

5 WMA Restoration Strategies

In an area as built-out and diverse as Fairfax County, it is important to understand the specific issues in a watershed in order to determine the best strategy to restore and protect it. To do this, each watershed was divided into Watershed Management Areas, which are generally two to four square miles and are named for the local major tributary. Due to their smaller size, the Belle Haven and Four Mile Run watersheds were not divided into WMAs and thus the entire watershed for each was treated as a single WMA.

5.1 Belle Haven

The results of the subwatershed ranking analysis showed that all the subwatersheds in the Belle Haven watershed were impaired in some form. All except one were among the lowest ranking for the composite score of impacts and sources. In terms of overall ranking, Belle Haven had the four highest priority subwatersheds for the overall project.

Several reaches of Quander Brook, including parts in the headwaters, were incised and unstable, with points of high erosion. Four subwatersheds in this WMA were identified as headwaters and were reviewed for potential stormwater retrofit improvements. The west branch of Belle Haven, in the southeast portion of the watershed, flows partly in a concrete channel through a high-density residential area, but has the potential for restoration. Modeled water quality showed high pollutant loads, primarily from commercial, transportation, single and multi-family residential land uses that predate stormwater management regulations.

Flooding hazards are a significant issue in the Belle Haven watershed, primarily the area draining under the George Washington Memorial Highway, North of Wake Forest Drive. This area is part of a planning process by the US Army Corps of Engineers.

5.1.1 Structural Projects

5.1.1.1 10-Year Projects

BE9100 Stormwater Pond Retrofit

This project is designed to retrofit an existing detention basin adjacent to West Potomac High School by converting it to a shallow wetland. The bottom of the detention basin will be excavated to incorporate wetland planting zones and meandering flow channels. A new control structure will be installed on the existing barrel pipe to increase the pond's detention time.

BE9102 New Stormwater Pond

This project proposes implementation of an extended detention dry pond at Belle View Elementary School. Project BE9102 will treat runoff from Belle View Elementary School rooftops and parking lots.

BE9103 New Stormwater Pond

This project is proposed to create an extended detention dry pond with a sediment forebay at Fairchild Property. The pond is designed for multiple benefits: to provide quantity and quality control for a large untreated impervious area upstream, to reduce erosive flows downstream, to work with the proposed stream restoration projects in Quander Brook and to improve conditions at adjacent storm drain outfalls.

BE9200 Stream Restoration

Most of this project lies within Belle Haven Park property. The channel is currently experiencing severe bank and bed erosion. Restoration of the channel will include regrading and stabilizing the eroded stream banks. Projects BE9103, BE9202 and BE9203 have been proposed upstream of this project and should be completed prior to this project.

BE9201 Stream Restoration

This low gradient reach has been channelized and straightened for its entire length. The potential project consists of removing the concrete channel and restoring natural bed and banks and improving the riparian buffer from Belle View Boulevard downstream to the confluence with the Belle Haven West Channel.

BE9202 Stream Restoration

This 400 linear foot site is located within a moderately forested tract of land and extends from a 72-inch pipe outfall and continues towards Quander Road. Currently this channel is mostly straight, incised, over-widened and contains a riparian buffer that is comprised of many invasive species. Restoration of this channel will include regrading and stabilizing eroded stream banks along with the installation of grade controls, buffer restoration and elimination of invasive species.

BE9203 Stream Restoration

The proposed projects will daylight the culvert adjacent to the car dealership which will help to reduce the back water effect in this area. Restoration of this channel should follow the design and construction of BE9103 and BE9202 to allow for proper stream design and construction between projects.

BE9500 BMP/LID

The proposed project is to create bioretention areas and install tree box filters to treat the roof and parking lot runoff from the Shops at Huntington Gateway. The tree box filters will be installed at the existing storm drain inlets in the parking lot and bioretention areas will be created by grading the existing medians.

BE9501 BMP/LID

Installation of bioretention filters, basins and tree box filters is proposed to treat the runoff from a large commercial strip mall parking lot located along Richmond Highway. A portion of this parking lot in the north is used for a park and ride. This project is located just upstream of project BE9103, which is a proposed stormwater facility.

BE9502 BMP/LID

The proposed project is to install tree box filters to receive parking lot runoff at Quander Road School. The project site is the parking lot east of the school near the entrance. Tree box filters will be installed at three existing inlets in the parking lot.

BE9503 BMP/LID

The project proposes installation of tree box filters at the existing inlets and creation of a bioretention area to treat the runoff from the west side parking lot. Eight existing inlets will be installed with tree box filters and the open area next to the western-most parking lots will be graded and converted to a bioretention area.

BE9504 BMP/LID

The proposed project is designed to install tree box filters and create bioretention areas to receive runoff from the northern section of parking lot at Belle View Shopping Center on Belle View Boulevard. Tree box filters will be installed at four existing inlets and medians will be graded to create bioretention areas.

BE9505 BMP/LID

Installation of a vegetated swale in the median of 14th Street and tree box filters along the roadway will treat road and roof runoff from residences between H Street and Old Towne Road.

BE9506 BMP/LID

Installation of tree box filters along the shoulders and in the medians of Belle View Boulevard is proposed to treat runoff for water quality.

BE9507 BMP/LID

This project would treat runoff from the parking lot and roof of the Belle View Shopping center by implementing bioretention filters and basins in the medians and constructing a tree box filter in the parking lot.

BE9508 BMP/LID

This project would treat runoff from the Belle View Elementary School parking lot by installing bioretention filters and basins in the medians and adjacent grassy areas. This project is located just upstream of project BE9102, which is a proposed stormwater pond.

BE9509 BMP/LID

Tree box filters are proposed at eleven storm drain inlets to treat parking lot runoff from the Mt. Vernon Recreation Center and Sports Complex.

BE9510 BMP/LID

This project consists of implementing bioretention filters and basins along the edges of the parking lot to treat runoff on the west side of West Potomac High School. This project is located just upstream of the stormwater facility retrofit site BE9100.

BE9600 Flood Protection/Mitigation

The storm drain under Princeton Drive is modeled as flooding for the 100-year event, and the road crossing at Yale Drive overtops for the 10-year event. The project would be reconstruction of the road crossing and storm drain.

5.1.1.2 25-Year Projects

BE9701 Outfall Improvement

This project is an outfall retrofit which would repair a failing outfall and eroding channel behind Quander Road School.

5.1.2 Non-Structural Projects

DC9904 Community Outreach/ Public Education – Storm Drain Marking

This project is intended as a watershed-wide outreach program to provide stencils or other markings on storm drain inlets to educate the public, reduce dumping and reduce the amount of litter entering the storm drain system. Several locations were identified in this WMA through the upland reconnaissance assessment, including Belle Haven, Penn Daw MHP, Fordham Village and Belle Haven Towers.

DC9905 Community Outreach/ Public Education – Tree Planting

Restoration of the urban forest has both water quantity and quality benefits. It is one of few methods to reduce temperature impacts of urbanization, and it provides terrestrial habitat as well. This project is intended as a watershed-wide outreach program to encourage tree planting. The upland reconnaissance identified several residential areas that could benefit, including Belle View, Westgrove, New Alexandria, Belle Haven Meadows and Villamay.

DC9906 Community Outreach/ Public Education – Turf Management

This project is intended to reach out to professional turf managers throughout the watershed and help them assess their practices in the context of stormwater runoff quality. In this WMA, Belle Haven Country Club was identified as a project site.

DC9909 Inspection/Enforcement Enhancement Project – Vehicle Maintenance

This project would provide watershed-wide targeted enforcement of spill prevention and pollution prevention regulations for sites where vehicles are maintained. The upland reconnaissance identified a car dealership where materials were stored outside without cover; there was visible staining around the storage area and vehicles were maintained, washed, repaired and stored outside.

