ROANOKE RIVER BACTERIA TMDL ACTION PLAN

City of Salem

A Plan to Address the City's Assigned Wasteload Allocation for the Roanoke River TMDL

Permit#: VAR040010
Prepared: June 2015
Updated: April 2025

This document addresses Part II B of the General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems. This document serves as a City-specific TMDL Action Plan to identify the best management practices and other interim milestone activities to be implemented to address the bacteria wasteload allocation assigned to the City's regulated MS4 area in the *"Bacteria TMDLs for Wilson Creek, Ore Branch and Roanoke River Watersheds, Virginia"* approved by the Environmental Protection Agency on August 2, 2006. For the purposes of this Plan, the 2000 and 2010 Census Urbanized Areas were used to define the City of Salem's regulated MS4 area as defined in 9VAC25-890 Section 1.

SALEM VIRGINIA

Wetland Studies and Solutions, Inc.
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EXECUTIVE SUMMARY

The City of Salem 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, the City 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 the City 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 City within the "Bacteria TMDLs for Wilson Creek, Ore Branch and Roanoke River Watersheds," approved by the EPA on August 2, 2006. The TMDL assigns the City a WLA for Escherichia coli (*E. coli*) equivalent to a 98.8% reduction in the existing conditions to meet water quality standards. The expectation of the TMDL is for MS4 permittees, such as the City, to address the TMDL WLAs through the iterative implementation of programmatic BMPs. The City's stormwater program BMPs are described in this TMDL Action Plan, specifically to their application to reductions in *E. coli* discharges to the MS4. The Action Plan addresses *E. coli* in accordance with the special conditions of the MS4 General Permit and expectations of the TMDL by demonstrating that the iterative implementation of programmatic BMPs to reduce or eliminate *E. coli* to the maximum extent practicable. Compliance to the special conditions is demonstrated through:

- ✓ Summary of BMPs already included in the City of Salem's MS4 Program Plan that address *E. coli*;
- ✓ The City's MS4 Public Education and Outreach strategy and plan;
- ✓ An assessment of City-owned and operated properties; and
- ✓ A methodology to measure Action Plan effectiveness through MS4 annual reporting.

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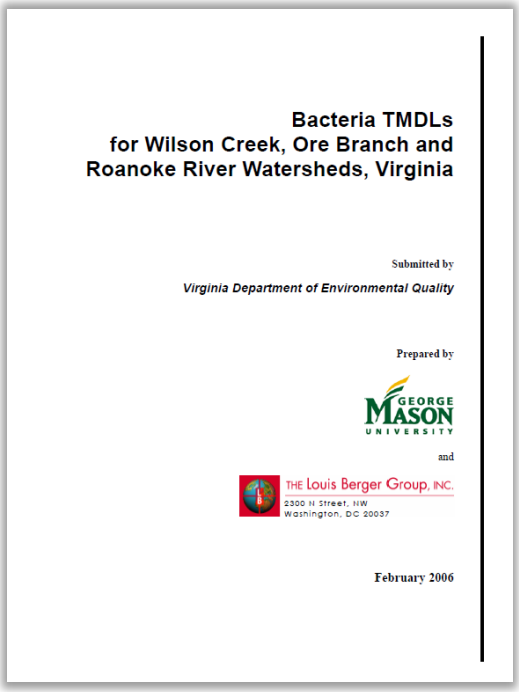
ACRONYMS

BMP	Best Management Practice
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
City	City of Salem
I&I	Inflow and Infiltration
IDDE	Illicit Discharge Detection and Elimination
LA	Load Allocation
MCM	Minimum Control Measure
MOS	Margin of Safety
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
SWPPP	Stormwater Pollution Prevention Plan
SWM	Stormwater Management
TMDL	Total Maximum Daily Load
VSMP	Virginia Stormwater Management Program
WLA	Wasteload Allocation

1.0 INTRODUCTION AND PURPOSE



Mandated by Congress under the Clean Water Act, 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). The City of Salem (City) 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, the City 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 (TMDL), 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 1998, DEQ listed segments of the Wilson Creek, Ore Branch, and the Upper Roanoke River 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, the "Bacteria TMDLs for Wilson Creek, Ore Branch and Roanoke River Watersheds," were developed and approved by the Environmental Protection Agency (EPA) on August 2, 2006.

