Action Plan for the James River (Tidal) Bacteria TMDL
(2013-2018 MS4 General Permit)

A Plan to Address JTCC’s Assigned Waste Load Allocation for the Chester Campus

Prepared: June 30, 2015
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This document addresses Section 1, Part B, of the General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer System. This document serves as a specific TMDL Action Plan to identify the best management practices and other interim milestone activities to be implemented to address the bacteria waste load allocation assigned to JTCC’s regulated MS4 area in the “Bacteria Total Maximum Daily Load Development for the James River and Tributaries – City of Richmond,” approved by the State Water Control Board on June 29, 2012.
EXECUTIVE SUMMARY

John Tyler Community College (JTCC), is authorized to discharge stormwater from its municipal separate storm sewer system (MS4) under the Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Discharge of Stormwater from Small MS4s (MS4 General Permit). To maintain permit compliance, JTCC implements an MS4 Program Plan that includes best management practices (BMPs) to address six minimum control measures (MCMs) and special conditions for the Total Maximum Daily Loads (TMDL) in which JTCC has been assigned a wasteload allocation (WLA). The Environmental Protection Agency (EPA) describes a TMDL as a “pollution diet” that identifies the maximum amount of a pollutant the waterway can receive and still meet water quality standards. A WLA determines the required reduction in pollutant of concern loadings from the MS4s to meet water quality standards. The MS4 General Permit serves as the regulatory mechanism for addressing the load reductions described in the TMDL, predominantly through the requirement of a TMDL Action Plan.

The purpose of this Action Plan is to address the WLA assigned to the JTCC Chester campus for the “Bacterial Total Maximum Daily Load Development for the James River and Tributaries – City of Richmond,” approved by the Department of Environmental Quality on June 29, 2012. The TMDL assigns JTCC a WLA for Escherichia coli (E.coli) of 5.03 X 10^9 cfu/day from the existing conditions. However, the TMDL states: “For MS4/VSMP permits, the permittee may address the TMDL WLAs for stormwater through the iterative implementation of programmatic BMPs.”

The Action Plan addresses E.coli in accordance with the special conditions and expectations of the TMDL by demonstrating that JTCC uses an adaptive iterative implementation of programmatic BMPs to reduce or eliminate E.coli to the maximum extent practicable. Compliance to the special conditions is demonstrated within the Action Plan through:

✓ Implementation of JTCC MS4 Program Best Management Practices (BMPs) and associated policies and procedures;
✓ BMPs integrated into the JTCC MS4 Program Plan beyond those required by the permit;
✓ Enhancement of the JTCC MS4 Public Education and Outreach Plan;
✓ An assessment of campus facilities;
✓ A methodology to measure Action Plan effectiveness through MS4 annual reporting.
Table of Contents

1.0 Introduction and Purpose .....................................................................................................1
1.1 Total Maximum Daily Loads ............................................................................................1
1.2 TMDL Special Conditions ...............................................................................................2
1.3 JTCC James River (Tidal) Action Plan .............................................................................3
2.0 The James River (Tidal) Bacteria TMDL ............................................................................4
  2.1 Wasteload Allocation .......................................................................................................4
3.0 Chester Campus Characterization in the TMDL Watershed ...............................................5
  3.1 Potential Campus Sources of E.coli ..............................................................................5
    3.1.1 Pet Waste .............................................................................................................5
    3.1.2 Facilities ............................................................................................................5
    3.1.3 Wildlife Sources ...............................................................................................5
4.0 Applicable Overview of JTCC’s MS4 Program ..................................................................7
  4.1 Legal Authority and Minimum Control Measures .........................................................7
  4.2 Practices and Controls beyond the Minimum Control Measures ..................................9
    4.2.1 Prohibition of Potential Sources ....................................................................9
    4.2.2 Increased Frequency of Staff Training .........................................................9
    4.2.3 Enhanced Public Education and Outreach Plan ...........................................9
5.0 Implementation to the MEP ...............................................................................................10

