

# Bacteria Total Maximum Daily Load (TMDL) Action Plan

Stormwater Management / MS4 Permit Compliance



City of Fairfax  
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Version 01/2025

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## Report Certification

As required by the MS4 General Permit, Part IV. K. 4.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name: Satoshi Eto

Signature: \_\_\_\_\_

Title: Public Works Program Manager

Date: \_\_\_\_\_



## Acronyms

Acronym	Meaning
BMP	Best Management Practice
CBPA	Chesapeake Bay Preservation Act
CFU	Colony Forming Units
City	City of Fairfax, Virginia
CWA	Federal Clean Water Act
DEQ	Virginia Department of Environmental Quality
EPA	United States Environmental Protection Agency
HP-SWPPP	High Priority Stormwater Pollution Prevention Plan
HUC	Hydrologic Unit Code
LA	Load Allocation
MCM	Minimum Control Measure
MOS	Margin of Safety
MS4	Municipal Separate Storm Sewer System
MS4 General Permit	VPDES General Permit for Discharges of Stormwater from Small MS4s
PEOP	Public Education and Outreach Plan
RPA	Resource Protection Area
SWM	Stormwater Management
TMDL	Total Maximum Daily Load
VDOT	Virginia Department of Transportation
VESMP	Virginia Erosion and Stormwater Management Program
VPDES	Virginia Pollutant Discharge Elimination System
WLA	Wasteload Allocation
Yr.	Year

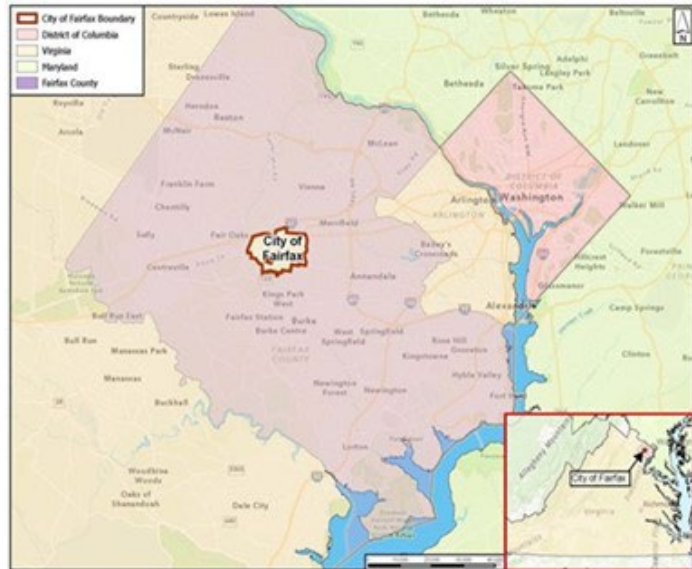


## 1.0 Introduction

The City of Fairfax (City) is an independent 6.24 square mile city of approximately 24,000 residents in the heart of Northern Virginia (Figure 1). It includes neighborhoods in four Potomac River tributary watersheds:

- Accotink Creek (Virginia Hydrologic Unit Code (HUC) PL30)
- Difficult Run (HUC PL22)
- Lower Bull Run (HUC PL46)
- Pohick Creek (HUC PL29) (Figure 2).

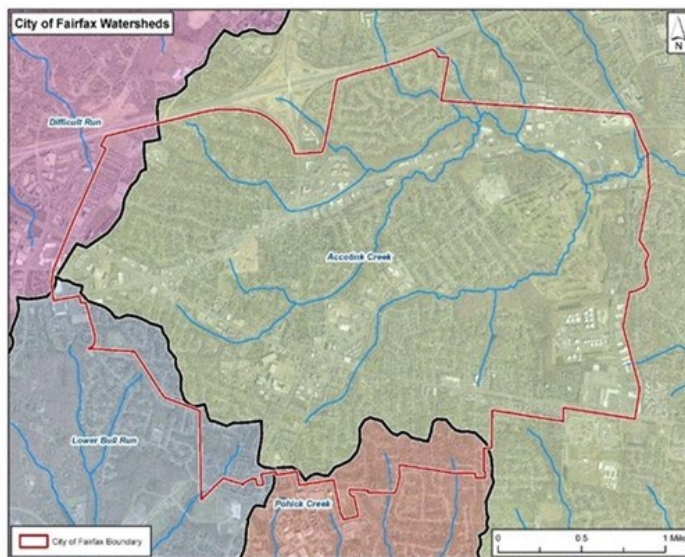
The City operates a small municipal separate storm sewer system (MS4) that collects stormwater from both private stormwater infrastructure and other MS4s, including Fairfax County and the Virginia Department of Transportation (VDOT).



**Figure 1. The City of Fairfax, located in Northern Virginia, is surrounded by Fairfax County**

Discharges from the MS4 are authorized under the Virginia Pollutant Discharge Elimination System (VPDES) program. As such, the City applied for and has maintained coverage for MS4 discharges under the appropriate VPDES General Permit for Discharges of Stormwater from Small MS4s (MS4 General Permit) since the initial MS4 General Permit was approved by the State Water Control Board in 2003.