The TMDL assigned the City a wasteload allocation (WLA) for *E. coli* of 2.29E+11 colony forming units per year (cfu/yr), representing a 98.8% reduction in the existing loads. The WLA represents the allowable bacteria load from the City's MS4 to prevent instances of exceedance of bacteria discharge water quality standards. The expectation from the Commonwealth for The City to address the WLA is through iterative implementation of programmatic BMPs. The City's programmatic BMPs applicable to the pollutant of concern are described herein and only failing to implement the BMPs would be considered a violation of the MS4 General Permit.

1.1 Total Maximum Daily Loads

A TMDL is 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:

- 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 City's 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 LAs assigned for each. The 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 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

The City operates its regulated MS4 that lies entirely within the Roanoke River bacteria TMDL watersheds and is therefore subject to the TMDL WLAs assigned in the TMDL. The special conditions for the TMDL listed in the MS4 General Permit require the City to develop a TMDL Action Plan designed to reduce loadings for pollutants of concern where the City 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, 2018, and in which an individual or aggregate wasteload has been allocated to the City, the City shall update the previously approved local TMDL action plans to meet the conditions of Part II B 4, B 6, B 7, and B 8 as applicable, no later than 18 months after the permit effective date and continue implementation of the action plan. Updated action plans shall include:
    1) An evaluation of the results achieved by the previous action plan; and

2) Any adaptive management strategies incorporated into updated action plans based on action plan evaluation.

- For TMDLs approved by EPA on or after July 1, 2018, and prior to October 31, 2023, and in which an individual or aggregate wasteload has been allocated to the City, the City shall develop and initiate implementation of action plans to meet the conditions of Part II B 4, B 5, B 6, B 7, and B 8 as applicable for each pollutant for which wasteloads have been allocated to the City MS4 no later than 30 months after the permit effective date.

The City 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 the City shall include the following:

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

- The TMDL project name;
- The EPA approval date of the TMDL;
- The wasteload allocated to the City (individually or in aggregate), and the corresponding percent reduction, if applicable;
- Identification of the significant sources of the pollutant of concern discharging to the City'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 5, B 6, B 7, and B8;
- Any calculations required in accordance with Part II B 5, B 6, B7, or B 8;
- For action plans developed in accordance with Part II B 5, B 6, and B 8, 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 Salem's Roanoke River Action Plan

The purpose of the City's Action Plan for the Roanoke River bacteria TMDL is to address each of the Local TMDL 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 the City's MS4 to the maximum extent practicable. The Action Plan is incorporated, by reference, into the City's MS4 Program Plan, which outlines the BMPs that address the entirety of the conditions set forth in the MS4 General Permit.

2.0 THE ROANOKE RIVER BACTERIA TMDL

The impaired segment of the Roanoke River begins in The City and flows through Roanoke City and Roanoke County. The TMDL study area also includes the Wilson Creek and Ore Branch tributaries, making up the overall Upper Roanoke River Basin (USGS Cataloging Unit 03010101) that drains 580 square miles. The City accounts for 2% of the overall watershed with the Roanoke River serving as the impaired receiving surface water for the entire City. The bacterial impairment is due to bacterial violations to water quality standards for *E. coli*. The "*Bacteria TMDLs for Wilson Creek, Ore Branch and Roanoke River Watersheds*" assigns a WLA for *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 scenarios where no violations of either the *E. coli* geometric mean standard or the instantaneous *E. coli* standard would occur. The selected TMDL scenario for establishing WLAs included reductions from sources as shown in Table 1.

2.1 Wasteload Allocation

The TMDL considered potential sources of *E. coli* bacteria from the sources identified in Table 1:

Table 1: Load Reduction Required to Meet *E. coli* Standards

Failed Septic & Pipes	Direct Livestock	Non-point Source (Agricultural)	Non-point Source (Urban)	Direct Wildlife
100%	100%	98.8%	98.8%	68%

Sources identified in Table 1 can be summarized as the following:

- Failed Septic Systems and Pipe – This category includes failed septic systems and "straight pipes" that directly discharge sewage to surface waters.
- Direct Livestock – Livestock inventory within the TMDL watershed consists of cows, hogs & pigs, sheep & lambs, and horses & ponies. Whereas indirect wildlife sources are those that are carried to the stream from the surrounding land via rain and runoff events, direct sources are those that are directly deposited into the stream.
- Non-point Source (Agricultural) – Agricultural sources of *E. coli* include land application of manure and biosolids to pastures and therefore considered an indirect source.
- Non-point Source (Urban) – This category includes MS4s as the nonpoint source runoff is ultimately discharges through the MS4. *E. coli* sources incorporated into the TMDL within the urban area include pet waste, primarily cats and dogs.