Appendices

Appendix A: Mapping for Determination of Applicable JTCC Campuses

Acronyms
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
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<tr>
<td>CUA</td>
<td>Census Urban Area</td>
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<td>CWA</td>
<td>Clean Water Act</td>
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<td>DEQ</td>
<td>Department of Environmental Quality</td>
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<td>EPA</td>
<td>Environmental Protection Agency</td>
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<td>IDDE</td>
<td>Illicit Discharge Detection and Elimination</td>
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<td>JTCC</td>
<td>John Tyler Community College</td>
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<td>LA</td>
<td>Load Allocation</td>
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<td>MCM</td>
<td>Minimum Control Measure</td>
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<td>MEP</td>
<td>Maximum Extent Practicable</td>
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<td>MOS</td>
<td>Margin of Safety</td>
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<tr>
<td>MS4</td>
<td>Municipal Separate Stormwater Sewer System</td>
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<td>MS4 GP</td>
<td>General Permit for Discharge of Stormwater from Small MS4s</td>
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<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
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<td>SWPPP</td>
<td>Stormwater Pollution Prevention Plan</td>
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<td>SWM</td>
<td>Stormwater Management</td>
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<td>TMDL</td>
<td>Total Maximum Daily Load</td>
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<tr>
<td>VAC</td>
<td>Virginia Administrative Code</td>
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<td>VSMP</td>
<td>Virginia Stormwater Management Program</td>
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<td>WLA</td>
<td>Wasteload Allocation</td>
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1.0 INTRODUCTION AND PURPOSE

Mandated by Congress under the Clean Water Act (CWA), the National Pollutant Discharge Elimination System (NPDES) storm water program includes the Municipal Separate Storm Sewer System (MS4), Construction, and Industrial General Permits. In Virginia the NPDES Program is administered by the Virginia Department of Environmental Quality (DEQ) through the Virginia Stormwater Management Program (VSMP) and the Virginia Pollutant Discharge Elimination System (VPDES). John Tyler Community College (JTCC) is authorized to discharge stormwater from its MS4 under the VPDES General Permit for Discharge of Stormwater from Small MS4s (MS4 General Permit). As part of the MS4 General Permit authorization, JTCC developed and implements a MS4 Program Plan with best management practices (BMPs) to address the six minimum control measures (MCMs) and the special conditions for applicable total maximum daily loads (TMDLs), as outlined in the MS4 General Permit. Implementation of these BMPs is consistent with the provisions of an iterative MS4 Program constituting compliance with the standard of reducing pollutants to the “maximum extent practicable.”

In 1996, the DEQ listed the James River and its tributaries on their biennial 303(d) TMDL Priority List and Report due to violations of the state’s water quality standard for fecal coliform bacteria, now expressed as *E.coli*. As a consequence, a TMDL was developed and subsequently approved on June 29, 2012, by the State Water Control Board (SWCB). The TMDL assigned MS4 Permit holders a waste load allocation (WLA) for *E.coli* discharges. The WLA represents the allowable *E.coli* load from the MS4s to prevent instances of exceedance of *E.coli* discharge water quality standards. The TMDL calculated the WLA for JTCC to be $5.03 \times 10^{09}$ colony forming units per day (cfu/day).

1.1 Total Maximum Daily Loads

A TMDL is the total maximum daily load, or the amount of pollutant a water body can assimilate and still meet water quality standards for its designated use. Typically, TMDLs are represented numerically in three main components:

- Wasteload Allocations (WLA) for point source contributions and MS4 Permit operators
- Load Allocations (LA) for non-point source contributions and natural background sources
- Margin of Safety (MOS)
Point source pollution is any single identifiable source from which pollutants are discharged. If point source discharges, including a permitted MS4, are present in the TMDL watershed, then any allocations assigned to that permittee must be in the form of a WLA. The JTCC Chester campus MS4 outfalls are defined as point source discharges and therefore fall under this category in the TMDL. Pollution that is not from an identifiable source, such as a pipe or a ditch, but rather originates from multiple sources over a relatively large area, are considered to be non-point source pollution. These sources are typically categorized into agricultural, livestock, and wildlife, with Load Allocations (LAs) assigned for each. The Margin of Safety (MOS) is a required component that accounts for the modeling uncertainty in the response of the waterbody to loading reductions and is implicitly incorporated into a TMDL computation. The TMDL is expressed in the following equation:

$$\text{TMDL} = \sum \text{WLA} + \sum \text{LA} + \text{MOS}$$

The James River (Tidal) bacteria TMDL represents the sum of calculable sources plus a margin of safety that is required to not exceed the state water quality standard for recreation of a 30-day geometric mean of 126 cfu/100 ml and an instantaneous water quality standard of 235 cfu/100 ml. The cfu/ml unit represents a volumetric concentration of viable bacteria cells that can multiply under controlled conditions.

