Action Plan for the James River (Tidal) Bacteria TMDL

(2018-2023 MS4 General Permit)

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

John Tyler Community College

Chester Campus

Permit #VAR040110
Prepared: June 30, 2015
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This document addresses Part II 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 Environmental Protection Agency on November 4, 2010.

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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 EPA on November 4, 2010. The TMDL assigns JTCC a WLA for *Escherichia coli* (*E.coli*) of *5.03E+09* colony forming units per year (cfu/year)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 Program;
- An assessment of campus facilities; and
- A methodology to measure Action Plan effectiveness through MS4 annual reporting.

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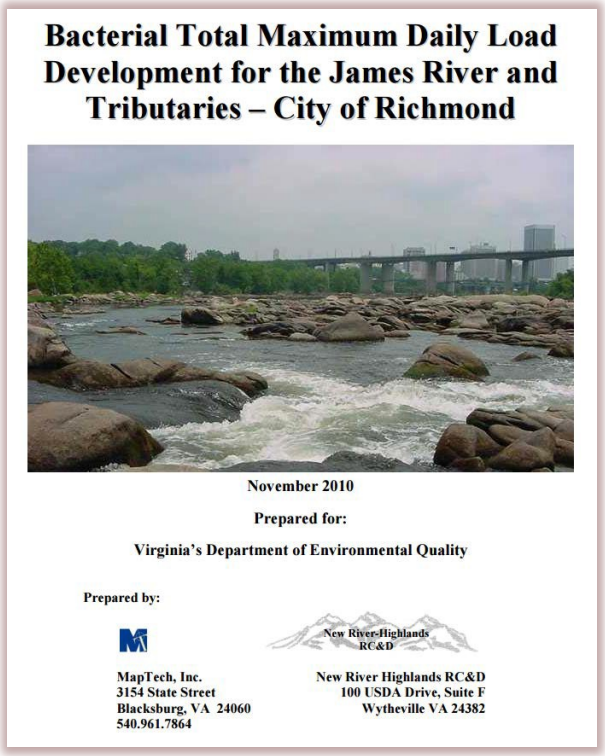
APPENDIX

ACRONYMS

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

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 by the EPA on November 4, 2010. 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 *5.03E+09* colony forming units per year (cfu/year).

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:

$$TMDL = \sum WLA + \sum LA + MOS$$

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 standard 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 local TMDL Action Plan designed to reduce loadings for pollutants of concern where JTCC is given a WLA to an impaired water for which a TMDL has been approved by the EPA as described below:

- For TMDLs approved by the EPA prior to July 1, 2013, and in which an individual or aggregate wasteload has been allocated to JTCC, JTCC shall update the previously approved local TMDL action plans to meet the conditions of Part II B 3, B 4, B 5, B 6, and B 7 as applicable, no later than 18 months after the permit effective date and continue implementation of the action plan; and
- For TMDLs approved by EPA on or after July 1, 2013, and prior to June 30, 2018, and in which an individual or aggregate wasteload has been allocated to JTCC, JTCC shall develop and initiate implementation of action plans to meet the conditions of Part II B 3, B 4, B 5, B 6, and B 7 as applicable for each pollutant for which wasteloads have been allocated to JTCC's MS4 no later than 30 months after the permit effective date.

JTCC shall complete implementation of the TMDL action plans as soon as practicable. TMDL action plans may be implemented in multiple phases over more than one permit cycle using the adaptive iterative approach provided adequate progress is achieved in the implementation of BMPs designed to reduce pollutant discharges in a manner that is consistent with the assumptions and requirements of the applicable TMDL.

Each local TMDL action plan developed by JTCC shall include the following:

- The TMDL project name;
- The EPA approval date of the TMDL;
- The wasteload allocated to JTCC (individually or in aggregate), and the corresponding percent reduction, if applicable;
- Identification of the significant sources of the pollutants of concern discharging to JTCC;s MS4 and that are not covered under a separate VPDES permit. For the purposes of this requirement, a significant source of pollutants means a discharge where the expected pollutant loading is greater than the average pollutant loading for the land use identified in the TMDL;
- The BMPs designed to reduce the pollutants of concern in accordance with Parts II B 4, B 5, and B 6;
- Any calculations required in accordance with Part II B 4, B 5, or B 6;
- For action plans developed in accordance with Part II B 4 and B 5, an outreach strategy to enhance the public's education (including employees) on methods to eliminate and reduce discharges of the pollutants; and
- A schedule of anticipated actions planned for implementation during this permit term.

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 Part II B. 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 second footnote in Table 5.46 of the TMDL, "For MS4/VSMP permits, 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. These particular bacteria are 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. coli* geometric mean standard or the instantaneous *E. 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.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.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 *1.38E+07* 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*.

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

Wildlife has been determined to be a source of *E.coli* at JTCC. Specifically, waterfowl and other birds are assumed to present an increased loading of *E.coli* as they migrate towards stormwater management facilities and roam the campus. This presents the most likely scenario where JTCC should focus efforts in reducing loading identified in the TMDL WLA.