- Direct Wildlife – Whereas indirect wildlife sources are those that are carried to the stream from the surrounding land via rain and runoff events, direct sources are those that are directly deposited into the stream. An example of wildlife serving as a direct source are those that live within close vicinity of the stream such as muskrat, geese and beaver.

The City, as a regulated MS4, received a WLA of *2.29E+11* cfu/year, which is computed as part of a 98.8% reduction within the Roanoke River TMDL watershed. The City is categorized into the "non-point urban" source classification and therefore is assigned a WLA equivalent to a 98.8% reduction from existing loads of *E. coli*. A review of the reduction allocations demonstrates the potential difficulty to achieve water quality standards with the necessity to remove 68% of direct wildlife contributions and nearly all of the remaining sources. The expectation of the TMDL is for the City to address the WLA through the "iterative implementation of BMPs in the watershed."

3.0 SALEM'S CHARACTERIZATION IN THE TMDL WATERSHED

A review of the TMDLs, the City's MS4 Program Plan and a field investigation of City-owned and operated properties resulted in the characterization related to potential *E. coli* sources described in the following sub-sections.

3.1 Potential City Sources of *E. coli* and Implemented Measures

An evaluation of City-owned and operated properties for significant sources of *E. coli* determined that agricultural and livestock sources are not considered applicable sources to the City's MS4. Reduction of wildlife in the City is not a strategy proposed by the TMDL and changing the natural background conditions is not the intent of the TMDL. In reference to Table 1, of the sources considered by the TMDL, the following are applicable to the City and further considered in the following sub-sections:

- Pet waste (urban runoff);
- Public sanitary sewer system; and
- Failed septic systems (urban runoff) and straight pipes.

3.1.1 Pet Waste

The TMDL assumed that an average of 1.7 dogs and 2.2 cats resided in each household in the City and constituted the primary pets that contributed to potential bacteria loading. As of the 2010 Census, the population of the City was 24,802, and the number of households can be estimated to be 9,976. Based on the estimated number of households, approximately 17,000 dogs and 22,000 cats reside within the City. In 2025, the City database suggests a smaller number of pets with approximately 2,050 registered dog and cat owners. Actual dog and cat numbers are not available. Waste loading associated with these animals is largely confined to residential areas, but it may also be assumed that waste can enter waterways along adjoining streets and in areas frequented by dog owners, such as dog parks, trails, and recreation areas where dogs are permitted.

The City's approach to address pet waste controls are threefold, including prohibition on most City properties, pet stations at strategic locations where pets are allowed and targeted public education outreach.

The City prohibits the owner of a dogs, cat and other animals to allow the animal on the premises of any city park or school facilities, either on or off leash (*Salem City Code – Chapter 14-2*). A violation is a class 4 misdemeanor. The Salem Rotary Dog Park, which is equipped with pet waste stations (bag dispensers, signage and waste containers), is the lone exception to the prohibition. Other than parks and schools, the assessment of City-owned and operated properties identified the Roanoke River Greenway trail system as a potential contributing source of *E. coli*. At least 14 pet stations are strategically located within the City.

Whereas prohibitions and pet waste stations target City properties, the City addresses pet waste sources through a targeted educational outreach program as part of the City's MS4 Public Education and Outreach Program. Bacteria is specifically addressed as "Water Quality Issue #2.

3.1.2 Public Sanitary Sewer System

The City owns, operates, and maintains a sanitary sewer collection system. The system services mainly residential and commercial properties. Wastewater flows to the Western Virginia Water Authority Water Pollution Control system and the Roanoke Regional Water Pollution Control Plant. Wet weather peak flows, along with blockage factors typical to municipal systems, have periodically resulted in overflows at manholes and system bypasses.

The City and DEQ entered into a Special Order by Consent (Order) in December of 2005 for issues related to inflow and infiltration (I&I) to its existing sanitary sewer network that resulted in system overflows and bypasses at the downstream treatment plant. The Order indicated several priority repair projects and the City submitted a Corrective Action plan to address the issues in a phased approach based on the five-year VPDES permit cycle. Priority repairs to the system were completed and a Corrective Action Plan for the collection system was initiated in 2007, which included a phased approach to subsequent I&I abatement. The Corrective Action Plan provides methods for eliminating and/or properly managing any peak flows that significantly contribute to overflows of the system and bypasses at the plant.