## 2.0 City of Fairfax Stormwater Pollutant Reduction Efforts



**Figure 2. The City of Fairfax intersects four 6th Order Hydrologic Unit Codes in the Potomac River watershed**

The City has developed an MS4 Program Plan to document its strategies and implementation schedules for addressing the MS4 General Permit conditions. The MS4 Program Plan includes best management practices (BMPs) for each of the permit's six minimum control measures (MCMs) (Table 1). These BMPs have varying impacts on reducing individual pollutants of concern found in Total Maximum Daily Loads (TMDLs) based on the BMP, the pollutant of concern, and the City's BMP implementation strategy. The MS4 General Permit contains additional information regarding the implementation and schedule of these BMPs.



**Table 1. BMPs Implemented by the City of Fairfax to Meet the MS4 General Permit MCMs**

<b>BMP</b>	<b>BMP Title</b>
<b>MCM #1 - Public Education and Outreach</b>	
BMP 1A	Public Education and Outreach Program
<b>MCM #2 - Public Involvement and Participation</b>	
BMP 2A	Public Involvement Procedures
BMP 2B	Stormwater and Floodplain Management Webpage
BMP 2C	Stormwater Public Participation Initiative
<b>MCM #3 - Illicit Discharge Detection and Elimination</b>	
BMP 3A	Geographic Information System Mapping
BMP 3B	MS4 Outfall Data Management Tracking
BMP 3C	Downstream MS4 Interconnection – Operator Notification
BMP 3D	Prohibition of MS4 Illicit Discharges
BMP 3E	Illicit Discharge Detection and Elimination
BMP 3F	Dry Weather Screening
<b>MCM #4 - Construction Site Stormwater Runoff and Erosion and Sediment Control</b>	
BMP 4A	DEQ – Authorized Virginia Erosion and Stormwater Management Program (VESMP)
<b>MCM #5 - Post-Construction Stormwater Management (SWM) for New Development and Development on Prior Developed Lands</b>	
BMP 5A	DEQ-Authorized VESMP
BMP 5B	City-Owned/Operated SWM Facility Inspections
BMP 5C	City-Owned/Operated SWM Facility Maintenance
BMP 5D	Private SWM Facility Inspection and Long-Term Compliance
<b>MCM #6 - Pollution Prevention and Good Housekeeping for Facilities Owned or Operated by the Permittee within the MS4 Service Area</b>	
BMP 6A	Pollution Prevention and Good Housekeeping Standard Operating Procedures
BMP 6B	High Priority City Facility Evaluations
BMP 6C	HP-SWPPP for the City Property Yard
BMP 6D	Turf and Landscape Nutrient Management Plans
BMP 6E	Contractor Management and Oversight
BMP 6F	Stormwater Management Training

Additionally, the City of Fairfax is a Tidewater, Virginia, locality, as defined by the Chesapeake Bay Preservation Act (CBPA). Resource Protection Areas (RPAs) have been established along sensitive water resources. RPAs provide buffers between development and receiving waters to further reduce pollutants from anthropogenic sources entering impaired watersheds. Additional information regarding the City's CBPA Program and riparian buffers is available at <https://www.fairfaxva.gov/government/public-works/stormwater-and-floodplain-management/chesapeake-bay-ordinance>.



### 3.0 City of Fairfax TMDLs

The current MS4 General Permit, effective November 1, 2023, includes updated compliance requirements for MS4 operators who discharge to surface waters for which a TMDL study has been developed and approved by the Environmental Protection Agency (EPA). TMDLs are developed for surface waters that are “impaired” (i.e., not meeting their designated uses under the federal Clean Water Act (CWA) and State Water Control Law). TMDLs identify the cause and source of causing surface waters to be impaired and calculate the maximum loading rates of the identified pollutant of concern that can be discharged into the impaired waterbody while still meeting its designated uses.

TMDL = Wasteload Allocation (WLA) + Load Allocation (LA) + Margin of Safety (MOS)	
where	
WLA	The amount of the total pollutant load that can be discharged to the receiving water from VPDES-regulated point sources, such as the discharges from the City’s MS4.
LA	The amount of the total pollutant load that can be discharged to the receiving water from unregulated non-point sources.
MOS	Provides a margin of safety in the TMDL.

The MS4 General Permit conditions require the City to develop and implement TMDL Action Plans for waterbodies when EPA-approved TMDLs allocate a wasteload to the MS4. These TMDL Action Plans are implemented in multiple phases over more than one MS4 General Permit cycle using an adaptive iterative approach to achieve adequate progress to reduce discharge of the pollutant identified in the TMDL through implementation of BMPs in a manner consistent with the assumptions and requirements of the TMDL and compliant with the MS4 General Permit. Part II.B. of the current MS4 General Permit requires that the City evaluates the progress demonstrated through its existing TMDL Action Plans and update them to continue progression towards meeting the WLAs and implement the requirements of the MS4 General Permit for local TMDLs associated with:

- Bacteria
- Sediment
- Chloride

The Virginia DEQ has developed, and the EPA has approved eight TMDLs for local waterbodies that receive discharges from the City’s MS4 (Figure 3).