DC9911 Dumpsite/Obstruction Removal – Obstruction Removal

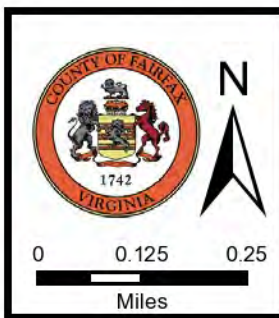
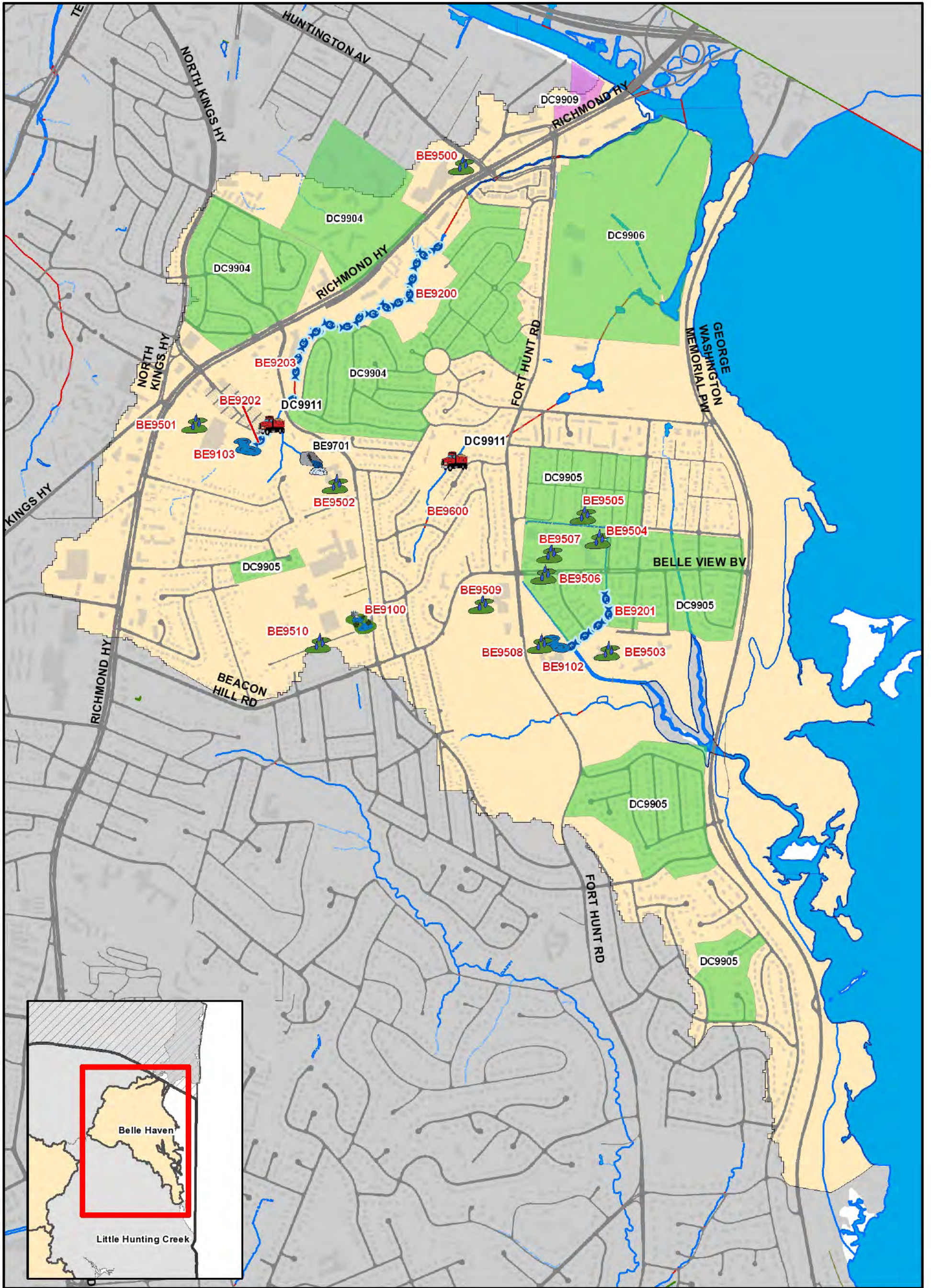
This project is intended as a watershed-wide program to remove obstructions in the stream network. Field assessment identified two stream sites with significant obstructions warranting a removal effort in this WMA. The first is a debris and log jam in the upper reaches of Quander Brook, and the second is debris and downed trees in the channel behind Swan Terrace.

Table 5-1: Belle Haven Projects

Structural Projects ¹						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	Phase
BE9100	Stormwater Pond Retrofit	BE-BH-0015	West Potomac High School	Water Quality and Quantity	County - FCPS	1 - 10
BE9102	New Stormwater Pond	BE-BH-0015	Belle View Elementary School	Water Quality and Quantity	County – FCPS	1 - 10
BE9103	New Stormwater Pond	BE-HC-0020	Fairchild Property	Water Quality and Quantity	County	1 - 10
BE9200	Stream Restoration	BE-HC-0010	Belle Haven Park between Richmond Hwy Foxcroft Rd, and Edgewood Ter	Water Quality	County - FCPA	1 - 10
BE9201	Stream Restoration	BE-BH-0015	Belle View Condos	Water Quality	Private - Residential	1 - 10
BE9202	Stream Restoration	BE-HC-0020	Shields Ave	Water Quality	Private - Residential	1 - 10
BE9203	Stream Restoration	BE-HC-0010	Downstream of Quander Rd	Water Quality	Private - Commercial	1 - 10
BE9500	BMP/LID	BE-HC-0025	Shops at Huntington Gateway	Water Quality	Private - Commercial	1 - 10
BE9501	BMP/LID	BE-HC-0020	Wal-Mart and Chuck E. Cheese parking lot	Water Quality	Private - Commercial	1 - 10
BE9502	BMP/LID	BE-HC-0015	Quander Road School	Water Quality	County - FCPS	1 - 10
BE9503	BMP/LID	BE-BH-0015	River Towers	Water Quality	Private – Residential	1 - 10
BE9504	BMP/LID	BE-BH-0015	Belle View Shopping Center	Water Quality	Private - Commercial	1 - 10
BE9505	BMP/LID	BE-BH-0015	14th St between H St and I St	Water Quality	State - VDOT	1 - 10
BE9506	BMP/LID	BE-BH-0015	Belle View Blvd	Water Quality	State - VDOT	1 - 10
BE9507	BMP/LID	BE-BH-0015	Belle View Shopping Center	Water Quality	Private – Commercial	1 - 10
BE9508	BMP/LID	Multiple	Belle View Elementary School	Water Quality	County – FCPS	1 - 10
BE9509	BMP/LID	Multiple	Mt. Vernon Recreation Center	Water Quality	County - FCPA	1 - 10
BE9510	BMP/LID	BE-BH-0015	West Potomac High	Water Quality	County - FCPS	1 - 10

Structural Projects¹						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	Phase
			School			
BE9600	Flood Protection/Mitigation	BE-BH-0015	Culvert under Yale Dr	Flood Mitigation	State - VDOT	1 - 10
BE9701	Outfall Improvement	BE-HC-0015	Quander Road School	Water Quality	Public/Local	11 - 25
Non-Structural Projects						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	
DC9904	Community Outreach/ Public Education – Storm Drain Marking	Multiple	Watershed-wide	Water Quality	Various	
DC9905	Community Outreach/ Public Education – Tree Planting	Multiple	Watershed-wide	Water Quality and Quantity	Private	
DC9906	Community Outreach/ Public Education – Turf Management	BE-HC-0000	Belle Haven Country Club	Water Quality	Private	
DC9909	Inspection/Enforcement Enhancement Project – Vehicle Maintenance	Multiple	Car dealerships	Water Quality	Private	
DC9911	Dumpsite/Obstruction Removal – Obstruction Removal	BE-BH-0015 BE-HC-0020	Upper reach of Quander Brook and behind Swan Ter	Water Quality	Private	

¹Only the 10-year structural projects will have an associated project fact sheet.



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| Buffer Restoration | Stream Restoration | BMP/LID | Culvert Retrofit | Dumpsite/Obstruction Removal | New Stormwater Pond | Outfall Improvement | Stormwater Pond Retrofit | Other | Community Outreach/Public Education | Area-wide Drainage Improvement | Land Conservation Project | Flood Protection/Mitigation | Inspection/Enforcement Enhancement | Rain Barrel Program | Street Sweeping Program | Studies, Surveys and Assessments |
|--------------------|--------------------|---------|------------------|------------------------------|---------------------|---------------------|--------------------------|-------|-------------------------------------|--------------------------------|---------------------------|-----------------------------|------------------------------------|---------------------|-------------------------|----------------------------------|
- Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years and non-structural projects.