1.2 TMDL Special Conditions
JTCC operates their regulated MS4 within a portion of the James River (Tidal) bacteria TMDL watershed and is therefore subject to the TMDL WLAs assigned to MS4s in the TMDL. The special conditions for the TMDL listed in the MS4 General Permit require JTCC to develop a TMDL Action Plan that identifies the BMPs and other interim milestone activities to be implemented during the remaining terms of this state permit and specifically:

- Includes a list of legal authorities applicable to reducing discharge of *E. coli* from the MS4
- A list of management practices and controls, beyond those required within the six minimum control measures of the MS4 General Permit, that are implemented as part of JTCC’s MS4 Program and applicable to reductions in *E. coli* discharge from the MS4;
- Enhancement of the JTCC Public Education and Outreach Plan (PEOP) and employee training program to promote methods to eliminate and reduce discharges of *E. coli* into the JTCC’s MS4;
- An identification and assessment of facilities that are owned and operated by the MS4, not covered under a separate VPDES permit, with the potential (greater than the average expected loading) to be significant sources of *E. coli* discharge to the MS4;
- A methodology to assess the effectiveness of the College’s Action Plan in reducing the discharge of *E. coli* from the college’s MS4.
1.3 JTCC James River (Tidal) Action Plan

The purpose of the JTCC Action Plan for the James River (Tidal) Bacteria TMDL is to address each of the MS4 General Permit special conditions listed in Section 1.2. As an adaptive and iterative approach to meet surface water quality goals, the Action Plan may be revised from time to time to reduce E.coli discharges from JTCC’s MS4 at the Chester campuses to the maximum extent practicable (MEP). As stated in Table 5.56 of the TMDL, “For MS4s, the permittee may address the TMDL WLAs for stormwater through the iterative implementation of programmatic BMPs.” The Action Plan is incorporated, by reference, into JTCC’s MS4 Program Plan, which outlines the best management practices that address the entirety of the conditions set forth in the MS4 General Permit.
2.0 THE JAMES RIVER (TIDAL) BACTERIA TMDL

The “Bacterial Total Maximum Daily Load for the James River and Tributaries – City of Richmond” assigns a WLA for the pollutant Escherichia coli, commonly abbreviated as E. coli. This particular bacteria is typically found in the lower intestines of warm-blooded organisms. Certain strains of the bacteria can be harmful and can survive for a limited amount of time outside of a host. Fecal contamination from these organisms, if ingested by another host, can cause serious poisoning.

A WLA was calculated for existing point sources, including MS4 permit operators, along with LAs and the MOS to meet the water quality standard and reduce the risk of waterborne illness. The TMDL was established based on a scenario where no violations of either the $E.\,\text{coli}$ geometric mean standard or the instantaneous $E.\,\text{coli}$ standard would occur. The selected scenario results in 100% reduction from straight pipes (direct human sources such as sanitary sewer discharges) and a 47% reduction in combined sewer overflows.

2.1 Wasteload Allocation

The TMDL considered potential sources of $E.\,\text{coli}$ bacteria from:

- Land Based Sources – Loadings from surface runoff characterized by land use (i.e. commercial, cropland, forest, residential, open space and wetlands). Wildlife populations, the rate of failure of septic systems, domestic pet populations, and numbers of livestock are examples of land-based nonpoint sources used to calculate $E.\,\text{coli}$ loads.
- Direct Sources – Loadings introduced directly to surface waters, including illicit sanitary sewer discharges and permitted sources.
- Combined Sewer Overflows – Loadings discharged to surface waters from combined stormwater and sanitary sewer systems.

JTCC, as a regulated MS4, received a WLA of $1.05 \times 10^{12}$ cfu/day which is computed as part of a 36.2% reduction within the James River (Tidal) TMDL watershed, although the TMDL allocation scenario is based on reductions only from the elimination of straight pipes and reduction in combined sewer overflows. The expectation of the TMDL is for JTCC to address the WLA through the “iterative implementation of programmatic BMPs.”
3.0 CHESTER CAMPUS CHARACTERIZATION IN THE TMDL WATERSHED

A review of the James River and tributaries TMDL watersheds determined that a portion of the Chester campus is subject to the TMDL WLA. Mapping for JTCC campuses in vicinity of the TMDL watersheds are provided in Appendix A. A review of the TMDL, JTCC MS4 Program Plan and a field investigation of the Chester campus resulted in the campus characterization related to potential E.coli sources described in the following sub-sections.

3.1 Potential Campus Sources of E.coli

A field investigation of the Chester campus determined no straight pipes discharge from the campus, no known septic systems exist and no livestock is present on the campus. Reduction of wildlife at the JTCC campus is not a strategy proposed by the TMDL. Of the sources considered by the TMDL, the following are further considered:

- Pet waste;
- Consistent with the special conditions of the MS4 General Permit, an evaluation of facility operations for significant sources of E.coli; and
- Wildlife populations.