## 4.0 City of Fairfax Bacteria TMDL Action Plan

This TMDL Action Plan documents the City strategies and efforts for addressing TMDLs developed to address local bacteria impairments. Bacteria, identified as either fecal coliform or *E. coli*, is the pollutant of concern, and associated wasteload has been allocated to the City MS4 for the following Bacteria TMDLs:

- Fecal Coliform TMDL for Accotink Creek, Fairfax County, Virginia
- Bacteria TMDL for the Difficult Run Watershed Bacteria TMDLs for Popes Head Creek, Broad Run, Kettle Run, South Run, Little Bull Run, Bull Run, and the Occoquan River, Virginia.

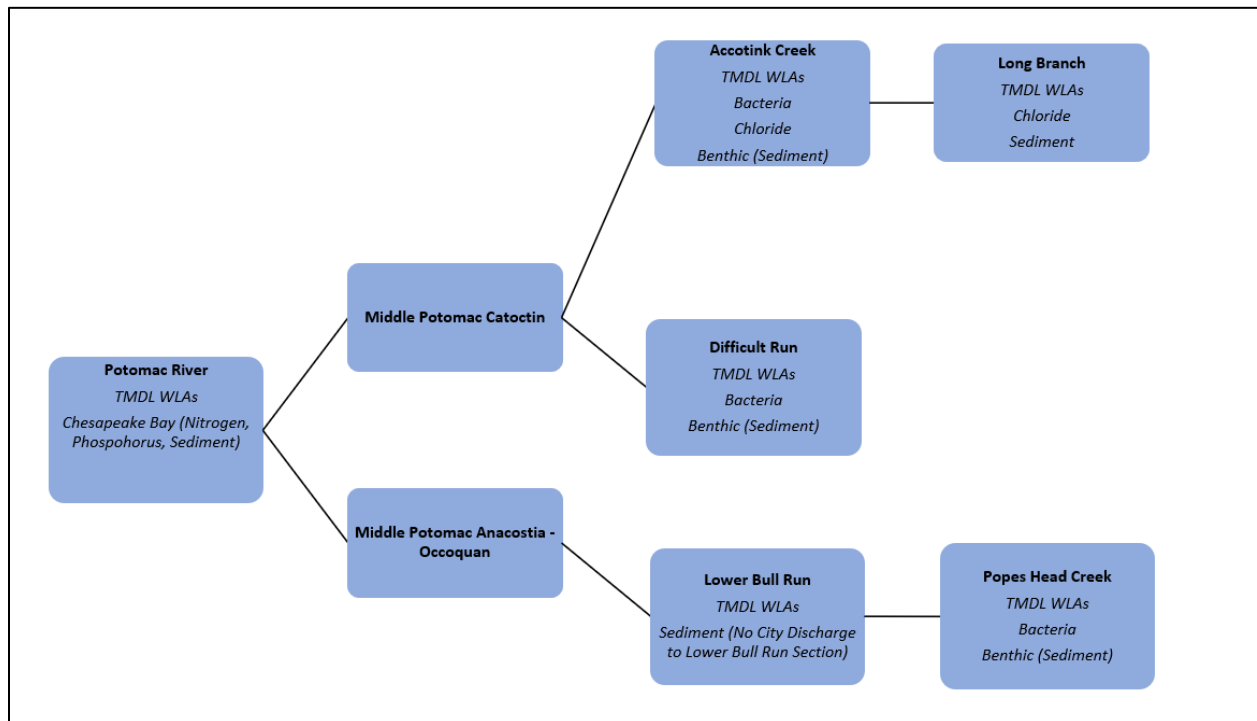


Figure 3. Waterbodies with TMDL Wasteloads or Pollutant Reductions Allocated to City of Fairfax MS4 Discharges





**Table 2. TMDLs Addressed in this TMDL Action Plan**

<b>MS4 Permit Special Condition Requirement</b>	<b>Individual TMDL</b>		
<b>Name</b>	Fecal Coliform TMDL for Accotink Creek, Fairfax County, Virginia	Bacteria TMDL for the Difficult Run Watershed	Bacteria TMDLs for Popes Head Creek, Broad Run, Kettle Run, South Run, Little Bull Run, Bull Run and the Occoquan River, Virginia
<b>EPA Approval Date</b>	5/31/2002	11/7/2008	11/15/2006
<b>Waterbody</b>	Accotink Creek	Difficult Run	Popes Head Creek
<b>Pollutant</b>	Bacteria – Fecal Bacteria	Bacteria – E. coli	Bacteria – E. coli
<b>WLA</b>	N/A	9.44 E+12 cfu/yr.	6.83 E+11 cfu/yr.
<b>Percent Reduction</b>	93%	90%	94%
<b>Individual or Aggregate WLA</b>	N/A	Aggregate	Aggregate
<b>Shared WLA MS4 Operators</b>	Wasteload allocated to Fairfax County MS4	Fairfax County, Town of Vienna, VDOT, Fairfax County Public Schools, George Washington Memorial Parkway	VDOT

Watershed maps showing the relationship between the impaired water segment addressed in each of the appropriate TMDLs and the City's jurisdictional boundaries are provided in Appendix A (Accotink Creek), Appendix B (Difficult Run), and Appendix C (Popes Head Creek). Accotink Creek receives the preponderance of the stormwater discharged through the City's MS4 (88%), whereas only three percent (3%) of the City drains to Difficult Run and five percent (5%) drains to Bull Run via Popes Head Creek. As a result of the predominance of the City being in the Accotink Creek watershed, the opportunities, strategies, and actions implemented in this Bacteria TMDL Action Plan will be concentrated in the Accotink Creek watershed.