Map 5.1

WMA: Belle Haven
Proposed Projects

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5.2 Dogue Creek – Barnyard Run Results

The results of the subwatershed ranking analysis showed that most of the subwatersheds in Barnyard Run were in good condition, primarily due to the influence of Huntley Meadows Park, which made up all or most of the land area in the lower part of the WMA. In addition, Lee District Park makes up part of the headwaters of this tributary. Three subwatersheds were identified as headwaters and were reviewed for potential retrofits and improvements.

None of the subwatersheds in the Barnyard Run WMA were ranked among the highest priority areas for stream problems; however, there are potential projects for restoration of concrete channels in three subwatersheds. No significant flooding issues were identified.

5.2.1 Structural Projects

5.2.1.1 10-Year Projects

DC9106 Stormwater Pond Retrofit

There is an existing detention basin located at Groveton Woods Condominiums, adjacent to Lafayette Village Apartments that may be converted to a shallow wetland by removing the existing concrete low flow channels, excavating the existing bottom to incorporate wetland planting zones and meandering flow channels and modifying the riser.

DC9210 Stream Restoration

This project is located in Woodstone HOA between Parsons Court and Stover Drive and extends from Bedrock Road downstream to an existing tree line just north of the Huntley Meadows Park boundary. Currently, this channel is concrete lined and very straight with a narrow strip of mowed grass on each side of the channel. Restoration efforts should focus on removing the existing 500' of concrete channel and replacing it with a more natural channel with an improved buffer on each bank.

DC9211 Stream Restoration

This project is located within Woodstone HOA between Vantage Drive and Bedrock Court and extends from Bedrock Road downstream to just north of the Huntley Meadows Park boundary. The channel is straight, concrete lined and has a narrow strip of mowed grass on each side. The downstream portion of this channel is mostly forested. Restoration efforts should focus on replacing the existing concrete channel with a restored natural channel.

DC9512 BMP/LID

This project involves installation of tree box filters and creation of bioretention areas to treat runoff from parking lots at Groveton Gardens. One existing storm drain inlet will be retrofitted with a filter and a low open area adjacent to the parking lot will be graded to create a bioretention area.

DC9513 BMP/LID

A tree box filter and bioretention filters and basins are proposed in the Groveton Elementary School parking lot to treat stormwater runoff. Field assessment showed that this parking lot was currently treated for quantity control; however, quality treatment is lacking at this time.

5.2.1.2 25-Year Projects

DC9514 BMP/LID

This project recommends implementation of tree box filters at the inlets in the Faith United Methodist Church parking lot. This project also provides a good educational opportunity.

DC9703 Outfall Improvement

This project would improve two outfalls along Harrison Lane: a culvert experiencing severe active erosion and a culvert for which the concrete apron is being undermined and has shifted.

5.2.2 Non-Structural Projects

DC9911 Dumpsite/Obstruction Removal – Obstruction Removal

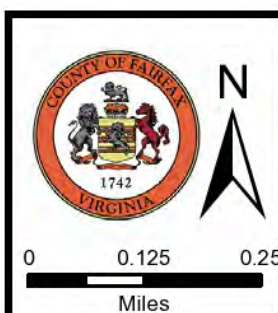
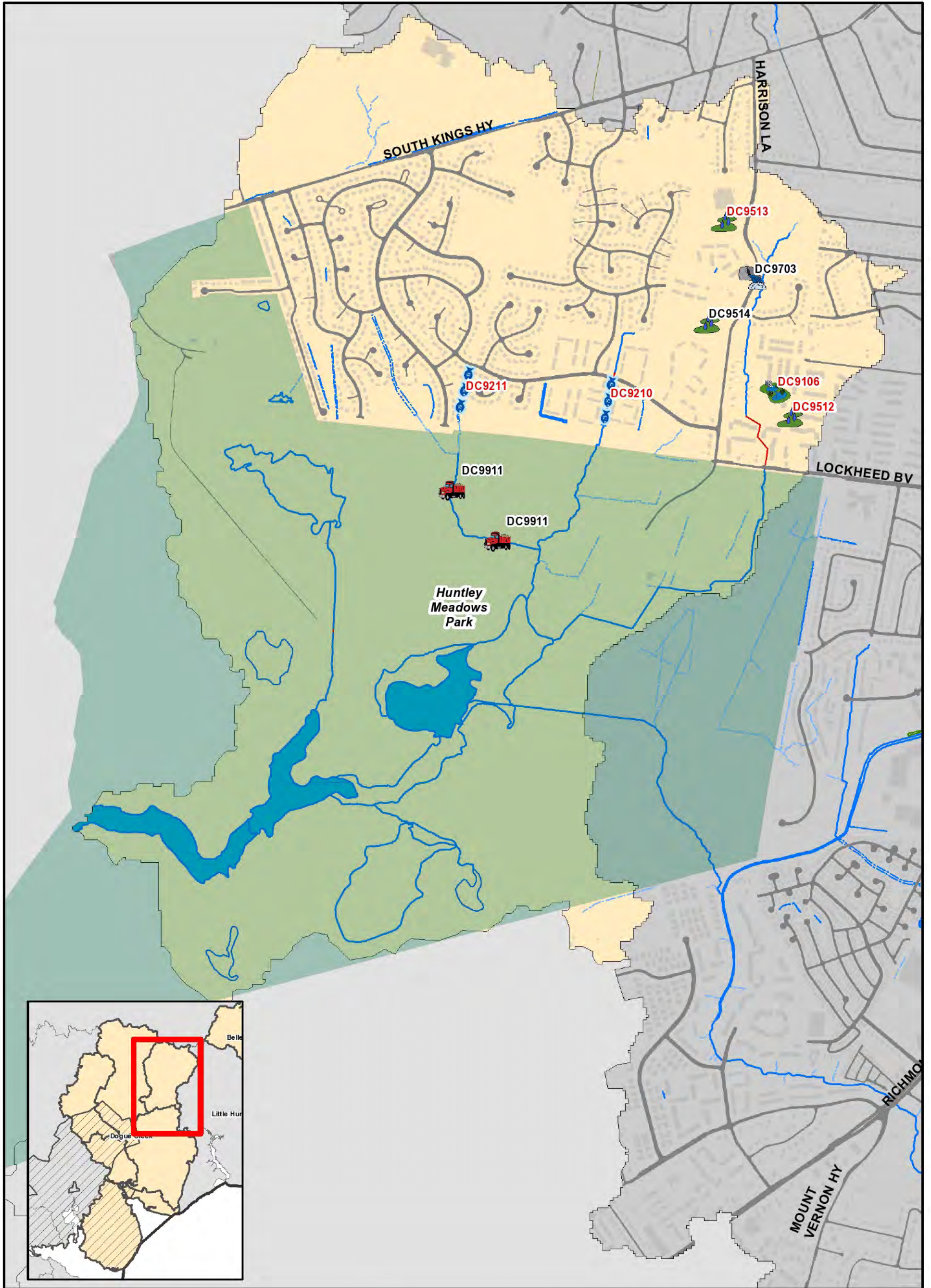
The stream assessment identified trees and debris at two points in stream in Huntley Meadows Park. This project is intended to be part of a watershed-wide program to remove obstructions in the stream network.

Table 5-2: Barnyard Run WMA Projects

Structural Projects¹						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	Phase
DC9106	Stormwater Pond Retrofit	DC-BY-0030	Groveton Woods Condominium	Water Quality and Quantity	Private - Residential	1 - 10
DC9210	Stream Restoration	DC-BY-0035	Between Parsons Ct and Stover Dr	Water Quality	Private - Residential	1 - 10
DC9211	Stream Restoration	DC-BY-0040	Between Bedrock Ct and Vantage Drive	Water Quality	Private - Residential	1 - 10
DC9512	BMP/LID	DC-BY-0030	Groveton Gardens	Water Quality	Private	1 - 10
DC9513	BMP/LID	DC-BY-0030	Groveton Elementary School	Water Quality	County - FCPS	1 - 10
DC9514	BMP/LID	DC-BY-0035	Faith United Methodist Church	Water Quality	Private - Church	11 - 25
DC9703	Outfall Improvement	DC-BY-0030	Harrison Ln	Water Quality	County-FCPA, Private	11 - 25
Non-Structural Projects						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	
DC9911	Dumpsite/Obstruction Removal – Obstruction Removal	DC-BY-0020	Huntley Meadows Park	Water Quality	County -FCPA	

¹Only the 10-year structural projects will have an associated project fact sheet.

