Chickahominy River and Tributaries Bacteria TMDL Action Plan

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This Action Plan is developed to: (1) address applicable sections of Part II.B of the Commonwealth's General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems and (2) for consistency with the *E. coli TMDL Development for Chickahominy River and Tributaries, VA*, approved by EPA on September 19, 2012.

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Executive Summary

J. Sargeant Reynolds Community College (JSRCC) is permitted to discharge stormwater from the college's Parham Road municipal separate storm sewer system (MS4) by maintaining coverage under the General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Small MS4s (MS4 General Permit). In part, the MS4 General Permit requires the college to meet special conditions for a Total Maximum Daily Load (TMDL) when the college has been assigned a waste load allocation (WLA). JSRCC has been assigned a WLA for the Parham Road campus with the *E. coli TMDL Development for Chickahominy River and Tributaries, VA*, approved by the Environmental Protection Agency (EPA) on September 19, 2012. Assignment of the WLA necessitates the development and implementation of a TMDL Action Plan. Per the TMDL, MS4 permittees, such as JSRCC, may address the TMDL WLA through the iterative implementation of programmatic BMPs. The BMPs to address the WLA are described in the JSRCC MS4 Program Plan available on the college's stormwater webpage and within this action plan.

This Action Plan supersedes and replaces previous versions of the JSRCC Chickahominy River and Tributaries Bacteria TMDL Action Plan and evaluates results achieved thus far, demonstrating the college achieves the WLA consistent with the intent of the TMDL and MS4 General Permit. The action plan also characterizes the bacteria source loadings from the Parham Road campus and the WLA. In summary, the action plan describes the programmatic BMPs in place to address the WLA, specifically with:

- ✓ Continued implementation of the existing MS4 Program Plan BMPs that could impact bacteria loading from the MS4;
- ✓ Modification of MS4 Program supporting documents, as applicable, to include information regarding bacteria as a local TMDL pollutant of concern; and with
- ✓ Providing and maintaining pet waste stations on campus.

This action plan is part of the JSRCC MS4 Program Plan, by reference, and implementation will be annually reported as part of JSRCC's MS4 annual reporting requirements.

1.0 Introduction

JSRCC has developed, maintains, implements and enforces a municipal separate storm sewer system (MS4) program designed to reduce the discharge of pollutants from the college's MS4 to the maximum extent practicable (MEP). The program is designed in accordance with the *General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Small MS4s*, also known as the MS4 General Permit. The program is intended to protect water quality and to satisfy the water quality requirements of the State Water Control Law and its attendant regulations. JSRCC utilizes the legal authority provided by the laws and regulations of the Commonwealth of Virginia to control discharges, into and from, the college's MS4 consistent with the MS4 General Permit. Legal authorities include college policies and specific contract language, as applicable.

Compliance with the MS4 General Permit is dependent on the implementation of best management practices (BMPs) to address the requirements described in the permit, including special conditions associated with applicable total maximum daily loads (TMDLs). A TMDL is a study producing a calculation of the maximum amount of an impairing pollutant that can enter a waterbody while still maintaining water quality standards (including a margin of safety). A TMDL assigns pollutant reduction targets and allocates allowable loadings of the pollutant(s) to point source discharges, including discharges from regulated MS4s such as JSRCC. The allocations to MS4s, known as waste load allocations (WLAs), represent the amount of the pollutant the MS4 permittee is allowed to discharge annually, often translated to a percent reduction of the existing (baseline) annual pollutant loading. JSRCC's Parham Road campus has been assigned a WLA for bacteria (*E. coli*) in an Environmental Protection Agency (EPA) approved total maximum daily load (TMDL) for the Chickahominy River and Tributaries to which JSRCC stormwater runoff discharges.

Map Tech Inc., prepared the TMDL report entitled "*E. coli TMDL Development for Chickahominy River and Tributaries, VA*," dated may 2012 and approved by the EPA on September 19, 2012. The TMDL was developed as required by Section 303(d) of the Clean Water Act (CWA) and the EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) since a 7.54-mile stream segment (Segment ID: VAP-G06R_CHK01A98) along the Chickahominy River, located downstream of JSRCC' Parham Road campus, was listed in 2008 as impaired on Virginia's Section 303(d) Report of Impaired Waters (see Figure 1 for

watershed location). The impairment designation is the result of a water quality assessment that found water quality violations of the general standard for fecal coliform and did not support its designated use of recreation/swimming.