#### 4.1 Potential Significant Sources of Bacteria

Based on the definition of a significant source of pollutants of concern in the MS4 General Permit, the City believes that there is one City facility that could be considered a potentially significant source of bacteria:

- Westmore Dog Park (located in the Popes Head Creek watershed)

The Westmore Dog Park is a potentially significant source of bacteria as it is the singular location provided to City residents specifically for their dogs. To minimize the potential for bacteria contamination, the City constructed the dog park as part of a redevelopment project. Over an acre of existing impervious cover was removed and converted back to managed turf. Stormwater runoff from the dog park is directed through a newly constructed bioretention facility before discharging into the City's MS4. The dog park is outside of the existing CBPA RPA and regulated floodplain. The City installed pet waste public outreach signs reminding owners that they are required under the City ordinance to clean up after their dogs. The City also installed and maintains three pet waste stations at the dog park.



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## 5.0 Overall Bacteria Reduction Strategy

High bacteria levels in three of the City's four HUC6 watersheds – Accotink Creek, Difficult Run, and Bull Run (Pope's Head Creek) - have resulted in their inclusion as impaired waters in the DEQ 303(d)/305(b) Integrated Report and development of separate TMDLs. Urban areas, such as the City of Fairfax, face water quality challenges from bacteria entering the local watersheds from anthropogenic sources, including pet waste and leaking or failed sanitary sewer and septic systems. Given the preponderance of local surface waters with bacterial contamination and associated TMDLs, the City has implemented a jurisdiction-wide initiative to address bacteria sources. These initiatives are included in the City's MS4 Public Outreach and Education Program (PEOP) and involve City-wide bacteria reduction strategies, as described below.

### 5.1 Public Outreach Strategy

The City identified bacteria pollution as one of its three high priority stormwater issues in its PEOP implemented to comply with MCM 1 of the MS4 General Permit. For the latest information regarding the City's efforts, refer to the MS4 Program Plan and MS4 Annual Reports found at <https://www.fairfaxva.gov/government/public-works/stormwater-and-floodplain-management/municipal-separate-storm-sewer-system-ms4>.

### 5.2 MS4 General Permit Bacteria Reduction Strategies Implemented City-Wide

The MS4 General Permit Part II.B.5 requires the City to implement at least three strategies listed in the permit's Table 5. By implementing this TMDL Action Plan, the City will implement eight Table 5 strategies through six City practices, including the following:

- 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 pet waste bags and cleaning up other sources of bacteria
- Protect riparian buffers and provide unmanicured vegetative buffers along streams to dissuade stream access
- 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)
- Other - Implement a wastewater lateral repair and replacement reimbursement program.

The City has implemented City-wide bacteria reduction practices to address anthropogenic bacteria sources.



### 5.2.1 Pet Waste Signage and Pet Waste Stations

Bacteria Source	Corresponding MS4 General Permit Bacteria Special Condition Strategy
Domestic Pets	Provide Signage to Pick Up Dog Waste
	Providing Pet Waste Bags and Disposal Containers.

The City has installed 27 pet waste stations on parklands and trails, including in the Accotink Creek and Pope's Head Creek watersheds and Kutner Park, which straddles the Difficult Run and Accotink Creek watershed boundaries (Figure 4). Individual pet waste stations comprise signage, a bag distribution center, and a trash receptacle. City staff maintain pet waste stations for routine maintenance and trash removal. For additional information regarding the City's pet waste stations, please visit the City of Fairfax MS4 Pet Waste Stations View webpage at

<https://cityoffairfax.maps.arcgis.com/apps/instant/attachmentviewer/index.html?appid=0703749e61a44eb398ec6a1be8fdd0f3>.