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| Buffer Restoration | New Stormwater Pond | Community Outreach/Public Education |
| Stream Restoration | Outfall Improvement | Area-wide Drainage Improvement |
| BMP/LID | Stormwater Pond Retrofit | Land Conservation Project |
| Culvert Retrofit | Other | Flood Protection/Mitigation |
| Dumpsite/Obstruction Removal | | Inspection/Enforcement Enhancement |
| | | Rain Barrel Program |
| | | Street Sweeping Program |
| | | Studies, Surveys and Assessments |
- Implementation timeframe denoted by project label color: Red = 0-10 years Black = 11-25 years and non-structural projects.

Map 5.2

WMA: Barnyard Run
Proposed Projects

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5.3 Dogue Creek – Mainstem Results

The results of the subwatershed ranking analysis showed that a significant number of the subwatersheds in the Mainstem of Dogue Creek were in good condition, primarily due to the influence of undeveloped areas of three large parcels: Huntley Meadows Park, Woodlawn Plantation Greendale Golf Course and Fort Belvoir. Because of its long, narrow shape, many of the subwatersheds in this WMA were identified as headwaters.

Restoration projects were identified in stream reaches with concrete channels or erosion and stability issues. Three sites with impaired buffer were rated with moderate impact and moderate restoration potential.

5.3.1 Structural Projects

5.3.1.1 10-Year projects

DC9213 Stream Restoration

This project involves restoring three separate concrete lined stream channels within Greendale Golf Course. Restoration efforts should focus on removing the existing concrete channels and replacing them with a more natural channel. Development of a riparian buffer around each natural channel should be incorporated with the restoration if feasible.

DC9214 Stream Restoration

This project includes restoring two separate natural stream channels that total 2,000 feet, which flow to golf course ponds and have a tree buffer on one bank and a fairway on the other bank. These channels are incised and over-widened. Proposed restoration includes regrading and stabilizing eroded stream and adjusting the profile to reduce active erosion.

DC9217 Stream Restoration

This project would restore three separate sections on Dogue Creek Mainstem between Richmond Highway and Old Mill Road. The areas of severe erosion and deficient buffer included in this project total a restored length of approximately 850 feet.

DC9400 Culvert Retrofit

The project consists of providing an impoundment structure such as a weir wall across the existing stream channel on the upstream (north) side of a culvert under Telegraph Road to provide stormwater management.

DC9510 BMP/LID

Hayfield Secondary School parking lot runoff could be treated by installing bioretention filters and basins in the medians and adjacent grassy areas. The facilities would be installed on the downstream side of each parking lot.

DC9511 BMP/LID

This project would treat runoff from the Hayfield Plaza parking lot by implementing bioretention filters and basins in the grassy areas adjacent to the southern portion of the parking lot. The facilities would most likely be installed on the downstream side of each parking lot.

DC9518 BMP/LID

Installation of tree box filters are proposed to provide water quality treatment for runoff from the parking lot behind the commercial strip mall located along Kingstowne Village Parkway. Currently, the site appears to have quantity treatment in the form of underground storage.

DC9519 BMP/LID

Installation of bioretention filters and basins and tree box filters are proposed to treat runoff from the driveways and parking lots behind the commercial strip mall located between Kingstowne Boulevard and Kingstowne Village Parkway. The open area between the parking lots will be used for bioretention and one existing inlet will be retrofitted with a tree box filter.

DC9520 BMP/LID

Installation of bioretention filters and basins and tree box filters are proposed to treat runoff from the parking lot surrounding the Church of Jesus Christ of Latter Day Saints along Villa Street. Tree box filters can be added near the church building. Parking lot islands as well adjacent grassy areas could be modified for bioretention filters and basins.

DC9522 BMP/LID

Installation of vegetated swales is proposed to treat road and residential runoff along Clames Drive and Higham Drive. The right-of-way along Clames Drive appears to have enough room for placement of the proposed projects. Coordination with existing driveway culverts and property owners will be needed.

DC9523 BMP/LID

Bioretention filters and basins and rooftop disconnection are proposed to treat Virginia Presbyterian Church runoff before entering an existing dry pond located on the east side of the property. In particular, the drains located on the west side of the church could be disconnected and allowed to drain onto open area for filtration and bioretention filters and basins could be placed at the edge of the parking lot to treat water before entering the dry pond.

5.3.1.2 25-Year Projects

DC9107 Stormwater Pond Retrofit

An existing detention basin at Devereux West would be converted to a shallow wetland by removing the existing concrete low flow channels, excavating the pond bottom to incorporate wet storage zones ranging in depth for high and low marshes and installing a new control structure on the barrel pipe.

DC9108 Stormwater Pond Retrofit

This project will reconstruct the existing pond at Crossroads Residential School to enhance water quality treatment and to prevent embankment failure. The inflow for the existing dry pond is currently clogged causing the pond to function as a wet pond or wetland.

DC9109 Stormwater Pond Retrofit

This project would remove the concrete channels in the existing stormwater management pond at the Church of Jesus Christ of Latter Day Saints at Franconia Road and South Van Dorn Street. There would be some excavation to allow water quality, aquatic vegetation would be added and the riser would require debris clearing.

DC9110 Stormwater Pond Retrofit

This is a retrofit of a stormwater management pond treating a parking lot next to Virginia Presbyterian Church. This project would remove the concrete channels in the existing stormwater management pond and plant aquatic vegetation.

DC9208 Stream Restoration

This project is a stream restoration for a reach at 8822 Richmond Highway (between Old Mill Road and Sacramento Drive) with an exposed sewer manhole and vertical banks.

DC9209 Stream Restoration

This stream restoration would repair moderate bank erosion for a 700 foot reach upstream of Old Mill Road assessed with active widening.

DC9212 Stream Restoration

This project would restore the existing 400 foot concrete channel at Wickford Park to a natural channel design.

DC9515 BMP/LID

This project would convert several parking lot islands at The Shops at Telegraph to bioretention areas. This project would treat approximately half of the stormwater runoff from the parking lot and associated buildings.

DC9516 BMP/LID

This project is a retrofit of a parking lot at Crossroads Residential School and includes adding dry swales, bioretention and water quality inlets for water quality treatment. Existing water and electric lines, a storm drain and trees would affect implementation. The pond proposed in project DC9108 located east of the school would add additional water quality treatment along with providing water quantity control for the site.

DC9517 BMP/LID

This project is a retrofit of a parking lot at the KinderCare Learning Center on May Boulevard which currently drains to a yard inlet. The project would create a rain garden at the existing inlet to allow for water quality treatment. Design and implementation would need to take child safety into account.

DC9521 BMP/LID

This would retrofit an existing dry pond at Franconia Road at Morning Glory Drive by converting to a dry swale to add water quality treatment. Debris would also be removed from the existing inlets.

5.3.2 Non-Structural Projects

DC9800 Buffer Restoration

Stream assessment information was used to identify areas of deficient buffer with the potential for restoration. This site is adjacent to a commercial and industrial area. The project would consist of revegetating or reforesting the riparian buffer to enhance streambank stability and provide habitat.

DC9801 Buffer Restoration

This site is near Sheridonna Lane adjacent to Huntley Meadows Park. Stream assessment information was used to identify areas of deficient buffer with the potential for restoration. The project would consist of revegetating or reforesting the riparian buffer to enhance streambank stability and provide habitat.

DC9901 Rain Barrel Programs – Downspout Disconnection

The upland reconnaissance identified several commercial sites where downspouts were directly connected to storm drains and a watershed-wide outreach program could be beneficial in reducing runoff volume or peak flows. In this WMA, two gas stations, and an auto center at the corner of Route 1 and Mt. Vernon Memorial Highway were noted.

DC9903 Community Outreach/ Public Education – Lawn Care

This project would be part of a watershed-wide outreach program to homeowners to provide education and guidance on lawn care practices that could potentially reduce pollutants in stormwater runoff. The upland reconnaissance identified one multifamily residential neighborhood (Gilford) with high-maintenance lawns that could be targeted with this effort.