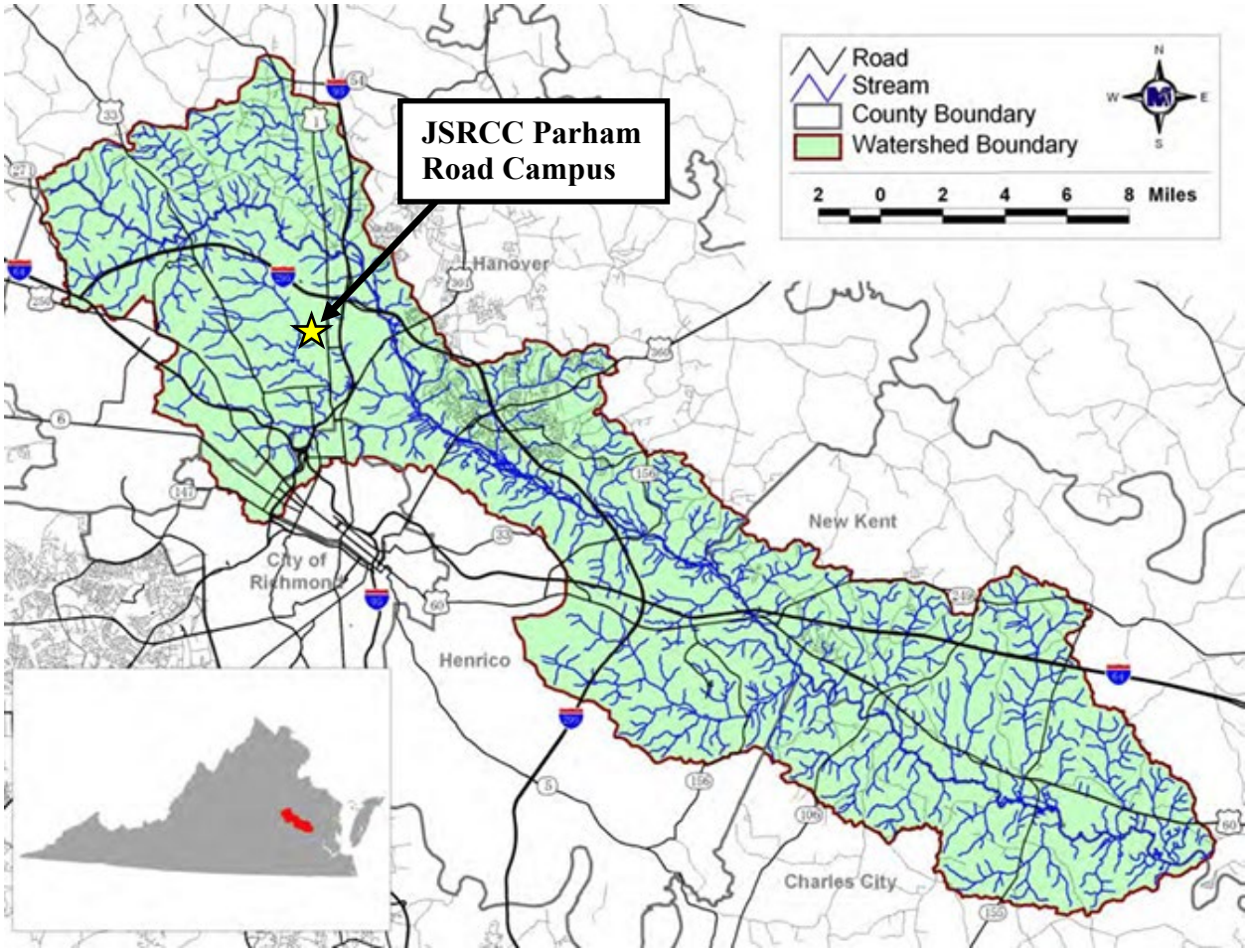

Figure 1. Location map of the impaired Chickahominy River and Tributaries watershed (from Figure 1.1 of the TMDL Report with JSRCC location added). Total area is approximately 194,000 acres.