3.1.3 Failed Septic Systems and Straight Pipes

In general, residences and commercial properties that are not currently connected a municipal sanitary sewer are either using septic systems or straight pipes to discharge wastes. Older septic systems and those not properly maintained can create bypass flows of sanitary waste that may flow overland to streams.

To determine the extent of failed septic systems within the City, the TMDL used data from the 1990 Census that provided the percent of houses within the City on public sewer (93.10%), septic system (6.86%) or other means (0.04%), with other means assumed to be straight pipes. The information was then used with 2000 Census household (9,954) data to determine the number of septic systems in the City. Finally, a failure rate of 3% was assumed. Based on the information provided in the TMDL report and presented in Table 2, the City has approximately 305 septic systems. Considering an assumed 3% failure rate, the City estimates 9 septic system failures for the purposes of the TMDL.

At the present time, the City believes that approximately 97.03% of household sanitary sewage is discharged to the public sewer system. No properties are known to discharge sanitary waste directly to streams. A comparison of the TMDL estimates and the City's current estimates is provided in Table 2.

Table 2: Estimate of Failed Septic Systems in the City of Salem

Sewage Disposal Method	TMDL Estimation (1990 & 2000 Census Data)		City Engineer Estimation (Present)	
	Percentage (%)	# Households	Percentage (%)	# Households
Public Sewer	93.10%	9,267	97.03%	9,954
Private Septic System	6.86%	682	2.97%	305
- Potentially Failing Systems	0.2%	20	3%	9*
Straight Pipe	0.04%	4	0.00%	0

* Based on 3% failure rate

The City currently requires the connection of new residences and commercial facilities to the sanitary sewer system, and septic system installation requires a special use permit (*City Code - Article III, Division 3-Sewage Disposal)*. Variances are only approved by the City Engineer when sanitary sewer service is not reasonably available. The Roanoke Health Department oversees the permits for new and existing septic systems, with print records going back fifty years or more.

There are no known straight pipe discharges to surface waters within the City. The City's Illicit Discharge Detection and Elimination (IDDE) Program includes a proactive approach to reduce illicit discharges with annual outfall screening to seek out and remove non-stormwater discharges into the MS4. As part of MCM3, the City will continue annual outfall screening and to add new outfalls to mapping as they are discovered. In the case that annual dry-weather screening should identify an illicit discharge, including sewage, the existing policies and procedures will aim to eliminate the discharge through an IDDE investigation and enforcement of the City's IDDE Ordinance.

3.2 City-owned and Operated Properties

Properties owned and operated by the City were previously assessed when the original action plan was developed to determine each of their potential for presence of sources of *E. coli* to the city's MS4 or directly into surface waters. Potential sources include those associated with the municipal waste stream, those potentially producing bacteria pollution as a part of their operations, or those subject to loading from outside sources, such as pets at recreational parks. The assessment was generally conducted as illustrated in Figure A and included the properties shown in Figure B.

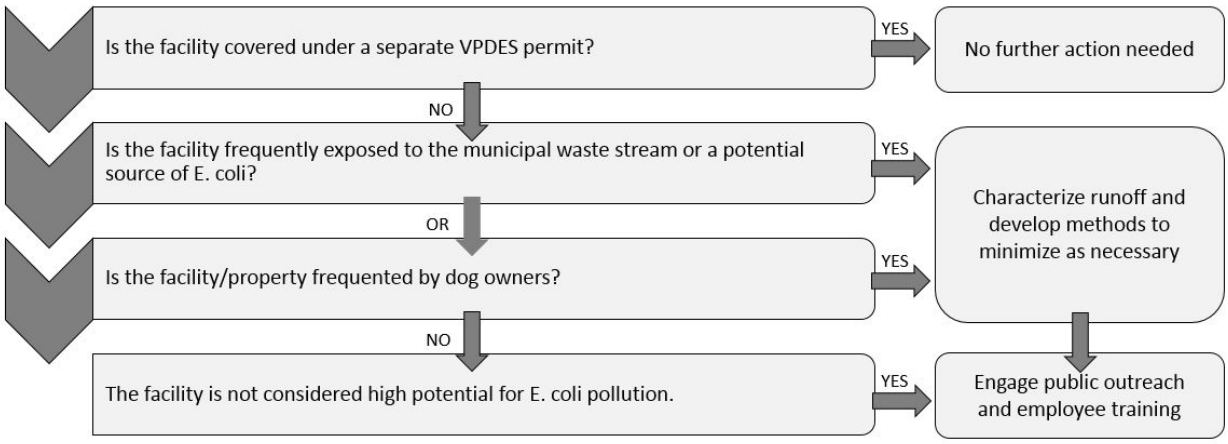


Figure A. City-owned properties assessment process.