DC9905 Community Outreach/ Public Education – Tree Planting

This project is intended as a watershed-wide outreach program to encourage tree planting, which has both water quantity and quality benefits and is one of few methods to reduce temperature impacts of urbanization, and it provides terrestrial habitat as well. One multi-family neighborhood (Gilford) was identified as a potential outreach target.

DC9906 Community Outreach/ Public Education – Turf Management

This project is intended to reach out to professional turf managers throughout the watershed and help them assess their practices in the context of stormwater runoff quality. In this WMA, Greendale Golf Course was identified as a project site. It is part of the Fairfax County Parks system.

DC9907 Inspection/Enforcement Enhancement Project – Dumpster Maintenance

Poorly maintained dumpsters and other waste management practices are a source of litter and pollutants in stormwater runoff. This project is a watershed-wide enforcement and outreach approach to properties where problems were identified during the upland reconnaissance. Dumpsters in this WMA with evidence of leakage, lack of cover, and direct connection to storm drain inlets were flagged as hotspots.

DC9909 Inspection/Enforcement Enhancement Project – Vehicle Maintenance

This project would provide watershed-wide targeted enforcement of spill prevention and pollution prevention regulations for sites where vehicles are maintained. The upland reconnaissance identified two gas stations and an auto center at the corner of Route 1 and Mt. Vernon Memorial Highway where vehicles were stored, repaired and maintained outside; there was evidence of spill and leakage from vehicles, and uncovered fueling areas were present and directly connecting to storm drains.

DC9911 Dumpsite/Obstruction Removal – Obstruction Removal

This project is intended as a watershed-wide program to remove obstructions in the stream network. Two sites were identified during field assessment where trees, sediment, and debris had created a blockage.

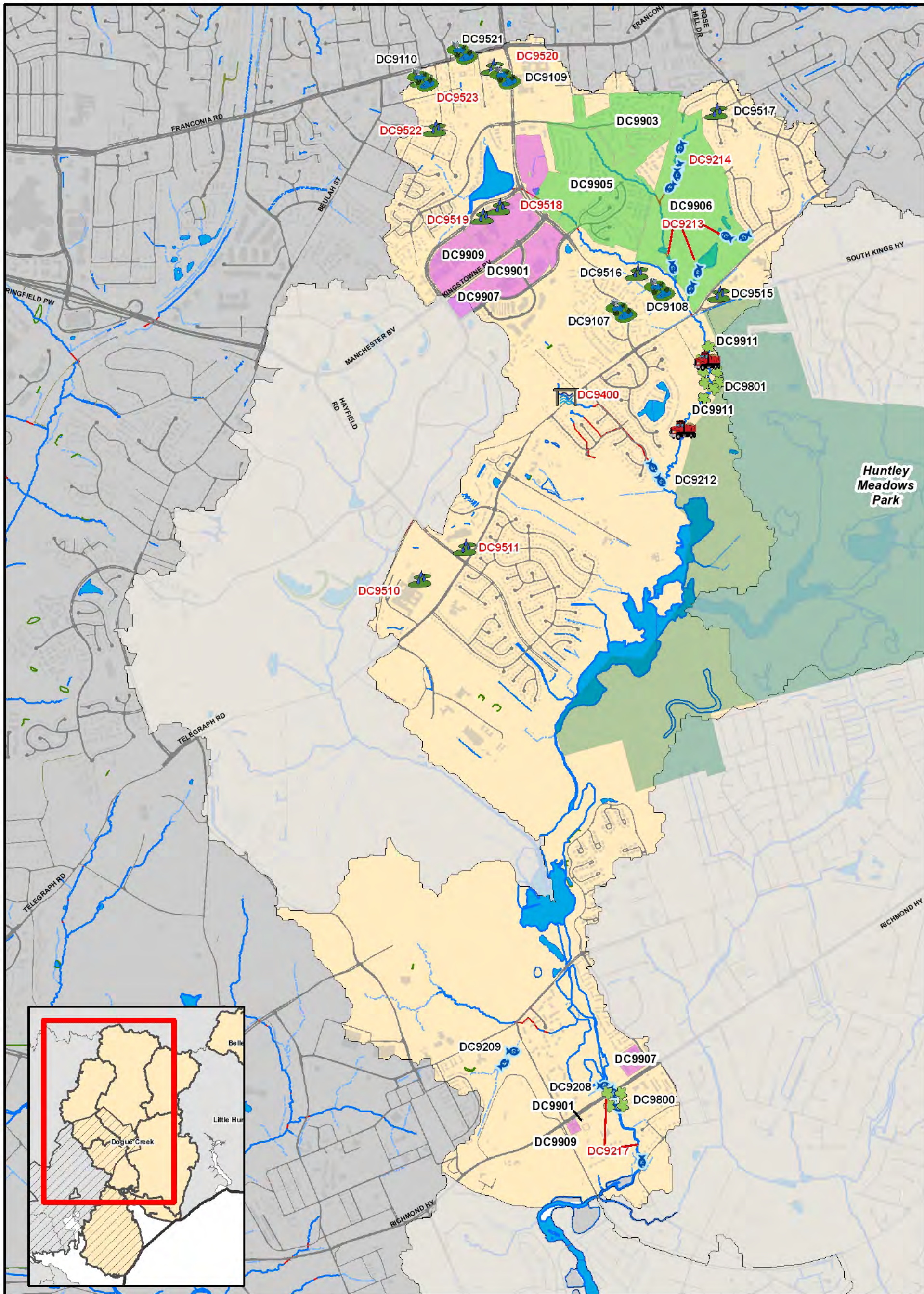
Table 5-3: Mainstem WMA Projects

Structural Projects ¹						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	Phase
DC9213	Stream Restoration	DC-DC-0090	Greendale Golf Course	Water Quality	County - FCPA	1 - 10
DC9214	Stream Restoration	DC-DC-0100	Greendale Golf Course	Water Quality	County - FCPA	1 - 10
DC9217	Stream Restoration	DC-DC-0000	Between Old Mill Rd and Richmond Hwy	Water Quality	Private	1 - 10
DC9400	Culvert Retrofit	DC-DC-0075	North side, Telegraph Rd	Water Quality	State – VDOT	1 - 10
DC9510	BMP/LID	DC-DC-0050	Hayfield Secondary School	Water Quality	County - FCPS	1 - 10
DC9511	BMP/LID	DC-DC-0050	Hayfield Plaza	Water Quality	Private - Commercial	1 - 10
DC9518	BMP/LID	DC-DC-0110	Kingstowne Village	Water Quality	Private - Commercial	1 - 10
DC9519	BMP/LID	DC-DC-0110	Kingstowne Village	Water Quality	Private - Commercial	1 - 10
DC9520	BMP/LID	DC-DC-0110	Church of Jesus Christ of Latter Day Saints	Water Quality	Private – Church	1 - 10
DC9522	BMP/LID	DC-DC-0110	Clames Dr	Water Quality	State - VDOT	1 - 10
DC9523	BMP/LID	DC-DC-0110	Virginia Presbyterian Church	Water Quality	Private - Church	1 - 10
DC9107	Stormwater Pond Retrofit	DC-DC-0085	Devereux West	Water Quality and Quantity	Private	11 - 25
DC9108	Stormwater Pond Retrofit	DC-DC-0085	Crossroads Residential School	Water Quality and Quantity	Private - School	11 - 25
DC9109	Stormwater Pond Retrofit	DC-DC-0110	Church of Jesus Christ of Latter Day Saints	Water Quality and Quantity	Private - Church	11 - 25
DC9110	Stormwater Pond Retrofit	DC-DC-0110	Virginia Presbyterian Church	Water Quality and Quantity	Private - Church	11 - 25
DC9208	Stream Restoration	DC-DC-0010	8822 Richmond Hwy (between Old Mill Rd and Sacramento Dr)	Water Quality	County- FCPA, Private	11 - 25
DC9209	Stream Restoration	DC-DC-0015	Upstream of Old Mill Rd (Close to Pope Leighy House)	Water Quality	Private	11 - 25
DC9212	Stream Restoration	DC-DC-0065	Wickford Park	Water Quality	Public/Local	11 - 25