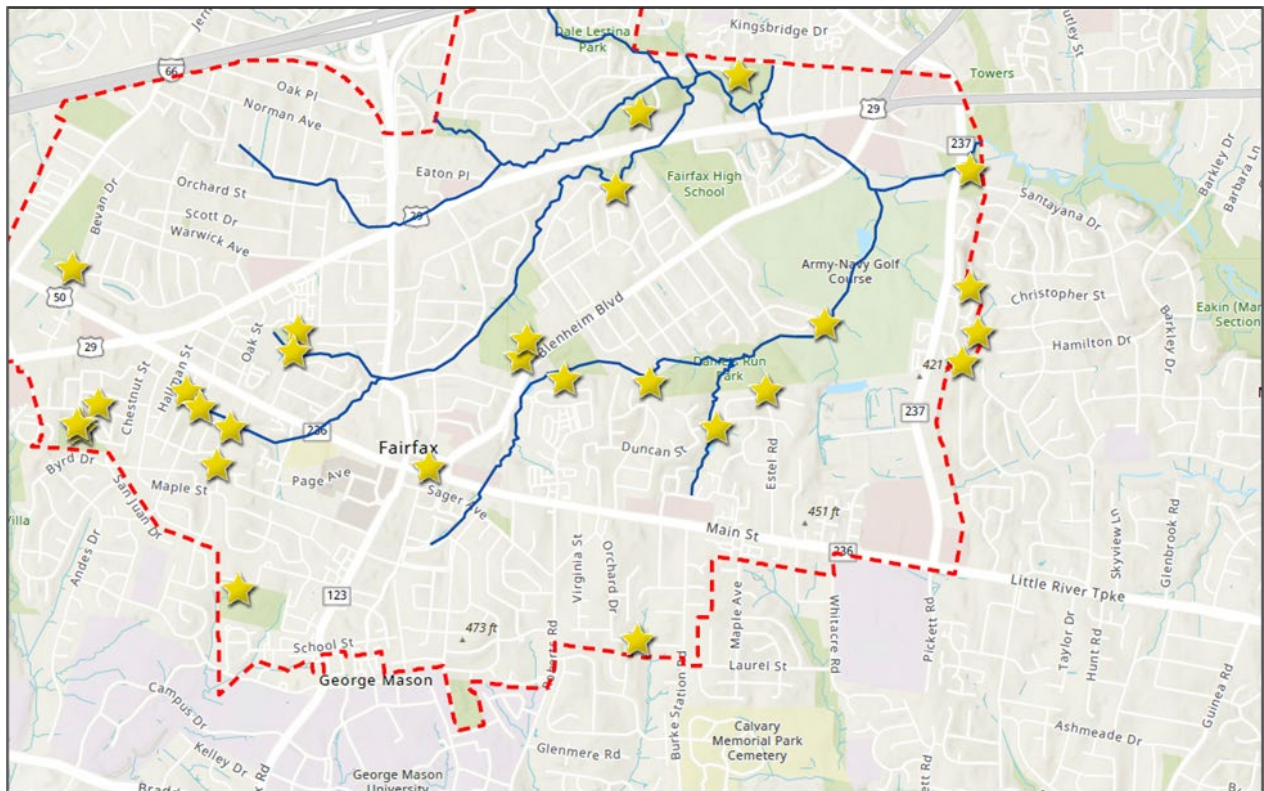


Figure 4. Location of Pet Waste Stations throughout the City



### 5.2.2 Pet Waste Ordinance and Park Policies

Bacteria Source	Corresponding MS4 General Permit Bacteria Special Condition Strategy
Domestic Pets	Adopt and Enforce Pet Waste Ordinances or Policies, or Leash Laws or Policies

Section 6-61 of the City of Fairfax Code of Ordinance requires dog owners to immediately remove dog excrement from a public right-of-way or any property other than the dog owner's property. Failure to comply with Section 6-61 constitutes a Class 3 misdemeanor. Similarly, the City Council has established a separate set of rules for public parklands and trails in which "No animal excrement or fecal matter shall be left or deposited in any Park except in a proper trash or dog fecal matter receptacle. If none is available, the animal owner must carry it out with them." Failure to comply with this requirement can lead to the following actions:

- A Verbal Warning
- A Suspension
- Permanent Suspension
- Police Enforcement

### 5.2.3 Dog Park Placement and Maintenance

Bacteria Source	Corresponding MS4 General Permit Bacteria Special Condition Strategy
Domestic Pets	Place Dog Parks Away from Environmentally Sensitive Areas
	Maintain Dog Parks by Removing Disposed Pet Waste Bags and Cleaning Up Other Sources of Bacteria

In 2018, the City utilized the Special Use Zoning Permit process to allow the City to use the former Westmore Elementary School site to be used for open space and construction of the City's dog park (Latitude 38.847258, Longitude -77.328877). After the demolition of the elementary school, the dog park was constructed within the school's original footprint, reducing the amount of impervious cover on-site and stormwater runoff discharged to Difficult Run (Figure 5). In addition, the dog park design incorporated installing a bioretention facility to treat stormwater runoff originating from the fenced dog park area. The DEQ Guidance Manual for TMDL Implementation Plans, June 2017, states that bioretention stormwater BMPs provide 90% efficiency in removing bacteria.



**Figure 5. Redevelopment of the Westmore Elementary School into the City Dog Park, demonstrating a reduction in impervious cover and retrofit of previously untreated stormwater runoff**

The City also provides non-structural best management practices in the form of pet waste disposal facilities. It provides routine maintenance to ensure the facilities are properly stocked, and pet waste is appropriately disposed of.