The assessment identified the following properties as potential sources of *E. coli*:

- Salem Rotary Dog Park – The Park provides an off-leash area for dogs and is frequented by local residents with dog licenses. The facility is located adjacent to the City's waste transfer station, next to the Parks and Recreation building. Signage, pet waste bags, and trash receptacles are provided to encourage cleanup of pet waste. The City's website for the park also states that dog owners must pick up after pets.
- Roanoke River Greenway – This linear trail system in the City is frequented by dog owners. Pet waste stations are currently maintained at six locations along approximately 2.5 miles of trail.
- Public Works Facility – Garbage trucks are stored and maintained. Potential exists for leachate from stored trucks to convey to the storm sewer.

The primary anthropogenic source of potential *E. coli* pollution at City owned facilities is pet waste. For the two park properties that are potentially significant contributors, the City will continue maintaining the existing signage and pet waste stations. Potential *E. coli* sources at the Public Works facility will be addressed through site-specific Stormwater Pollution Prevention Plans (SWPPP). SWPPPs include mapping that identifies potential sources and BMPs to minimize and eliminate discharges.

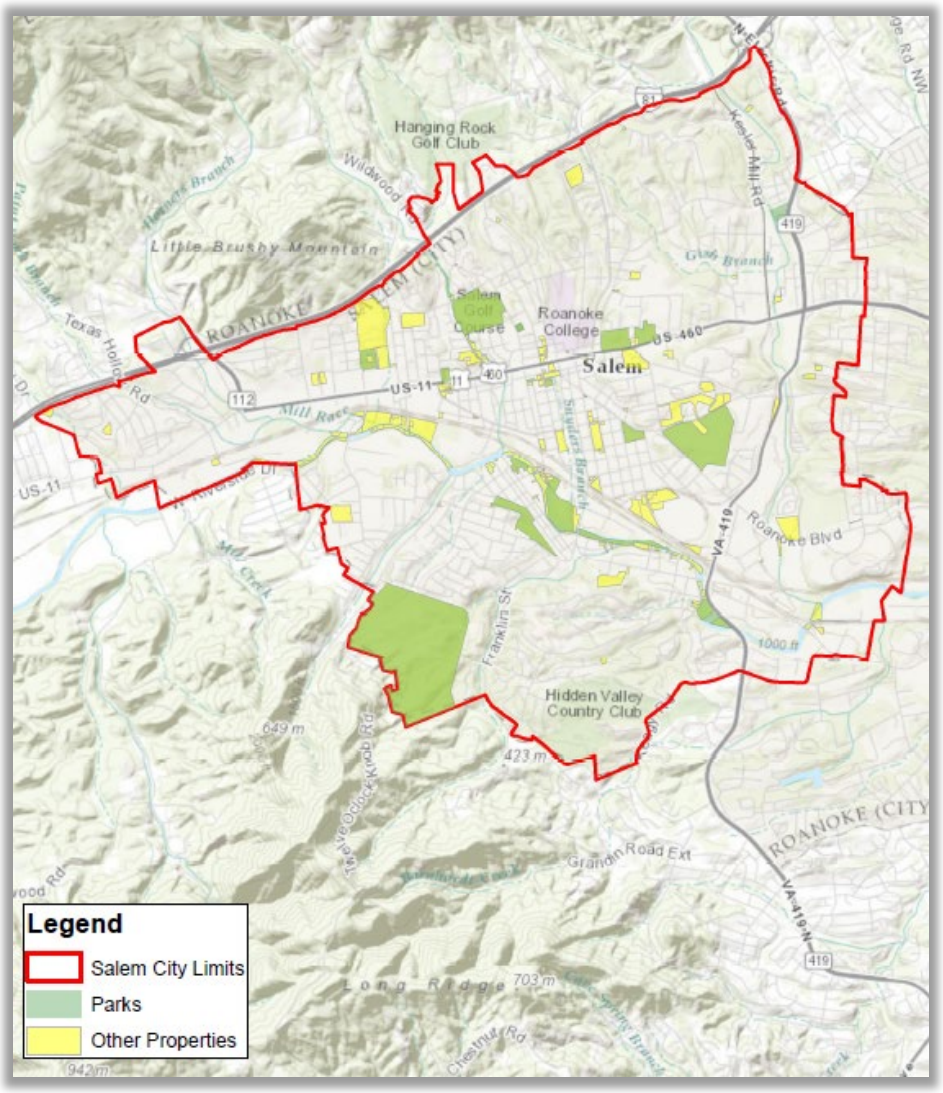


Figure B. City-owned properties included in the bacteria source assessment.