Structural Projects¹						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	Phase
DC9515	BMP/LID	DC-DC-0085	The Shops at Telegraph	Water Quality	Private - Commercial	11 - 25
DC9516	BMP/LID	DC-DC-0085	Crossroads Residential School	Water Quality	Private - School	11 - 25
DC9517	BMP/LID	DC-DC-0100	KinderCare Learning Center, May Blvd	Water Quality	Private - Commercial	11 - 25
DC9521	BMP/LID	DC-DC-0110	Franconia Rd at Morning Glory Dr	Water Quality and Quantity	Private - Residential	11 - 25
Non-Structural Projects						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	
DC9800	Buffer Restoration	DC-DC-0000	Buffer restoration adjacent to commercial / industrial site, Dogue Ct	Water Quality and Quantity	Private	
DC9801	Buffer Restoration	DC-DC-0080	Stream adjacent to Huntley Meadows near Sheridonna Ln	Water Quality and Quantity	Private, FCPA	
DC9901	Rain Barrel Programs – Downspout Disconnection	Multiple	Watershed-wide	Water Quality and Quantity	Private	
DC9903	Community Outreach/ Public Education – Lawn Care	Multiple	Watershed-wide	Water Quality	Private	
DC9905	Community Outreach/ Public Education – Tree Planting	Multiple	Watershed-wide	Water Quality and Quantity	Private	
DC9906	Community Outreach/ Public Education – Turf Management	DC-DC-0090	Greendale Golf Course	Water Quality	County - FCPA	
DC9907	Inspection/Enforcement Enhancement Project – Dumpster Maintenance	Multiple	Watershed-wide	Water Quality	Private	
DC9909	Inspection/Enforcement Enhancement Project – Vehicle Maintenance	Multiple	Gas stations and auto centers	Water Quality	Private	

Non-Structural Projects					
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner
DC9911	Dumpsite/Obstruction Removal – Obstruction Removal	DC-DC-0080	Trees and debris in mainstem in Huntley Meadows Park	Water Quality	County - FCPA

¹Only the 10-year structural projects will have an associated project fact sheet.



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| Buffer Restoration | Stream Restoration | New Stormwater Pond | Community Outreach/Public Education |
| BMP/LID | Culvert Retrofit | Outfall Improvement | Area-wide Drainage Improvement |
| Dumpsite/Obstruction Removal | Other | Stormwater Pond Retrofit | Land Conservation Project |
| | | Flood Protection/Mitigation | Inspection/Enforcement Enhancement |
| | | | Rain Barrel Program |
| | | | Street Sweeping Program |
| | | | Studies, Surveys and Assessments |
- Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years and non-structural projects.

Map 5.3

WMA: Mainstem
Proposed Projects

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5.4 Dogue Creek – North Fork Results

The subwatershed ranking analysis showed that all but two of the subwatersheds in North Fork were impaired in some form. Most of the subwatersheds were among the lowest ranking. Nine subwatersheds were identified as headwaters and were reviewed for potential stormwater retrofit improvements.

Analysis showed low ratings in stream quality. Many streams have been channelized with a concrete channel but have potential for restoration to a more natural condition. Several of the streams were ranked poor for aquatic habitat. There were a number of reaches described as unstable and actively eroding, with either good or moderate restoration potential.

5.4.1 Structural Projects

5.4.1.1 10-Year Projects

DC9100 New Stormwater Pond

The project proposes creation of an extended detention dry pond with a sediment forebay at Mount Vernon High School. Runoff from the roofs and parking lots will be treated for water quantity control and water quality. The proposed pond will be implemented in open space adjacent to the track and field.

DC9201 Stream Restoration

This site is characterized by severe erosion and has a high restoration potential. The site runs through a wooded residential area between Presidential Drive and Volunteer Drive and extends from just upstream of Cherrytree Drive to Robertson Boulevard. Several other items, including utility line stabilization, a head cut and obstructions could be remedied at this site as part of the stream restoration project.

DC9202 Stream Restoration

This 1350 LF site is located within a moderately forested tract of land and sits between Sulgrave Drive and Adrienne Drive. Based on existing conditions, this project would consist of spot stabilization treatments, using both hard and soft engineering techniques. Minor changes in channel dimensions would be required.

DC9203 Stream Restoration

This project is a stream restoration upstream of Mount Zephyr Drive near Maryland Street. This reach is currently experiencing moderate to severe erosion along both banks. Restoration will include reconnecting this channel back to the original floodplain and installing grade controls to help prevent future downcutting and overwidening.

DC9204 Stream Restoration

This site is located within George Washington Park between Quisenberry Drive and Old Mount Vernon Road. The existing conditions within the reach include several head cuts, incision areas and destabilized banks. Restoration efforts should focus on reconnecting this channel to the floodplain by reducing channel dimensions and raising bed elevations through profile adjustments, regrading and stabilizing stream banks.

DC9207 Stream Restoration

Most of this channel is over-widened, unstable and incised with eroded banks on straight reaches of the stream. Restoration of this channel will focus on creating a nested channel, where the floodplain and banks of the current channel will be regraded to allow for a new floodplain at an elevation lower than the original floodplain.

DC9500 BMP/LID

Installation of bioretention filters and basins and tree box filters are proposed to treat runoff from the parking lot surrounding Smitty's Building Supply and adjacent areas along Richmond Highway.

DC9501 BMP/LID

Bioretention filters and basins are proposed for construction at low points of the parking lots in this area to capture and treat the runoff. The sites at Maury Place located between the street and the lot would require construction of a depressed berm. Removal of either play area or parking and curb cuts might be required for the site at the foot of Mohawk Lane.

DC9503 BMP/LID

This project would treat runoff from the parking lots at Riverside Elementary School and George Washington Recreational area by implementing bioretention filters and basins and tree box filters in the medians and in adjacent grassy areas in the parking lots.

DC9504 BMP/LID

Mount Vernon High School south parking lot runoff would be treated by installing bioretention filters and basins and tree box filters in and along the edges of the parking lot. Tree box filters will be suitable in the parking lot and bioretention filters are possible at the south edge of the parking lot.

DC9505 BMP/LID

Mount Vernon High School north parking lot runoff would be treated by installing bioretention filters and basins and tree box filters in and along the edges of the parking lot. All but one of these sites are located just upstream of a proposed stormwater project (DC9100) and could be designed as a system to maximize pre-treatment, water quality benefits and water quantity storage.

DC9600 Flood Protection/Mitigation

The crossing at Ashboro Drive overtops. Culvert reconstruction could reduce backwater effects.

5.4.1.2 25-Year Projects

DC9101 Stormwater Pond Retrofit

This project would convert the existing stormwater management pond at the end of Purks Court to a shallow marsh to allow for additional water quality treatment.

DC9200 Stream Restoration

This 700 linear foot site is characterized by a concrete channel. The intention of this project would be to remove the concrete channel and develop a natural stream channel. The proposed restoration site runs from Robertson Boulevard to Craig Avenue and should be completed after project DC9201, located upstream.

DC9205 Stream Restoration

The concrete channel for the reach between Oak Leaf Drive and McNair Drive would be partially or completely removed as part of this stream restoration project. This would restore the channel to more natural conditions.

DC9206 Stream Restoration

This stream restoration project would restore the stream reach at Rosemont Avenue and Rosemont Circle to a more natural condition by removing the concrete channel and should be completed after project DC9205, located upstream. The riparian buffer would be replanted as well.

DC9401 Culvert Retrofit

This culvert retrofit would regrade and revegetate an existing grass swale along Lawrence Street between Central Park and Ashboro Drive.

DC9502 BMP/LID

This project would place tree box filters or bioretention filters at all curb inlets at the KinderCare Learning Center on Buckman Road.

5.4.2 Non-Structural Projects

DC9803 Wetland Mitigation

This project would expand the existing wetland adjacent to Riverside Elementary School and could include an educational component with boardwalk and signage. Additionally, the existing wetland would benefit from the removal of several invasive species.

DC9901 Rain Barrel Programs – Downspout Disconnection

This project is intended as a watershed-wide outreach program that could reduce the runoff volume or peak flows. The upland reconnaissance identified several commercial sites where downspouts were directly connected to storm drains. In this WMA, several gas stations and other businesses on Richmond Highway were flagged for potential downspout disconnection.