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.

4.1. Minimum Control Measures

The General Permit requires the Program Plan to include BMPs to address the requirements of six MCMs described in Part I E of the General Permit. BMPs already included in the JTCC Program Plan that address *E.coli* are summarized below.

4.1.1. 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 efforts communicate that E.coli is a major contributor of concern and includes, as part of the relevant message for identifying methods to reduce introduction of *E.coli* into stormwater runoff.

4.1.2. MCM 2 Public Involvement and Participation

JTCC's MS4 program includes the public involvement and participation effort to post this Action Plan on their stormwater pollution prevention webpage at https://jtcc.edu/about/sustainability-at-jtcc/. Availability of the Action Plan will increase awareness of the TMDL with web page visitors.

4.1.3. 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 Pollutant of Concern (POC) through staff training, prohibition of illicit discharges, and annual outfall screening.

4.1.4. MCM 4 Construction Site Runoff Control Program

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.

4.1.5. 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 have been achieved on new developments and developments on previously 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.

4.1.6. 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.

5.0 IMPLEMENTATION OF THE STRATEGY TO REDUCE BACTERIA

JTCC has existing BMPs designed to reduce the pollutants of concern. An outreach strategy has been implemented to enhance the public's education (including employees) on methods to eliminate and reduce discharges of the pollutants, with a schedule of anticipated actions planned for implementation during this permit term.

JTCC is not an approved VSMP authority; therefore, JTCC shall select at least one strategy listed in Table 1 below designed to reduce the load of bacteria to the MS4 relevant to sources of bacteria applicable within the MS4 regulated service area. Selection of the strategies shall correspond to sources identified in Part II B 3 d of the General Permit.

Table 1: Strategies for Bacteria Reduction Stormwater Control/Management Strategy

Source	Strategies (provided as an example and not meant to be all inclusive or limiting)
Domestic pets (dogs and cats)	Provide signage to pick up dog waste, providing pet waste bags and disposal containers. Adopt and enforce pet waste ordinances or policies, or leash laws or policies. Place dog parks away from environmentally sensitive areas. Maintain dog parks by removing disposed of pet waste bags and cleaning up other sources of bacteria. Protect riparian buffers and provide unmanicured vegetative buffers along streams to dissuade stream access.
Urban wildlife	Educate the public on how to reduce food sources accessible to urban wildlife (e.g., manage restaurant dumpsters and grease traps, residential garbage, feed pets indoors). Install storm drain inlet or outlet controls. Clean out storm drains to remove waste from wildlife. Implement and enforce urban trash management practices. Implement rooftop disconnection programs or site designs that minimize connections to reduce bacteria from rooftops Implement a program for removing animal carcasses from roadways and properly disposing of the same (either through proper storage or through transport to a licensed facility).

Table 1: Strategies for Bacteria Reduction Stormwater Control/Management Strategy	
Source	**Strategies** **(provided as an example and not meant to be all inclusive or limiting)**
Illicit connections or illicit discharges to the MS4	Implement an enhanced dry weather screening and illicit discharge, detection, and elimination program beyond the requirements of Part I E 3 to identify and remove illicit connections and identify leaking sanitary sewer lines infiltrating to the MS4 and implement repairs. Implement a program to identify potentially failing septic systems. Educate the public on how to determine whether their septic system is failing. Implement septic tank inspection and maintenance program. Implement an educational program beyond any requirements in Part I E 1 though E 6 to explain to citizens why they should not dump materials into the MS4.
Dry weather urban flows (irrigations, car washing, powerwashing, etc.)	Implement public education programs to reduce dry weather flows from storm sewers related to lawn and park irrigation practices, car washing, powerwashing and other nonstormwater flows. Provide irrigation controller rebates. Implement and enforce ordinances or policies related to outdoor water waste. Inspect commercial trash areas, grease traps, washdown practices, and enforce corresponding ordinances or policies.
Birds (Canadian geese, gulls, pigeons, etc.)	Identify areas with high bird populations and evaluate deterrents, population controls, habitat modifications and other measures that may reduce bird-associated bacteria loading. Prohibit feeding of birds.

Table 1: Strategies for Bacteria Reduction Stormwater Control/Management Strategy	
Other sources	Enhance maintenance of stormwater management facilities owned or operated by the permittee. Enhance requirements for third parties to maintain stormwater management facilities. Develop BMPs for locating, transporting, and maintaining portable toilets used on permittee-owned sites. Educate third parties that use portable toilets on BMPs for use. Provide public education on appropriate recreational vehicle dumping practices.

In the 2019-2020 MS4 Permit cycle, JTCC has selected one strategy from the list in Table 1 to further reduce the load of bacteria to the MS4. Because wildlife is deemed a potential source of *E.coli*, JTCC is including in an educational brochure information on how the public can reduce food sources accessible to urban wildlife and a prohibition that bans feeding of the birds to improve the water quality of the local waterways.

In future permit years JTCC will, at a minimum, select one strategy from the table above. This proposed strategy will be included in the annual MS4 Program Plan update and implementation will be reported during the annual MS4 reporting process.