4.0 APPLICABLE OVERVIEW OF SALEM'S MS4 PROGRAM

The City's MS4 Permit covers stormwater discharges from areas included within census urbanized areas. The City's collective efforts, as described in the City's MS4 Program Plan, result in significant reduction of pollutants that may 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 the General Permit. BMPs already included in the City's Program Plan that address *E. coli* are summarized below.

4.1.1 MCM 1 Public Education and Outreach on Stormwater Impacts

The City'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*. In addition, Water Quality Issue #2, is the Education on impacts of bacteria & sediment on stormwater.

The City's PEOP also identifies City staff as a target audience and requires training. Staff training material (Salem's Good Housekeeping/Pollution Prevention Manual) includes information regarding TMDL pollutants of concern.

To enhance the City's public education and outreach program, the City partners with the Clean Valley Council (CVC). The CVC implements public education and outreach strategies to promote methods to eliminate or reduce the discharge of bacteria in the Roanoke River watershed. Examples of locations where this information could be presented include Stream School Seminars, Stormwater Educational Programs, Conferences, Booths, etc.

4.1.2 MCM 2 Public Involvement and Participation

The City will post this Action Plan on their stormwater pollution prevention webpage at the https://www.salemva.gov/Departments/Community-Development/Stormwater-Information/Program-Information. Availability of the Action Plan will increase awareness of the TMDL with web page visitors.

To enhance the City's public education and outreach program, the City partners with the Clean Valley Council (CVC). The CVC implements public involvement and participation activities to promote methods to eliminate or reduce the discharge of bacteria in the Roanoke River watershed. Examples of locations where this information could be presented include:

- Stream School Seminars
- Stormwater Educational Programs
- CVC Website
- Fall Waterways Cleanup
- Go Fest
- Clean Valley Day Clean Up
- Earth Day
- Party for the Planet with Mill Mountain Zoo
- Many More

4.1.3 MCM 3 Illicit Discharge Detection and Elimination

The City's MS4 Program includes an IDDE Program with 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. The City prohibits non-stormwater discharges into the storm sewer system through language provided within an Illicit Discharge Ordinance. The IDDE Program includes a proactive approach to reduce illicit discharges with annual outfall screening to detect and eliminate non-stormwater discharges into the MS4. IDDE BMPs are described in the MCM 3 BMPs of the City's MS4 Program Plan.

4.1.4 MCM 4 Construction Site Stormwater Runoff Control

The City's Construction Program includes mechanisms to ensure compliance and enforcement on regulated construction sites that are enforced through the City's stormwater management (SWM) and Erosion and Sediment Control (ESC) Ordinances that are consistent with the Virginia Erosion and Sediment Control and SWM 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 SWM facilities

Through inspections and enforcement, especially in regards to construction SWPPP inspections, potential for *E. coli* discharges (i.e. port-a-johns) is minimized. MCM 4 BMPs in the City's MS4 Program Plan describe construction site runoff control BMPs.

4.1.5 MCM 5 Post-Construction Stormwater Management

The City'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 prior developed land through implementation of a SWM Ordinance. Included within the ordinance are requirements for as-built certifications for SWM BMPs and long-term maintenance covenants to ensure that SWM 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. MCM 5 in the City's MS4 Program Plan describes post-construction stormwater management BMPs.

4.1.6 MCM 6 Pollution Prevention/Good Housekeeping for Operations

The City'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 City-owned and operated properties to the maximum extent practicable. The program is supported with the City's Pollution Prevention & Good Housekeeping Manual and training for applicable staff. MCM 6 in the City's MS4 Program Plan describes 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.