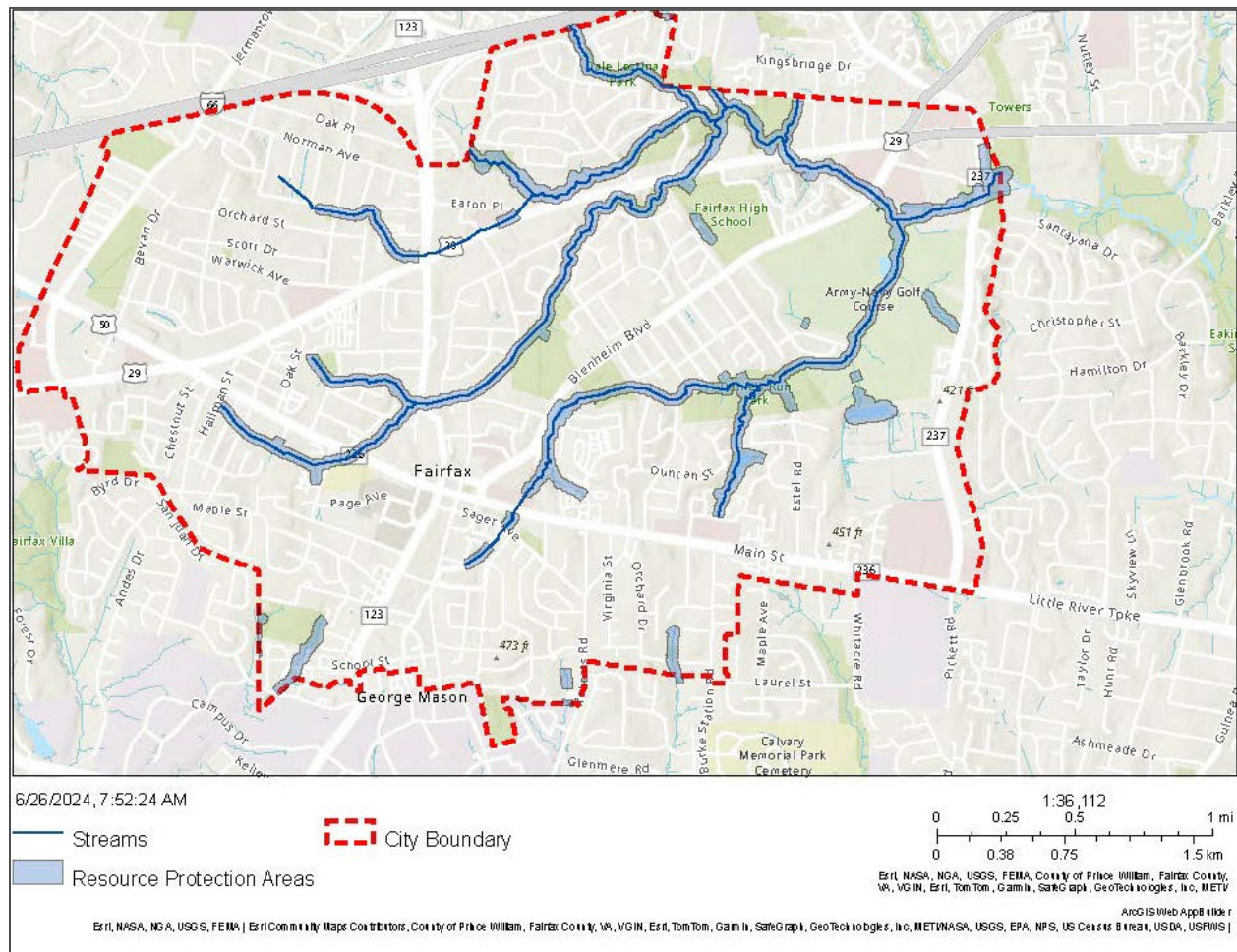




## 5.2.4 Riparian Buffers

Bacteria Source	Corresponding MS4 General Permit Bacteria Special Condition Strategy
Domestic Pets	Protect Riparian Buffers and Provide Unmanicured Vegetative Buffers Along Streams to Dissuade Stream Access

As a Chesapeake Bay Preservation Act locality, the City has established RPAs along its water resources, including in the Accotink Creek and Pope's Head Creek watersheds (Figure 6). The City follows the guidelines published in the Virginia Department of Conservation and Recreation Riparian Buffer Manual when considering proposed activities within RPAs. The City Comprehensive Plan includes an action to "retain and acquire riparian areas as open space or parkland to meet its Natural Environment Goal 1 of preserving, promoting and enhancing a healthy environment. The City has developed over 28 miles of trails, with many located within the preserved open space. Trail rules require that pet waste and leash ordinances be adhered to and prohibit trail users from leaving the established trails.



**Figure 6. Location of Riparian Zones with Riparian Buffers Protected Under the CBPA at Daniels Run Elementary School**



### 5.2.5 Carcass Removal

Bacteria Source	Corresponding MS4 General Permit Bacteria Special Condition Strategy
Urban Wildlife	Implement a Program for Removing Animal Carcasses from Roadways and Properly Disposing of the Same

The City provides collection and disposal of dead animals from most public streets. Citizens can report dead animals by calling the Department of Public Works at (703) 385-7980. For additional information, see the City's Animal Control webpage (<https://www.fairfaxva.gov/government/police/animal-control>).