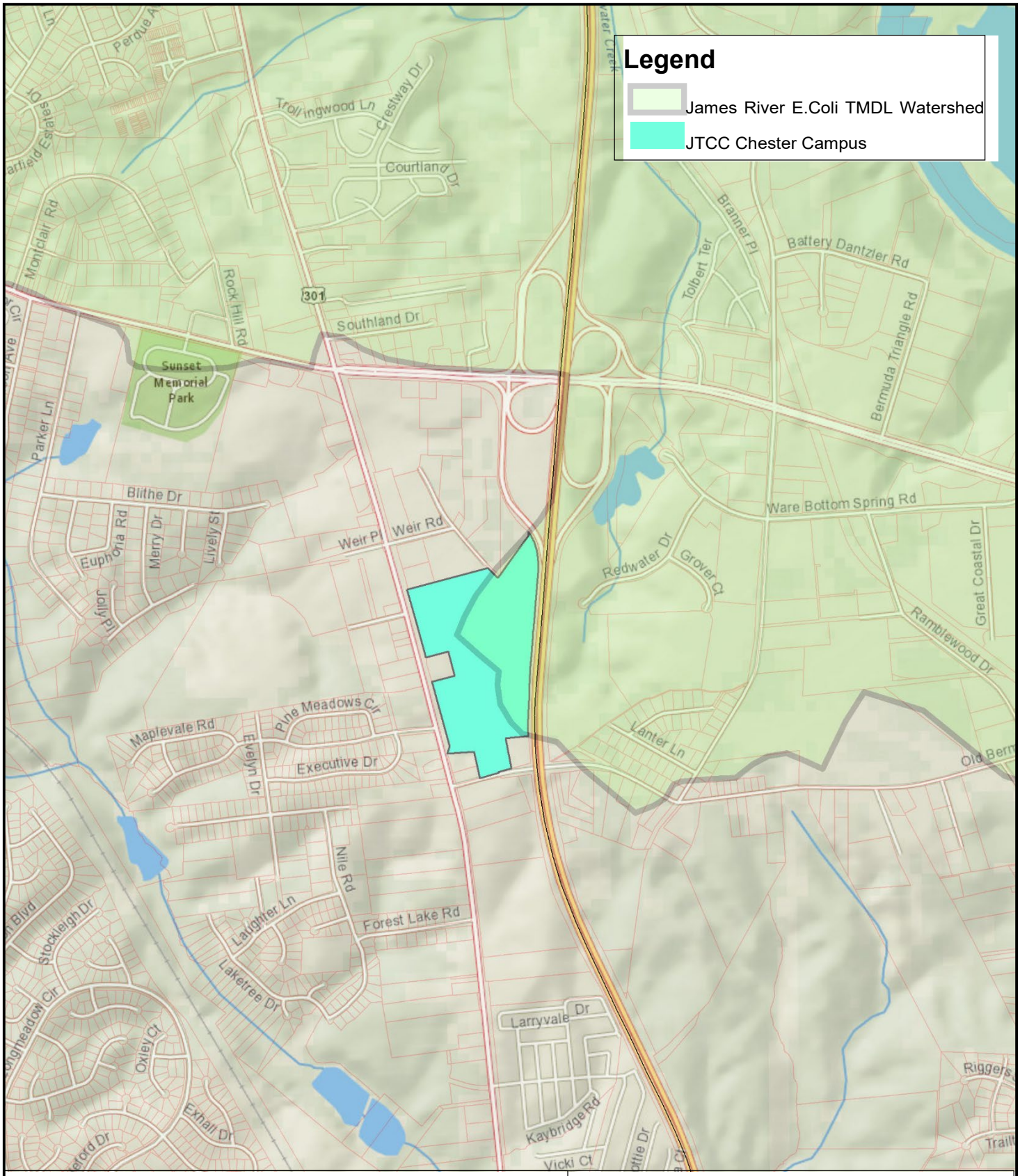
6.0 SCHEDULE

JTCC will implement the practices and controls described in Section 4 to reduce the potential of *E.coli* discharged to surface waters to the maximum extent practicable. In accordance with Part II B 2 and Part II B 3 (h), respectively, JTCC will complete implementation of the TMDL action plan as soon as practicable, with the schedule of anticipated actions planned for implementation during this permit term shown below in Table 2. The method of assessment is implemented through the annual reporting process with the review of the effectiveness of each MS4 Program Plan BMP.

Table 2: Schedule of Anticipated Actions Planned for Implementation of Bacteria Reduction Stormwater Control/Management Strategies

Year	Strategies	Method	Completion Date
2020-2021	Educate the public on how to reduce food sources accessible to urban wildlife.	Distribution of the educational brochure	Annually (by June 30)
Future Permit Years	Select at least one strategy from Table 1 and include in the MS4 Program Plan.	To be determined	Annually (by June 30)

Appendix A: Map for Determination of Applicable JTCC Campuses



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

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Feet

Chesterfield, Virginia
Sources: ESRI National Geographic Map