As a result of the assignment of a WLA, the college is required to develop and implement a TMDL Action Plan. For consistency with the MS4 General Permit, this Action Plan is required to include the following:

- ✓ TMDL Project Name and EPA approval date (Project name is the name of this Action Plan and EPA approval date is provided on the Action Plan Cover and Page 1);
- ✓ The WLA allocation and the corresponding percent reduction (Section 2.2);

- ✓ Identification of any significant sources of sediment discharging to the college's MS4 (Section 2.3);
- ✓ The BMPs designed to reduce the pollutant of concern, including a calculation of the anticipated load reduction achieved from BMP(s) and the anticipated end date that the WLA will be achieved (Section 3; Note: BMPs ongoing, thus end date already annually achieved);
- ✓ Schedule of anticipated actions planned for implementation during the permit term (Section 3.4 and 4.1); and an
- ✓ Outreach strategy to enhance the public's education on methods to eliminate and reduce discharges of sediment (Section 3.3).

In addition, this updated Action Plan also provides:

- ✓ An evaluation of the results achieved by the previous action plan (Section 4); and
- ✓ Any adaptive management strategies incorporated into updated action plans based on action plan evaluation (Section 4.3).

2.0 MS4 Bacteria Discharge Characterization

The annual bacteria load discharged from JSRCC's Parham Road campus and the required annual reduction per the TMDL are provided in this Section. Additional discussion is available within the "*E. coli TMDL Development for Chickahominy River and Tributaries, VA*," referred to as the Chickahominy River Bacteria TMDL for the remainder of this Action Plan.

2.1 Bacteria Loadings

TMDL studies use modeling efforts to estimate pollutant loadings from the land surfaces within a watershed, as is the case with the Chickahominy River Bacteria TMDL. The Hydrologic Simulation Program-Fortran (HSPF) model was selected and used as a tool to predict in-stream water quality conditions under varying scenarios of rainfall and bacteria loadings. HSPF is a hydrologic, watershed-based water quality model. Generally, this means that HSPF accounts for the specific watershed conditions, the seasonal variations in rainfall and climate conditions, and activities and uses related to bacteria loading. The HSPF model is a continuous simulation model that can account for non-point source pollutants in runoff, as well as pollutants entering the flow channel from point sources. Hydrologic parameters collected for the watershed were used to calibrate and validate the simulated flow. The simulated bacteria concentration was calibrated by comparing model simulations of bacteria to observed bacteria values collected by DEQ at multiple locations. The bacteria concentration was validated using a different time period from the calibration period.

Land use in the study area was characterized using the National Land Cover Database 2001 (NLCD), as illustrated in Figure 2. The drainage area is predominantly forest with woodlands covering approximately 50% of the area. Developed areas in the watershed comprise roughly 16%. Pasture and hay land covers account for roughly 12% of the drainage area with croplands covering around 6% of the area. Wetlands are a sizable portion covering roughly 10% of the drainage area. Lands designated as commercial account for around 5% with water and barren comprising around 1% each. For MS4 areas, the TMDL describes sources of bacteria from land-based sources (pet, human, wildlife) which can be present in the runoff.

The MS4 loads within the watershed are aggregated, also including MS4 permitted areas for Henrico County, VDOT (in Henrico County), Hanover County, VDOT (in Hanover County), the Town of Ashland, the City of Richmond and VDOT (in the City of Richmond). Baseline

loads were calculated as the loads coming from impervious surfaces within the MS4 permit boundaries after load allocation is completed. Source loads on contributing lands are identified and quantified. Once allocation is completed, the load coming from the impervious portion of the contributing lands is estimated and summed to represent the MS4 load. Baseline bacteria loading for MS4 permitted areas was not explicitly provided in the Chickahominy River Bacteria TMDL report.