3.1.1 Pet Waste

Pets are prohibited on JTCC campuses, with the exception of service animals. Therefore, pet waste is not considered a significant E.coli source.

3.1.2 Facilities

A field inspection of the Chester campus did not identify any significant source of E.coli. The conclusion based on site inspection addresses the following special condition:

✓ Assess all significant sources of pollutant(s) from facilities of concern owned and operated by the MS4 operator that are not covered under a separate VPDES permit and identify all municipal facilities that may be a significant source of the identified pollutant. [Section I(B)(2)(b)]

Although not a significant source, facilities associated with the campus solid waste stream, such as maintenance buildings and dumpsters, could potentially be a source. However, the JTCC Good Housekeeping and Pollution Prevention Manual, along with annual staff training, addresses these concerns with the implementation of best management practices (i.e. keeping dumpsters covered).

3.1.3 Wildlife Sources

The TMDL indicates that removal of all anthropogenic sources of E. coli would not allow the Neabsco Creek watersheds to meet water quality standards, as wildlife input by itself exceeds the maximum load for the recreational designation. Neither DEQ nor EPA propose elimination of wildlife to allow for attainment of this standard, and changing of the natural background conditions is not the intent of the TMDL. As such, the focus of this Action Plan is to reduce only
non-natural \textit{E. coli} sources until such time that a Use Attainability Study addresses the primary designation of the watershed.
4.0 APPLICABLE OVERVIEW OF JTCC’S MS4 PROGRAM

JTCC’s MS4 Permit regulates stormwater discharges from areas included within census urbanized areas (CUAs), including its Chester campus within the TMDL watershed. JTCC’s collective efforts, as described in the JTCC MS4 Program Plan, result in significant reduction of pollutants that could potentially be discharged from its regulated MS4. BMPs already included in the JTCC Program Plan that address E.coli are described in the following sub-sections. Each sub-section is provided to address the referenced special condition in the MS4 General Permit.

4.1 Legal Authority and Minimum Control Measures

As a non-traditional MS4, JTCC does not have the ability to create legal authorities and has not identified any necessary legal authorities necessary to meet the requirements of the special conditions. However, JTCC’s MS4 Program includes Minimum Control Measures (MCMs) that include policies and procedures consistent the goals of the MS4 General Permit special conditions. A summary of the applicable MCMs is listed below to address the following special condition:

✓ “Develop and maintain a list of its legal authorities such as ordinances, state and other permits, orders, specific contract language, and inter-jurisdictional agreements applicable to reducing the pollutant identified in each applicable WLA.” [Section I(B)(2)(a)]

- **MCM 1 (Public Education and Outreach)** – JTCC’s MS4 Program includes, by reference, a Public Education and Outreach Program (PEOP) that incorporates educational information about TMDL pollutants of concern, including E.coli. The PEOP includes, as part of the relevant message for Water Quality Issue #1, the distribution of educational materials regarding methods to reduce introduction of E.coli into stormwater runoff.

- **MCM 2 (Public Participation)** – JTCC will post this Action Plan on their stormwater pollution prevention webpage at [https://jtcc.edu/about/sustainability-at-jtcc/](https://jtcc.edu/about/sustainability-at-jtcc/). Availability of the Action Plan will increase awareness of the TMDL with web page visitors.

- **MCM 3 (Illicit Discharge Detection and Elimination)** – JTCC’s MS4 Program includes an Illicit Discharge Detection and Elimination (IDDE) Program that includes written procedures to detect, identify, and address non-stormwater discharges, including illegal dumping, to the small MS4 with policies and procedures for when and how to use legal authorities. JTCC prohibits non-stormwater discharges into the storm sewer system through language provided within the Standards of Conduct for employees and the Student Handbook for students. IDDE BMPs are described in the Minimum Control Measure 3 BMPs in the JTCC MS4 Program Plan. The IDDE Program is effective at addressing the POC through staff training, prohibition of illicit discharges, and annual outfall screening.
MCM 4 (Construction Site Runoff Control) – JTCC’s MS4 Program includes a Construction Site Runoff Control Program that includes mechanisms to ensure compliance and enforcement on regulated construction sites with implementation of the DEQ-approved “VCCS Annual Erosion and Sediment Control and Stormwater Management Standards and Specifications.” The standards and specifications are consistent with the Virginia Erosion and Sediment Control and Stormwater Management Laws and Regulations and includes:

- Required plan approval prior to commencement of a regulated land disturbance activity;
- Construction site inspections and enforcement; and
- Certification of post-construction stormwater management facilities.