DC9902 Rain Barrel Programs – Rain Barrels

Rain barrels are the residential solution and a first step to downspout disconnection. This project would be a watershed-wide outreach program to encourage their use. Six neighborhoods were identified during the upland reconnaissance with roof drainage that would be suitable for this approach.

DC9904 Community Outreach/ Public Education – Storm Drain Marking

This project is intended as a watershed-wide outreach program to provide stencils or other markings on storm drain inlets to educate the public, reduce dumping and reduce the amount of litter entering the storm drain system. Most of the residential neighborhoods in this WMA which were assessed during the upland reconnaissance assessment were found to be lacking storm drain markings.

DC9905 Community Outreach/ Public Education – Tree Planting

Several of the communities assessed during the upland reconnaissance could be sites for a watershed-wide outreach program to encourage tree planting and urban reforestation. These included Timothy Park, Fairfield, Mt Vernon Park, Pinewood Lawn, Mt Vernon on Potomac, Oxford and Mt Vernon Valley.

DC9906 Community Outreach/ Public Education – Turf Management

Outreach to turf managers is similar to residential lawn care outreach, but it is more focused on data gathering to assess current practices, with subsequent education for managers about runoff pollution. In this WMA, Mt Vernon Country Club was identified as a potential outreach site.

DC9907 Inspection/Enforcement Enhancement Project – Dumpster Maintenance

This project is a watershed-wide enforcement and outreach approach to properties where problems were identified with waste management practices during the upland reconnaissance. These included uncovered dumpsters and dumpsters located near storm drain inlets without runoff diversion methods.

DC9908 Inspection/Enforcement Enhancement Project – Outdoor Material Storage

Materials stored outdoors and exposed to precipitation are a potential source of stormwater runoff pollution. Two sites in this WMA had materials stored without cover or uncovered loading/unloading operations which drained towards the storm drain. This project would be a watershed-wide enforcement and outreach approach to check for stormwater pollution prevention plans and educate property owners.

DC9909 Inspection/Enforcement Enhancement Project – Vehicle Maintenance

In this WMA, eight of the sites assessed during the upland reconnaissance showed evidence of vehicles stored, repaired, or maintained outdoors, or with uncovered fueling areas. This project would provide watershed-wide targeted enforcement of spill prevention and pollution prevention regulations for sites where vehicles are maintained

DC9911 Dumpsite/Obstruction Removal – Obstruction Removal

Ten sites were identified with significant obstructions during the stream assessment. These included a beaver dam, concrete, trash and downed trees. This project is intended as a watershed-wide program to remove obstructions in the stream network.

DC9912 Street Sweeping Program

Three residential areas and two large shopping centers were found to have trash, litter, or organic debris in the curb and gutter flowing to storm drain inlets. This project consists of developing or extending a street sweeping program to remove potential pollutants from the street before they can wash off in a storm.

Table 5-4: North Fork WMA Projects

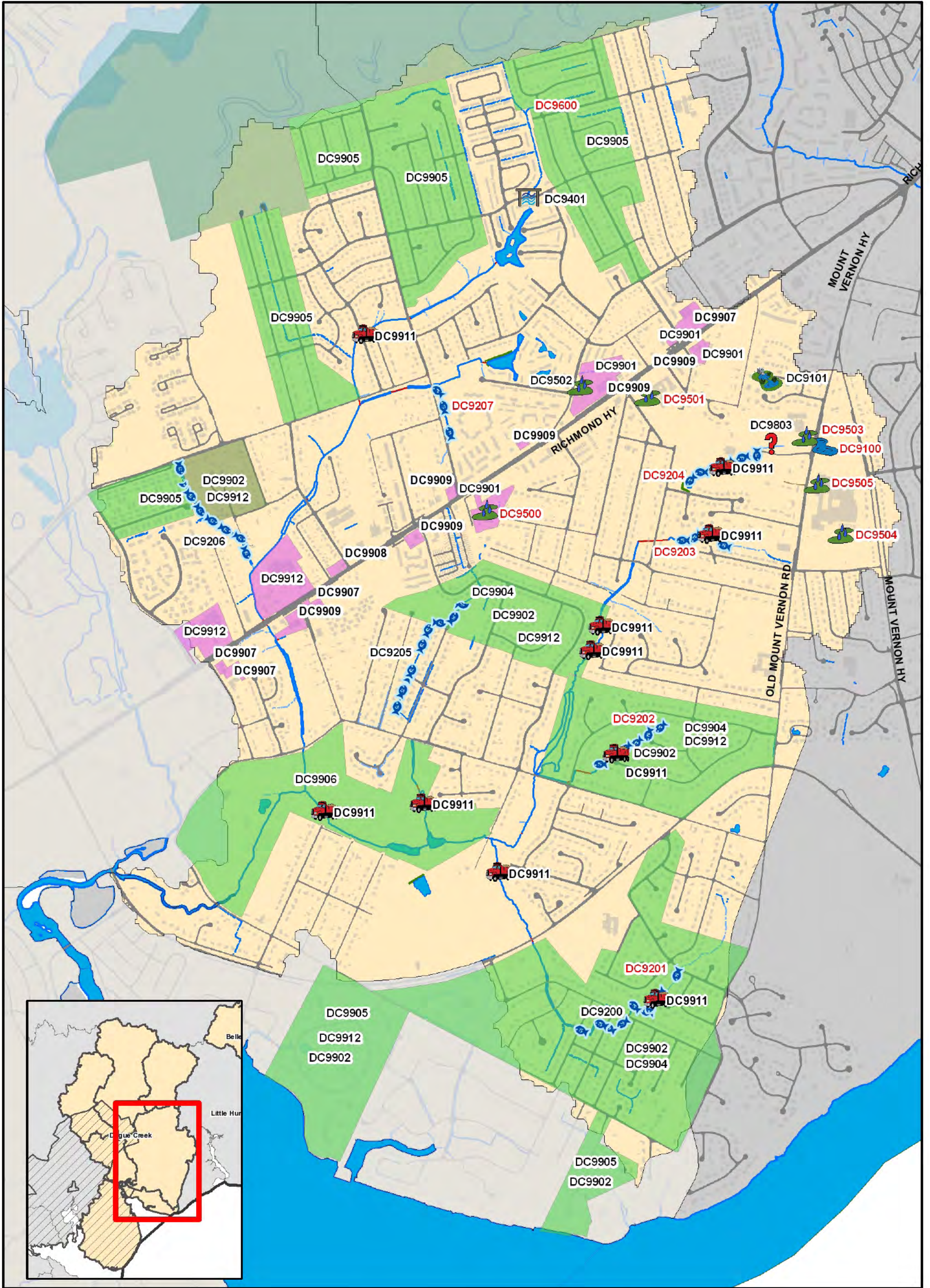
Structural Projects ¹						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	Phase
DC9100	New Stormwater Pond	DC-NE-0035	Mount Vernon High School	Water Quality and Quantity	County - FCPS	1 - 10
DC9201	Stream Restoration	DC-NE-0020	Between Presidential Dr and Volunteer Dr	Water Quality	Private - Residential	1 - 10
DC9202	Stream Restoration	DC-NE-0025	Between Sulgrave Dr and Adrienne Dr	Water Quality	Private - Residential	1 - 10
DC9203	Stream Restoration	DC-NE-0030	Upstream of Mount Zephyr Dr near Maryland St	Water Quality	Private - Residential	1 - 10
DC9204	Stream Restoration	DC-NE-0035	George Washington Park	Water Quality	County – FCPA	1 - 10
DC9207	Stream Restoration	DC-NW-0015	Behind Colony Dr	Water Quality	Private - Residential	1 - 10
DC9500	BMP/LID	DC-NW-0015	Smitty's Building Supply	Water Quality	Private - Commercial	1 - 10
DC9501	BMP/LID	DC-NW-0015	Various	Water Quality	County/Private	1 - 10
DC9503	BMP/LID	DC-NE-0035	Riverside Elementary School	Water Quality	County - FCPS	1 - 10
DC9504	BMP/LID	DC-NE-0035	Mount Vernon High School	Water Quality	County - FCPS	1 - 10
DC9505	BMP/LID	DC-NE-0035	Mount Vernon High School	Water Quality	County - FCPS	1 - 10
DC9600	Flood Protection/ Mitigation	DC-NW-0030	Culvert under Ashboro Dr	Flood Mitigation	Private - Commercial	1 - 10
DC9101	Stormwater Pond Retrofit	DC-NE-0035	End of Purks Ct	Water Quality	Private	11 - 25
DC9200	Stream Restoration	DC-NE-0020	Robertson Blvd	Water Quality	Private - Residential	11 - 25
DC9205	Stream Restoration	DC-NE-0005	Between Oak Leaf Dr and McNair Dr	Water Quality	Private	11 - 25
DC9206	Stream Restoration	DC-NW-0005	Rosemont Ave and Rosemont Cir	Water Quality	Private	11 - 25
DC9401	Culvert Retrofit	DC-NW-0030	Lawrence St between Central Park and Ashboro Dr	Water Quality	State - VDOT	11 - 25