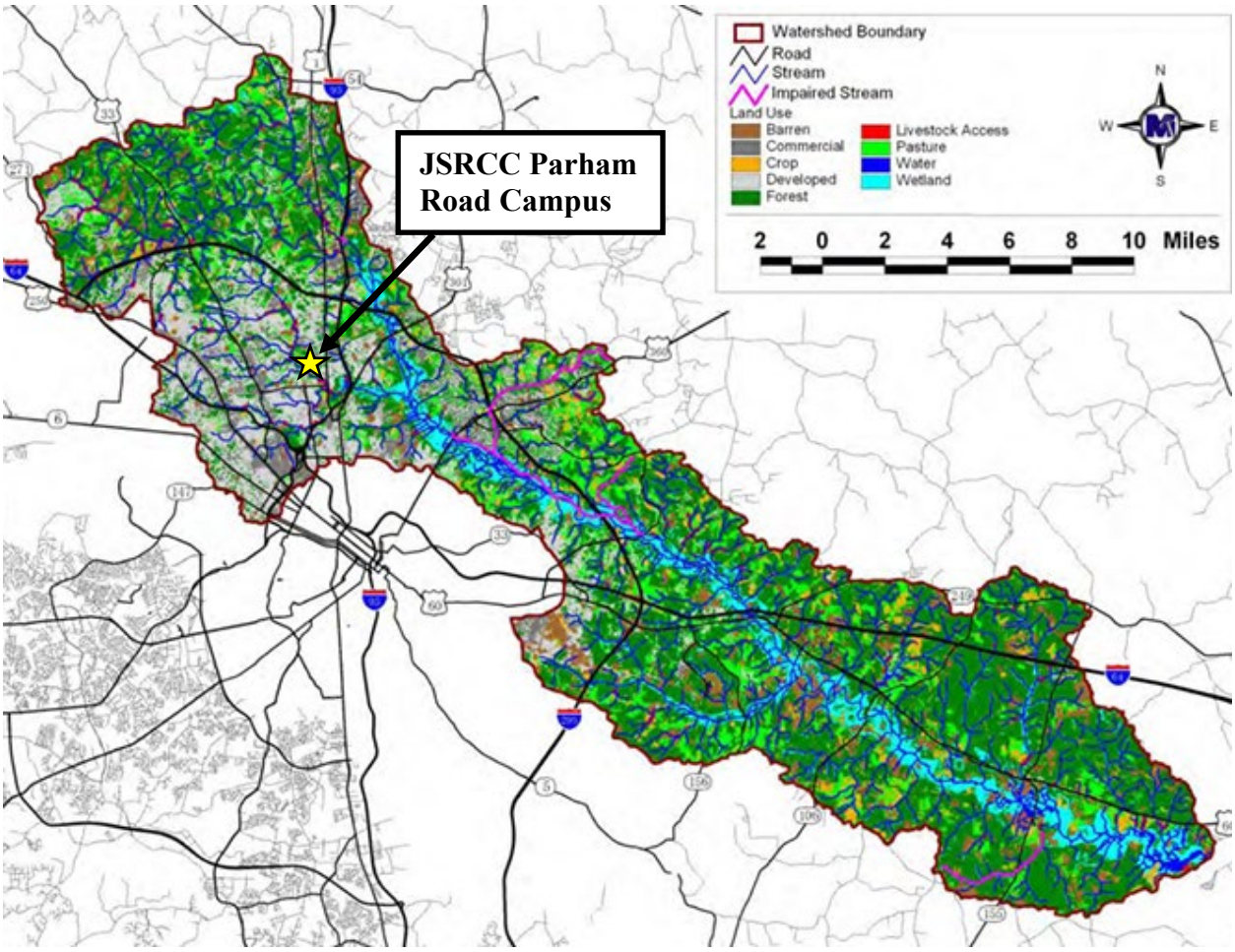

Figure 2. Land use within the impaired Chickahominy River and Tributaries watershed (from Figure B.2 of the TMDL Report with JSRCC location added).

2.2 Waste Load Allocation

Modeling results from the Chickahominy River Bacteria TMDL report provide a WLA for JSRCC as provided in Table 1. Percent reductions are provided in the report by source, characterized as land based or direct sources as summarized in Table 2.

Table 1. WLAs for *E.coli* bacterial loadings for the JSRCC Parham Road campus.

WLA (cfu/year)[1]	WLA (cfu/day)[1]	Percent Reduction[2]
3.50E+08	9.58E+05	99%

[1] cfu = colony forming units

[2] Percent reduction not explicitly provided in the TMDL for JSRCC and the baseline loading is not provided. However, percent reduction shown is per the TMDL for developed lands.

Table 2. Percent reductions designated in the Chickahominy River Bacteria TMDL report based on estimated baseline loadings and allocated loadings.