4.1.7 Additional Applicable City Codes

In addition to the IDDE, ESC and SWM Ordinances described in Section 4.1, the following City Code sections also serve as mechanisms to reduce the potential for *E. coli* discharge to the MS4:

- "*Removal of trash, garbage, etc.,*" as described in the City Code, Article 1, Section 30-4. A violation is a class 4 misdemeanor. Proper disposal of waste can prevent exposure to precipitation and subsequent runoff to the storm sewer.
- "*Allowing noxious, etc., matter or nuisance to be placed, etc., in or upon house, lot, etc.,*" as described in the City Code, Article 1, Section 30-5. The prohibition of noxious, unwholesome or offensive matter can prevent potential of materials stored outdoors on property that contain *E. coli* that could be exposed to precipitation and subsequent runoff to the storm sewer.
- "*Performance of plumbing work, etc., by registered plumber,*" as described in the City Code, Article IV, Section 18-262. The Code ensures a registered plumber is required to make connections to the City's sanitary system and therefore decreases potential discharge of sewage from poor connections.
- "Connection of premise with public sewer required," as described in the City Code, Article III, Section 90-121. The Code requires homes in subdivisions connect to the public sanitary sewer system and discontinue use of privies, septic tanks, cesspools and the like; provided that such a connection will not require a private sewer line over 150 feet in length, in which the requirement may be excused at the discretion of the council.
- "Permit for construction of septic tanks," as described in the City Code, Article III, Section 90-151. The Code requires a permit from the City Manager prior to construction of a septic system.

5.0 IMPLEMENTATION OF THE STRATEGY TO REDUCE BACTERIA

The City has existing BMPs designed to reduce the pollutants of concern. An outreach strategy has been implemented to increase the public's knowledge of how to reduce stormwater pollution and hazards associated with illegal discharges and improper disposal of waste with a schedule of anticipated actions planned for implementation during this permit term. Please note, the strategies selected may have already been completed.

The City is an approved VSMP authority; therefore, the City shall select at least three strategies listed in Table 3 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 4 d of the General Permit.

Table 3: Strategies for Bacteria Reduction Stormwater Control/Management Strategy

Source	Strategies
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).

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.
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.

5.1 Evaluation of the Results Achieved by the 2018 - 2023 Action Plan

During the 2018 - 2023 MS4 Permit cycle, the City selected three strategies from the list in Table 1 to further reduce the load of bacteria to the MS4. The City completed the following:

- Provided signage to pick up dog waste, provided pet waste bags and provided disposal containers.
- Maintained dog parks by removing disposed pet waste bags and cleaning up other sources of bacteria.
- Implemented and enforced ordinances or policies related to waste. See above Section 4.1.7 to reduce bacteria to the maximum extent practicable.
- Partnered with the Clean Valley Council to provide an enhanced public education and public participation program that not only reaches City residents but also multiple jurisdictions.
- Educated the public on sewer backup prevention and actions taken if they happen.

Based on an evaluation of the results of the strategy employed for the 2018 - 2023 permit cycle, the City has met the 2018 – 2023 action plan goals to the maximum extent practicable.

5.2 Adaptive Management Strategies for the 2023 – 2028 Action Plan

Similarly, the City plans in future permit years, at a minimum, to continue to select three strategies from the table above. These proposed strategies will be included in the annual MS4 Program Plan update and implementation will be reported during the annual MS4 reporting process. The City will provide adaptive strategies, as necessary, if any additional sources of bacteria are identified.

6.0 SCHEDULE

The City will implement the practices and controls described in Section 4 and 5 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, the City 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 4. The method of assessment is implemented through the annual reporting process with the review of the effectiveness of each MS4 Program Plan BMP.

Table 4: Schedule of Anticipated Actions Planned for Implementation of Bacteria Reduction

Strategies	Method	Timeframe	Metric
Provide signage to pick up dog waste, providing pet waste bags and disposal containers	Post signage and provide disposal containers and waste bags.	Completed and ongoing	Waste bags maintained and stocked
Implement and enforce ordinances or policies related to outdoor water waste.	See Section 4.1.7 of this report	Completed and ongoing	Approved ordinances
Implement an enhanced educational program beyond any requirements in Part I E 1 through E 6.	Enhanced Public Education and Outreach and Public Participation within the watershed through partnership with the Clean Valley Council	Completed and ongoing	Continued participation in the Clean Valley Council
Educate the public on sewer backup prevention and actions taken if the sewer overflows.	https://salemva.gov/464/Sewer-Backups-Overflows	Completed and ongoing	Website updated and online