### 5.2.6 Lateral Line Repair and Replacement Cost-Share Program

Bacteria Source	Corresponding MS4 General Permit Bacteria Special Condition Strategy
Illicit Connections	Other

In 2017, the City established a self-sustaining wastewater lateral repair and replacement program to reimburse customers for repairing laterals within the City rights-of-way and replacing pipes using conventional or trenchless technology. Information specific to this program can be found at: <https://www.fairfaxva.gov/government/public-works/wastewater-lateral-repair-and-replacement-program>.

This program is designed to promote the one-time replacement of an entire lateral length on private property and City right-of-way. Since its inception, the program has contributed to replacing 4,468 feet of private lateral at 112 properties, costing the City \$296,000.00.

## 6.0 Bacteria Reduction Strategy Implementation Schedule

The City will continue to implement these bacteria reduction strategies throughout the current MS4 General Permit (Table 3).

**Table 3. City of Fairfax Bacteria Reduction Strategy Implementation Schedule**

Strategy		Implementation Schedule				
		PY01	PY02	PY03	PY04	PY05
4.2.1	Pet Waste Signage and Pet Waste Stations	✓	✓	✓	✓	✓
4.2.2	Pet Waste Ordinance and Park Policies	✓	✓	✓	✓	✓
4.2.3	Dog Park Placement and Maintenance	✓	✓	✓	✓	✓
4.2.4	Riparian Buffers	✓	✓	✓	✓	✓
4.2.5	Carcass Removal	✓	✓	✓	✓	✓
4.2.6	Lateral Line Repair and Replacement Cost Share Program	✓	✓	✓	✓	✓

Additionally, the City has implemented a pilot program in which they are evaluating the use of Throne Bathroom units. The City is evaluating its ability to provide safe, clean restrooms that can be placed quickly and without utility hookups. Using the Throne units is a temporary solution while the City considers plans for permanent restrooms in City parks. As part of the pilot program, the City has installed three Throne units in the Accotink watershed - Vand Dyck Park, Old Town Square, and the Fairfax Circle



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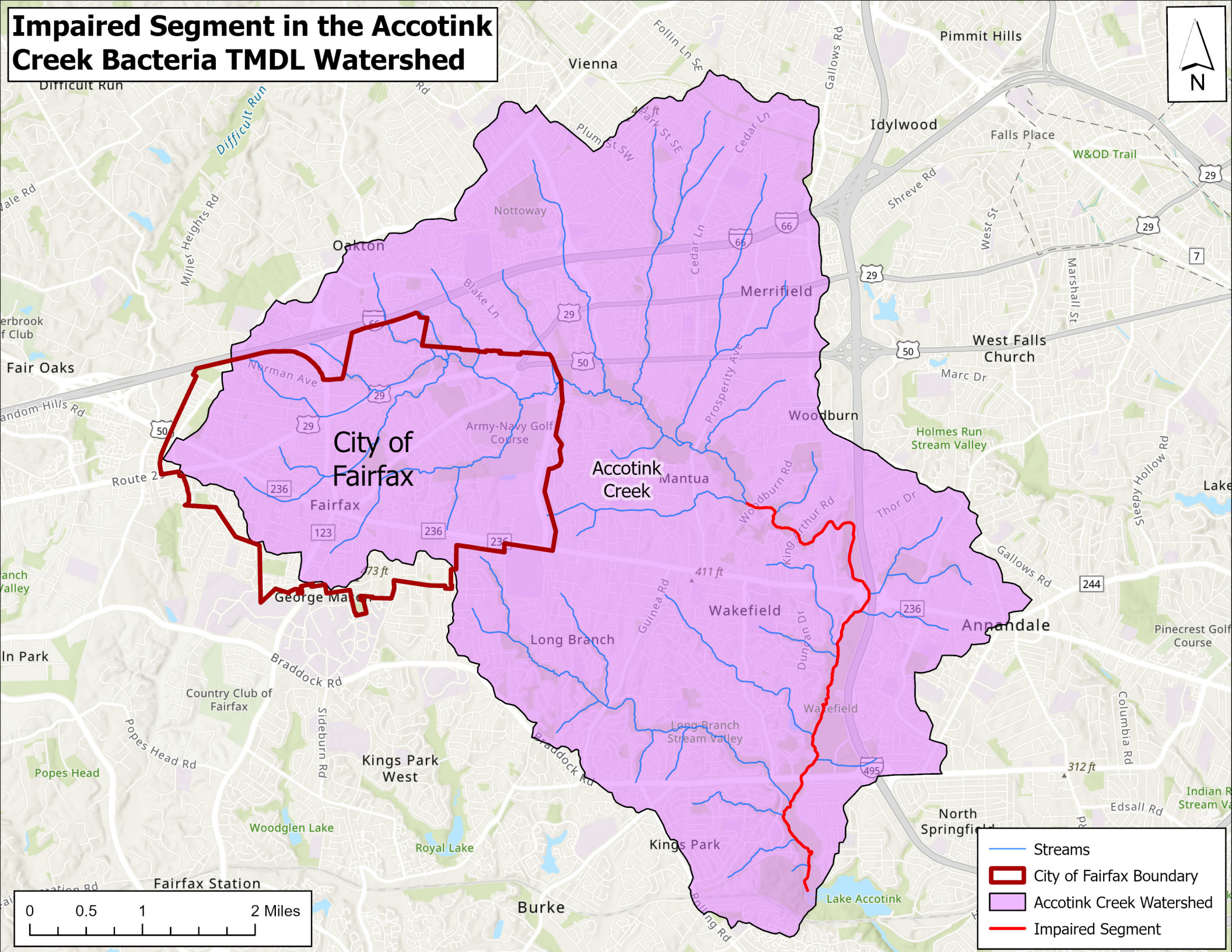
area - to provide restroom access to persons experiencing homelessness and provide restroom services to the general public.