Source		Percent Reduction
Land Based	Developed	99%
	Commercial	77%
	Barren	77%
	Forest	77%
	Pasture	99%
	Cropland	99%
	Wetland	77%
	Livestock pasture access near flowing streams	99%
Direct	Human (septic)	100%
	Livestock	100%
	Wildlife	77%
	VPDES permit VA0004031 (Tyson Food, Inc.)	0%
	Sanitary Sewer Overflows	100%
	Future Growth	N/A

2.3 Identification of Significant Sources of Bacteria

The MS4 General Permit requires this Action Plan identify significant sources of bacteria discharging to JSRCC's MS4. The permit defines a "significant source" as a discharge where the expected bacteria loading is greater than the average bacteria loading for the land use identified in the TMDL. Annual field inspection of the JSRCC Parham Road campus has not identified any significant source of bacteria where bacteria discharge would be expected to be greater than the average bacteria loading for developed land. However, potential sources on campus may include those listed in Table 3.

Table 3. Potential bacteria sources to surface waters from the JSRCC Parham Road Campus.

Potential Source of Bacteria Discharge to Surface Waters*	Campus Characterization from Annual Assessments
Sanitary sewer overflow	No reported, known or observed overflows from campus sanitary sewer.
Leaky or broken sanitary sewer infrastructure	No reported or known leaky/broken sanitary sewer. Annual outfall inspections have not identified any indication of discharge from the college's sanitary sewer.
Illicit discharge to MS4	Annual outfall inspections have not identified instances of illicit discharge associated with bacteria.
Domestic pet waste	With campus immediately adjacent to residential areas with residents that walk pets on campus, there is potential for pet waste to be a source from campus.
Urban wildlife	Within the MS4 drainage areas, wildlife from adjacent forest could potentially present as a source to the MS4. However, assessment has not identified wildlife as a significant source. It is note that neither Virginia nor EPA propose elimination of wildlife to achieve WLA objectives.

* No significant sources identified on campus.

3.0 Methods to Achieve the WLA

Pollutant reductions from stormwater discharge can be achieved using a variety of practices and methods. Selection of the appropriate practices and methods is dependent on variables such as physical opportunities, the scale of required reductions and cost effectiveness. Per the TMDL, MS4 permittees, such as JSRCC, may address the TMDL WLA through the iterative implementation of programmatic BMPs. JSRCC maintains consistency with the intent of the TMDL with the ongoing implementation of the college's MS4 program plan BMPs that minimize discharge of bacteria from the MS4. The following sections describe the applicable BMPs incorporated into the JSRCC MS4 Program Plan to minimize bacteria discharges to surface waters from the Parham Road campus.

3.1 MS4 Program BMPs Applicable to Reduction of Bacteria Loadings

Continued implementation of the JSRCC MS4 Program Plan BMPs constitutes compliance with the MS4 General Permit's standard of reducing pollutants to the maximum extent practicable, provides adequate progress in meeting water quality standards, and satisfies the appropriate water quality requirements of the State Water Control Law and its attendant regulations. JSRCC's MS4 Program Plan includes a description of each BMP, the necessary standard operating procedures (SOPs) or policies necessary to implement each BMP, the measurable goal by which each BMP or strategy will be evaluated; and the persons, positions, or departments responsible for implementing each BMP. Annually implemented BMPs applicable to addressing bacteria discharges are listed in Table 4, along with any changes implemented to supporting program materials to incorporate bacteria as a local TMDL pollutant of concern.

Table 4. JSRCC MS4 Program Plan BMPs annually implemented that have potential to reduce bacteria loadings at the Parham Road Campus.

