td>
<td>230</td>
<td></td>
</tr>
</tbody>
</table>

1 – Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2.
2 – To determine the existing developed areas requited in Column B, first determine the extent of the regulated service area based on the 2010 Census Urbanized Area (CUA). Next, delineate the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline data of June 30, 2009.
3 – Column C = Column A x Column B.
4 – Column F = Column C x Column D x Column E.
5 – Column G = the sum of the subsource cumulative reduction required by 6/30/23 (lbs/yr) as calculated in Column F.
6 – Per MS4 permit requirements, loading and reduction values greater than or equal to 10 pounds have been calculated and reported to the nearest pound. Loading and reduction values less than 10 pounds have been calculated and reported to two significant digits.
4.0 BMPs Implemented Prior to July 1, 2018 and Associated Reductions

JSRCC has funded the design and construction of a filtering manufactured treatment device (MTD) to serve parking lots L and M. This project has been fully designed and JSRCC has secured funding for construction. Refer to Appendix A for the approved construction drawings.

Table 4-1: BMPs Implemented

<table>
<thead>
<tr>
<th>Type</th>
<th>Project Name</th>
<th>% Removal Efficiency</th>
<th>Reduction Expected (lbs/yr)</th>
<th>Implementation Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtering MTD</td>
<td>Parking Lot L and M Stormwater Retrofit</td>
<td>35% 50% 80%</td>
<td>5.72 1.14 571.9</td>
<td>Design Initiated: 11/8/2017 Construction: Complete by June 1, 2021</td>
</tr>
</tbody>
</table>

5.0 BMPs to be Implemented Prior to Permit Expiration

JSRCC is investigating options and identifying projects as funding becomes available. These options may change or be removed entirely as more preliminary analysis is completed. Additionally, other options may present themselves. JSRCC is currently evaluating which strategies would be the most cost-effective before constructing any projects.

JSRCC intends to meet the reduction requirements for this permit term through the implementation of either additional filtering MTDs or a stream restoration project. The MTDs would be installed to treat impervious parking areas that currently discharge directly to an unnamed tributary of North Run. The stream restoration project would be implemented to restore up to approximately 1,600 ft of an unnamed tributary of North Run on JSRCC’s campus.

JSRCC is currently in the process of assessing the viability and cost effectiveness of stream restoration. The College has met with Henrico County to discuss potential partnership for implementation, and has commenced preliminary assessment and design, as of September 7, 2019.

Table 5-1 has been developed to show the preliminary pollutant removal calculation of the MTDs and stream restoration project.

Table 5-1: BMPs Considered for Implementation

<table>
<thead>
<tr>
<th>Type of BMP</th>
<th>Location</th>
<th>% Removal Efficiency</th>
<th>Reduction Expected (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N  P  TSS</td>
<td>N  P  TSS</td>
</tr>
<tr>
<td>Stream Restoration</td>
<td>Unnamed Tributary of North Run</td>
<td>50% 50% 50%</td>
<td>171.85 79.14 9195.52</td>
</tr>
<tr>
<td>Filtering MTD</td>
<td>Parking Lots I, J and K, Baseball Parking Lot, Football Parking Lot</td>
<td>35% 50% 80%</td>
<td>20.24 4.03 2023</td>
</tr>
</tbody>
</table>
5.1. Stream Restoration

Approximately 1,600 linear feet of an unnamed tributary of North Run flows east to west through the middle of JSRCC’s campus. JSRCC has performed a preliminary assessment of the unnamed tributary of North Run to determine if there is potential for any stream restoration projects. Figure 5-1 shows the location of this tributary.

At the completion of any stream restoration projects and after JSRCC has officially certified all credits required for TMDL compliance, JSRCC reserves the right to share the remaining credits and implementation costs of the project with adjacent MS4s.

Figure 5-1: Potential Location of Stream Restoration Project
5.2. Additional MTD Retrofits for Parking Lots

JSRCC recognizes that at this preliminary level of analysis, only some, if any, of the additional parking lots may be viable candidates for MTD retrofits. The drainage area to each project and the potential pollutant removal have been presented for conceptual planning purposes only. These calculations were completed using a similar approach as the proposed stormwater retrofit to Parking Lots L and M.

These additional MTD retrofits are based on the Parking Lot L and M Stormwater Retrofit project and their individual calculations are shown in Table 5-2. The locations and conceptual drainage areas for parking lots K, I, and J, and the Baseball and Football parking lots are shown in Figure 5-2. These areas were partially chosen because no constructed stormwater quality improvements are presently in place.

Table 5-2: Additional Parking Lot MTD Retrofit Calculations

<table>
<thead>
<tr>
<th>Project</th>
<th>Drainage Area (acres)</th>
<th>Nitrogen (lb/yr)</th>
<th>Phosphorus (lb/yr)</th>
<th>Total Suspend Solids (lb/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Lot I and J</td>
<td>2.5</td>
<td>13.5</td>
<td>2.7</td>
<td>1,349</td>
</tr>
<tr>
<td>Parking Lot K</td>
<td>0.75</td>
<td>4</td>
<td>0.8</td>
<td>405</td>
</tr>
<tr>
<td>Baseball Parking Lot</td>
<td>0.30</td>
<td>1.6</td>
<td>0.3</td>
<td>162</td>
</tr>
<tr>
<td>Football Parking Lot</td>
<td>0.20</td>
<td>1.1</td>
<td>0.2</td>
<td>108</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3.75</strong></td>
<td><strong>20.24</strong></td>
<td><strong>4.03</strong></td>
<td><strong>2,023</strong></td>
</tr>
</tbody>
</table>
Figure 5-2: Conceptual Locations for Additional Parking Lot MTD Retrofits
6.0 Summary of Comments Received as a Result of Public Participation

JSRCC has not received any formal public comment.
Appendix A
J. SARGEANT REYNOLDS COMMUNITY COLLEGE
LOT L & M STORMWATER RETROFIT

1651 EAST PARHAM ROAD
HENRICO COUNTY, VIRGINIA

06/29/2018

PROJECT SUMMARY

ADJACENT: 1651 EAST PARHAM ROAD
PHASES: I, II, III
EXISTING USE: COMMUNITY COLLEGE
PHASE AREA: 240 ACRES
AREA OF IMPACT: SUPPORTING
DATES: NOVEMBER

NUTRIENT REMOVALS PROVIDED BY THIS PROJECT

- TP (TOKAL, WW2) 1.7 TFL/AC/Year
- TN (TOKAL, WW2) 0.1 TFL/AC/Year
- TP (TOKAL, WW2) 0.4 TFL/AC/Year

SCALE: 1" = 2,000'

VICINITY MAP