## **Appendix A. Accotink Creek Watershed Map**



# Impaired Segment in the Accotink Creek Bacteria TMDL Watershed

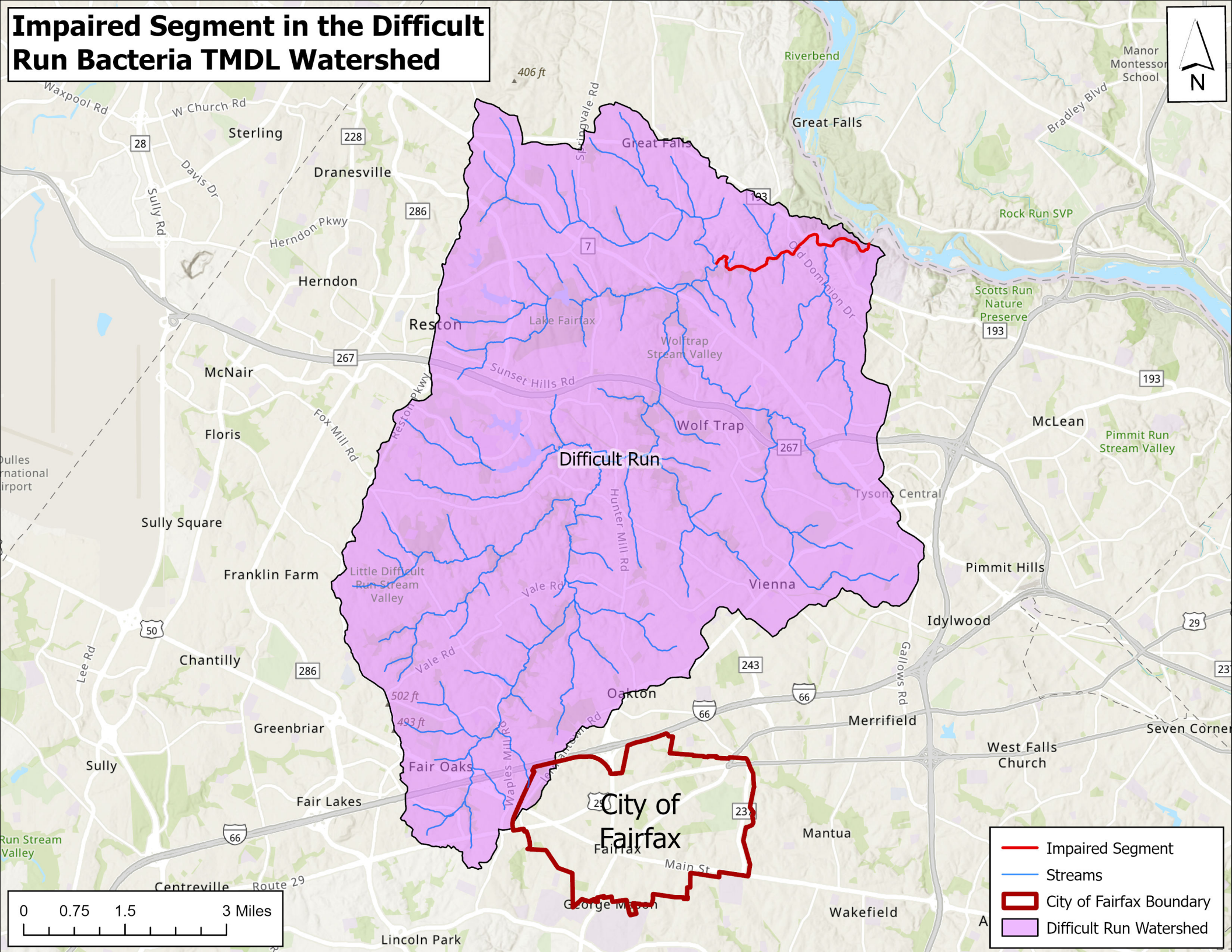




## **Appendix B. Difficult Run Watershed Map**



# Impaired Segment in the Difficult Run Bacteria TMDL Watershed





### **Appendix C. Popes Head Creek Watershed Map**



# Impaired Segment in the Popes Head Creek Bacteria TMDL Watershed