BMP ID	BMP Description	Bacteria TMDL Action
BMP 1A	Public Education and Outreach Plan - Water Quality Issue # 3 - Increase staff knowledge regarding pollutants of concern for TMDLs.	Educational materials modified to include discussion of bacteria as a local pollutant of concern.
BMP 2A	Publicly accessible JSRCC Stormwater Management Webpage.	The JSRCC Bacteria Action Plan is maintained on the webpage for public access and solicitation for comment.
BMP 2B	Procedures for Receipt/Response to Public Comment.	Address any public comment received on the Action Plan. Comments/responses will be incorporated into an appendix to this Action Plan, as appliable.
BMP 3A	Maintain MS4 Map and Info Table	Maintain map updates per the MS4 Program Plan. Use to track potential bacteria illicit discharges, if observed.
BMP 3B	Prohibition of Unauthorized Nonstormwater Discharges.	Continue enforcement per the MS4 Program Plan and JSRCC policy.
BMP 3C	IDDE Written Procedures.	Continue implementation per the MS4 Program Plan and MS4 Staff Handbook.
BMP 4A	Address Discharge from Construction Activities.	Continue implementation of VCCS Standards and Specifications for ESC and SWM for land disturbance activities, as applicable. This includes VAR10 SWPPP implementation for applicable land disturbance.
BMP 4B	Controls to prevent nonstormwater discharges during construction activities.	
BMP 5A	Address post-construction stormwater runoff.	
BMP 5B	Inspection/maintenance of stormwater management facilities.	Continue implementation per the MS4 Program Plan.
BMP 6A	Written procedures for good housekeeping/pollution prevention.	Includes information on bacteria as a local TMDL pollutant of concern.
BMP 6B	Stormwater Pollution Prevention Plan for High Priority/High Potential Facilities.	Continue implementation per the MS4 Program Plan, as applicable. Annual SWPPP assessments inherently identify potential bacteria discharge to the MS4.
BMP 6D	Contractor requirements to utilize controls to minimize pollutant discharges.	
BMP 6E	Training Plan for Applicable Employees.	Bacteria is incorporated into training material as a local TMDL pollutant of concern.
BMP SC2	JSRCC Chickahominy River and Tributaries Bacteria Action Plan.	Action Plan is incorporated into the MS4 Program Plan. (See also Section 4.2)

3.2 Bacteria-Specific Strategy

The MS4 General Permit requires JSRCC select to annually implement at least one of the bacteria-specific strategy listed in Table 5 and incorporate it into the TMDL Action Plan.

Table 5. Strategies for bacteria loading reduction per the MS4 General Permit. One strategy must be selected and implemented as part of this Action Plan.

Source	Strategies (provided as examples - not all-inclusive or limiting)[1]	Action Plan Note
Domestic pets (dogs/cats)	Provide signage to pick up dog waste, providing pet waste bags and disposal containers.	**Selected** for implementation at the Parham Road Campus. On-going implementation.
Urban wildlife	Educate the public on how to reduce food sources accessible to urban wildlife	Urban wildlife not applicable as an issue on campus, especially within the developed portions of campus considered in TMDL modeling WLAs (loadings from impervious cover).
	Install storm drain inlet or outlet controls.	
	Clean out storm drains to remove wildlife waste.	
	Implement a program for removing animal carcasses and properly disposing of the same.	
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 E 3 of the MS4 General Permit to identify and remove illicit connections and identify leaking sanitary sewer lines infiltrating to the MS4 and implement repairs	Illicit connections and leaking sanitary sewer lines have not been observed as a contributor nor a concern on campus. JSRCC will continue the current implementation of annual dry-weather outfall screening.
	Implement an educational program beyond any requirements in Part I E 1 though E 6 of the MS4 General Permit to explain to citizens why they should not dump materials into the MS4	Current educational program addresses dumping. Dumping has not been observed as a contributor/concern on campus.
Dry weather urban flows	Inspect commercial trash areas, grease traps, washdown practices.	Dry weather urban flows are addressed as part of annual dry weather outfall screenings and good housekeeping practices.
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.	Not applicable as an issue/concern on campus.
	Prohibit feeding of birds.	
Other sources	Enhance maintenance of stormwater management facilities.	Stormwater management facilities are inspected and maintained to maximize functionality (BMP 5B).

[1] Only the strategies applicable to JSRCC, as a non-traditional MS4 and college campus, are listed.

As described in the "Action Plan Notes" column in Table 5, JSRCC implements practices consisted with all of the *applicable* strategies listed in the Table. However, JSRCC explicitly identifies the strategy to address domestic pet waste to meet the permit requirement that requires the selection of at least one of the strategies from Table 5. JSRCC will continue implementation of the strategy to address bacteria sources from domestic pet waste from pet's walked on campus. Specifically, JSRCC will continue to provide signage to pick up dog waste and provide pet waste bags and disposal containers for the pet waste stations currently provided at strategically identified locations on the Parham Road Campus.