Through inspections and enforcement, especially in regards to stormwater pollution prevention plan (SWPPP) inspections, potential for *E.coli* discharges (i.e. port-a-johns) is minimized. Minimum Control Measure 4 BMPs in the JTCC MS4 Program Plan describe construction site runoff control BMPs.

MCM 5 (Post-Construction Stormwater Management) – JTCC’s MS4 Program includes a Post-Construction SWM Program that ensures water quality criteria in the Virginia Stormwater Management Regulations has been achieved on new developments and developments on prior developed land. Included among these requirements are written policies and procedures in the VCCS Erosion and Sediment Control and Stormwater Management Standards and Specifications to ensure that stormwater management facilities are designed and installed in accordance with appropriate law and regulations. Although the facilities are designed to achieve target phosphorus reductions, many water quality BMPs also are effective at *E.coli* removal. Post-construction, the Program includes schedules and written procedures to ensure long-term inspections and maintenance of stormwater management BMPs. Minimum Control Measure 5 BMPs in the JTCC MS4 Program Plan describe post-construction stormwater management BMPs.

MCM 6 (Good Housekeeping) – JTCC’s MS4 Program includes a Pollution Prevention/Good Housekeeping Program that includes policies and procedures to ensure that day-to-day operations minimize the exposure of pollutants to rainfall on campus grounds to the maximum extent practicable. The program is supported with JTCC’s Pollution Prevention & Good Housekeeping Manual and annual training for applicable staff. Minimum Control Measure 6 BMPs in the JTCC MS4 Program Plan describe pollution prevention and good housekeeping BMPs.

No new policies and procedures or modifications to existing policies and procedures were identified as necessary to meet the requirements of the special conditions.
4.2 Practices and Controls beyond the Minimum Control Measures
JTCC has existing prohibitions and increased training aimed to improve the water quality of the local waterways. Each of the TMDL scenarios allocated source for reductions is addressed in the following sub-sections to address the following special conditions:

✓ “Identify and maintain an updated list of all additional management practices, control techniques and system design and engineering methods, beyond those identified in Section II V, that have been implemented as part of the MS4 Program Plan that are applicable to reducing the pollutant identified in the WLA.” [Section I(B)(2)(b)]

4.2.1 Prohibition of Potential Sources
Pets and livestock are prohibited on JTCC campuses, with the exception of service animals. If unauthorized use of JTCC property becomes an issue in the future, specific policies, stricter enforcement, or other actions may be incorporated into this Action Plan.

4.2.2 Increased Frequency of Staff Training
As part of the JTCC Public Education and Outreach Plan, the permit required staff training frequency is increased from biennially to annually. Training is based on the “JTCC Good Housekeeping/Pollution Prevention Manual” that includes discussion regarding TMDLs. The increased frequency of applicable staff training is expected to reduce the potential of E.coli exposure to precipitation and subsequent runoff discharge.

4.2.3 Enhanced Public Education and Outreach Plan
As previously mentioned, JTCC lists “information regarding TMDL pollutants of concern,” including E.coli, into the relevant message of “Water Quality Issue #1: Public education on stormwater impacts” of the JTCC Public Education and Outreach Plan. As a result, the target audience, including all students, faculty and staff receive an email that in part, provides information promoting the elimination and reduction of E.coli. The inclusion of information regarding E.coli sources in stormwater runoff into the Public Education and Outreach Program and staff training materials addresses the following permit special condition:

✓ “General Permit SEC I.B.2.c: Enhance [its] public education and outreach and employee training programs to also promote methods to eliminate and reduce discharges of the pollutants identified
5.0 IMPLEMENTATION TO THE MEP
JTCC will implement the MS4 Program components described in Section 4 to reduce the potential of E. coli discharge to surface waters to the maximum extent practicable. The method of assessment is implemented through the annual reporting process with the review of the effectiveness of each MS4 Program Plan BMP. Interim milestone activities consist of the annually reported implementation of the Program components described herein; therefore addressing the following special condition:

✓ “Develop and implement a method to assess TMDL Action Plans for their effectiveness in reducing the pollutants identified in the WLAs.” [Section I(B)(2)(e)]
Appendix A: Mapping for Determination of Applicable JTCC Campuses
Legend
- James River E.Coli TMDL Watershed
- JTCC Midlothian Campus

John Tyler Community College - Midlothian
James River and Tributaries E. Coli TMDL

EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Projection: NAD 1983 StatePlane Virginia North FIPS 4501 Feet

Chesterfield, Virginia
Sources: ESRI National Geographic Basemap