3.3 Enhanced Public Education Outreach Strategy

JSRCC, as a non-traditional MS4, describes the college's public as students, faculty and staff in the JSRCC MS4 Program Plan. As required during the previous permit cycle's action plan, modifications have been made to applicable program BMPs supporting materials that incorporate bacteria as a local TMDL pollutant of concern (see Table 6). These modifications inherently enhance the public education and outreach program with:

- ✓ Inclusion of bacteria as a local TMDL pollutant in educational materials and
- ✓ Dissemination of materials to the JSRCC public, as described in the MS4 Program Plan' public education and outreach BMP.

3.4 Implementation Schedule

JSRCC will continue ongoing implementation of the MS4 program bacteria-loading associated BMPs (refer to Table 4), including providing signage to pick up dog waste and pet waste bags and disposal containers for pet waste stations. Implementation status will be provided in annual MS4 reporting and include:

- ✓ A summary of actions conducted to implement the TMDL action plan during the reporting period and
- ✓ A method for evaluating effectiveness and findings based on method.

4.0 Evaluation of Results Achieved

Evaluation of the JSRCC implementation of BMPs associated with reduction of bacteria loadings finds program implementation consistent with achieving the goals and requirements of the TMDL and MS4 General Permit standard of protecting water quality to the maximum extent practicable. The evaluation is based on successful implementation of MS4 Program Plan BMPs, including the bacteria-specific BMP to provide and maintain pet waste stations.

4.1 Applicable MS4 Program BMPs

JSRCC will continue implementation of MS4 Program BMPs as described in the college's MS4 Program Plan and in MS4 annual reporting. As noted in Table 6, JSRCC has modified MS4 program BMPs to incorporate bacteria as a local pollutant of concern.

Table 6. Action plan implementation schedule to address bacteria with MS4 program BMPs.

BMP ID	Action Item	Date for Completion*
BMP 1A	Modify educational materials to include bacteria as a local pollutant of concern in the WQ Issue #3 brochure.	Completed. Annually distributed as described in MS4 Program Plan.
BMP 2A	Post Action Plan on the JSRCC Stormwater Webpage for Public Access and Solicitation for Comment	Completed and ongoing.
BMP 2B	Address any public comment received on the Action Plan. Comments and responses will be incorporated into Appendix A of this Action Plan, as appliable.	Completed and ongoing.
BMP 6A	Update Staff MS4 Handbook to include bacteria as a local TMDL pollutant of concern.	Completed. Handbook utilized in training.
BMP 6E	Incorporate bacteria as a local TMDL pollutant of concern into training materials.	Completed and included in all trainings.
BMP SC2	Incorporate this Action Plan into the MS4 Program Plan and provide annual reporting per Program Plan.	Completed.
BMP SC2	Implement domestic pet waste practices by maintaining Pet Waste Stations	Ongoing and to be continued annually. See also Section 4.2.

* Initially completed previous permit cycle.

4.2 Pet Waste Stations

JSRCC began implementing the domestic pet waste practices by maintaining pet waste stations as described herein during the 2019-2020 MS4 reporting period, consistent with the implementation schedule in previous versions of this action plan. Implementation has since been described in annual MS4 reporting. JSRCC will continue to provide signage to pick up dog waste and provide pet waste bags and disposal containers for the pet waste stations currently provided at strategically identified locations on the Parham Road Campus. Pet waste stations continue to be utilized and maintained, indicating JSRCC is effectively implementing this strategy.

4.3 Adaptive Management Strategies

Based on annual assessment that do not find significant sources of bacteria loadings from the JSRCC Parham Road campus, along with continued successful implementation of MS4 program BMPs, including maintaining pet waste stations, no adaptive strategies are necessary at the time of development of this action plan. JSRCC will continue annual reporting of implementation of BMPs intended to address bacteria loadings to the maximum extent practicable.

Appendix A- Summary of Public Comments & JSRCC Response

JSRCC will maintain this TMDL Action Plan with request for solicitation and means for public comment on the college's stormwater management webpage. The latest version of the action plan will continue to be maintained on the webpage, along with the solicitation for comment throughout the permit cycle.

JSRCC will update this action plan annually as part of the annual reporting process, as applicable and necessary, to include any public comment(s) and plan modifications(s). A summary of any comments received from the public will subsequently be provided in this Appendix with a response from the college and a description of any modifications to the plan.