Structural Projects¹						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	Phase
DC9502	BMP/LID	DC-NW-0015	KinderCare Learning Center, Buckman Rd	Water Quality	Public/Local	11 - 25
Non-Structural Projects						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	
DC9803	Wetland Mitigation	DC-NE-0035	Riverside Elementary School	Water Quality	Public/Local	
DC9901	Rain Barrel Programs – Downspout Disconnection	Multiple	Watershed-wide	Water Quality and Quantity	Private	
DC9902	Rain Barrel Programs – Rain Barrels	Multiple	Watershed-wide	Water Quality and Quantity	Private	
DC9904	Community Outreach/ Public Education – Storm Drain Marking	Multiple	Watershed-wide	Water Quality	Private	
DC9905	Community Outreach/ Public Education – Tree Planting	Multiple	Watershed-wide	Water Quality and Quantity	Private	
DC9906	Community Outreach/ Public Education – Turf Management	DC-NE-0000	Mount Vernon Country Club	Water Quality	Private	
DC9907	Inspection/Enforcement Enhancement Project – Dumpster Maintenance	Multiple	Watershed-wide	Water Quality	Various	
DC9908	Inspection/Enforcement Enhancement Project – Outdoor Material Storage	Multiple	Watershed-wide	Water Quality	Various	
DC9909	Inspection/Enforcement Enhancement Project – Vehicle Maintenance	Multiple	Gas stations, body shops, and repair shops,	Water Quality	Various	

Non-Structural Projects					
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner
DC9911	Dumpsite/Obstruction Removal – Obstruction Removal	Multiple	Watershed-wide	Water Quality	Various
DC9912	Street Sweeping Program	Multiple	Watershed-wide	Water Quality	Various

¹Only the 10-year structural projects will have an associated project fact sheet.

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<ul style="list-style-type: none">  Buffer Restoration  Stream Restoration  BMP/LID  Culvert Retrofit  Dumpsite/Obstruction Removal 	<ul style="list-style-type: none">  New Stormwater Pond  Outfall Improvement  Stormwater Pond Retrofit  Other 	<ul style="list-style-type: none">  Community Outreach/Public Education  Area-wide Drainage Improvement  Land Conservation Project  Flood Protection/Mitigation  Inspection/Enforcement Enhancement  Rain Barrel Program  Street Sweeping Program  Studies, Surveys and Assessments
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Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years and non-structural projects.

Map 5.4

WMA: North Fork
Proposed Projects

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5.5 Dogue Creek – Piney Run Results

The lower reaches and subwatersheds of Piney Run are within the boundaries of Ft. Belvoir and were not assessed for this plan. The majority of the remaining subwatersheds met the definition of headwater areas and the assessment was focused on these areas.

While Piney Run was not ranked among the high priority areas for stream problems, there were a few localized areas where potential projects were identified from the stream assessment data. None of the subwatersheds within Piney Run were a high priority for flood mitigation. No road crossings were overtopped beyond the level of service frequency.

None of the subwatersheds in the Piney Run WMA were among the highest priority for water quality problems. There is a diversity of land use, primarily high-density residential and commercial areas, along with open space.

5.5.1 Structural Projects

5.5.1.1 10-Year Projects

DC9215 Stream Restoration

This site is experiencing bank erosion on outside meanders and channel bed incision, with an exposed sanitary sewer pipe. Restoration of the channel will include reconnecting the stream to the floodplain by reducing the existing channel dimensions, raising the bed elevation of the channel to correct the slope and installing grade controls to prevent future bed incision.

DC9218 Stream Restoration

This project will daylight a stream located on the Banks Property. The upstream portion of the reach is currently piped for several hundred feet. This project would restore this section of stream to a natural channel. The project would also repair eroded portions downstream of the property itself.

DC9506 BMP/LID

Installation of a vegetated swale and several tree box filters are proposed to treat roof as well as driveway runoff at the end of Alderman Drive.

DC9507 BMP/LID

Installation of bioretention filters and basins and tree box filters are proposed to treat runoff from the residential parking lots along Wescott Hills Way. This project includes retrofitting four existing inlets that drain the entire parking lot.

DC9508 BMP/LID

Bioretention filters and basins are proposed in the medians of the Shoppers' parking lot to treat the runoff from the parking lot before it enters into the storm drain system. Most of this parking lot drains to single inlets along medians.

5.5.1.2 25-Year Projects

DC9102 Stormwater Pond Retrofit

Concrete channels would be removed, the pond bottom flattened and aquatic plants would be planted at the existing pond at the Kingstowne Fire Station. The bottom of the existing pond is currently kept mowed. This maintenance would no longer be required.

DC9104 Stormwater Pond Retrofit

This is a retrofit of an existing pond at Kingstowne Village Parkway at Ashby Lane in which a low flow channel and wetland has already developed. Additional vegetation would be added and maintained and a micropool would be added at the riser.

DC9105 Stormwater Pond Retrofit

The retrofit of the existing pond at Manchester Lake Drive would include minor regrading, removing the concrete channel and creating landscaping around the edge of the pond.

DC9216 Stream Restoration

This stream restoration project at Rock Ridge Lane would repair severe bank erosion and heavy sediment deposition in the channel.

DC9509 BMP/LID

This project is a retrofit of a parking lot at Calvary Baptist Church and Christian School. Medians would be replanted with plants providing bioretention. Rain gardens would also be added to treat the rooftop runoff.

DC9701 Outfall Improvement

This outfall retrofit would repair the eroding channel and undercut banks at this outfall behind 6115 Summer Park Lane.

DC9702 Outfall Improvement

This project would replace the concrete pipe at this outfall under Rock Ridge Lane.

5.5.2 Non-Structural Projects

DC9802 Buffer Restoration

Field assessment identified a section of stream downstream of Hilltop Golf Club with a deficient buffer which had the potential for restoration. This project would consist of outreach to educate and encourage the property owners to restore the buffer.

DC9902 Rain Barrel Programs – Rain Barrels

Rain barrels are a residential approach to downspout disconnection. This project would be a watershed-wide outreach program to encourage their use, perhaps by subsidizing the cost. One neighborhood, Windsor Gable, was identified as suitable during the upland reconnaissance. Outreach to this area would be coordinated with other efforts throughout the watershed or the County.

DC9905 Community Outreach/ Public Education – Tree Planting

This project is intended as a watershed-wide outreach program to encourage tree planting. The upland reconnaissance identified three residential areas in this WMA that could benefit, including Manchester Lakes, Windsor Gable, and Victoria Cross.

DC9907 Inspection/Enforcement Enhancement Project – Dumpster Maintenance

This project is a watershed-wide enforcement and outreach approach to properties where problems were identified during the upland reconnaissance. Dumpsters at one site in this WMA were flagged as hotspots for poor condition and direct connection to storm drain inlets.

DC9909 Inspection/Enforcement Enhancement Project – Vehicle Maintenance

One site in the WMA was seen with vehicles maintained repaired, washed outside; evidence of leaks from at least one vehicle; and materials stored outside with the storage area directly connected to the storm drain. This project would provide watershed-wide targeted enforcement of spill prevention and pollution prevention regulations.

DC9911 Dumpsite/Obstruction Removal – Obstruction Removal

Six beaver dams were identified in Piney Run during the stream assessment. This project is intended as a watershed-wide program to remove obstructions in the stream network, including beaver dams if they are found to be contributing to erosion or flooding. The beaver dams in the Piney Run WMA will be removed because they are contributing to erosion or flooding.

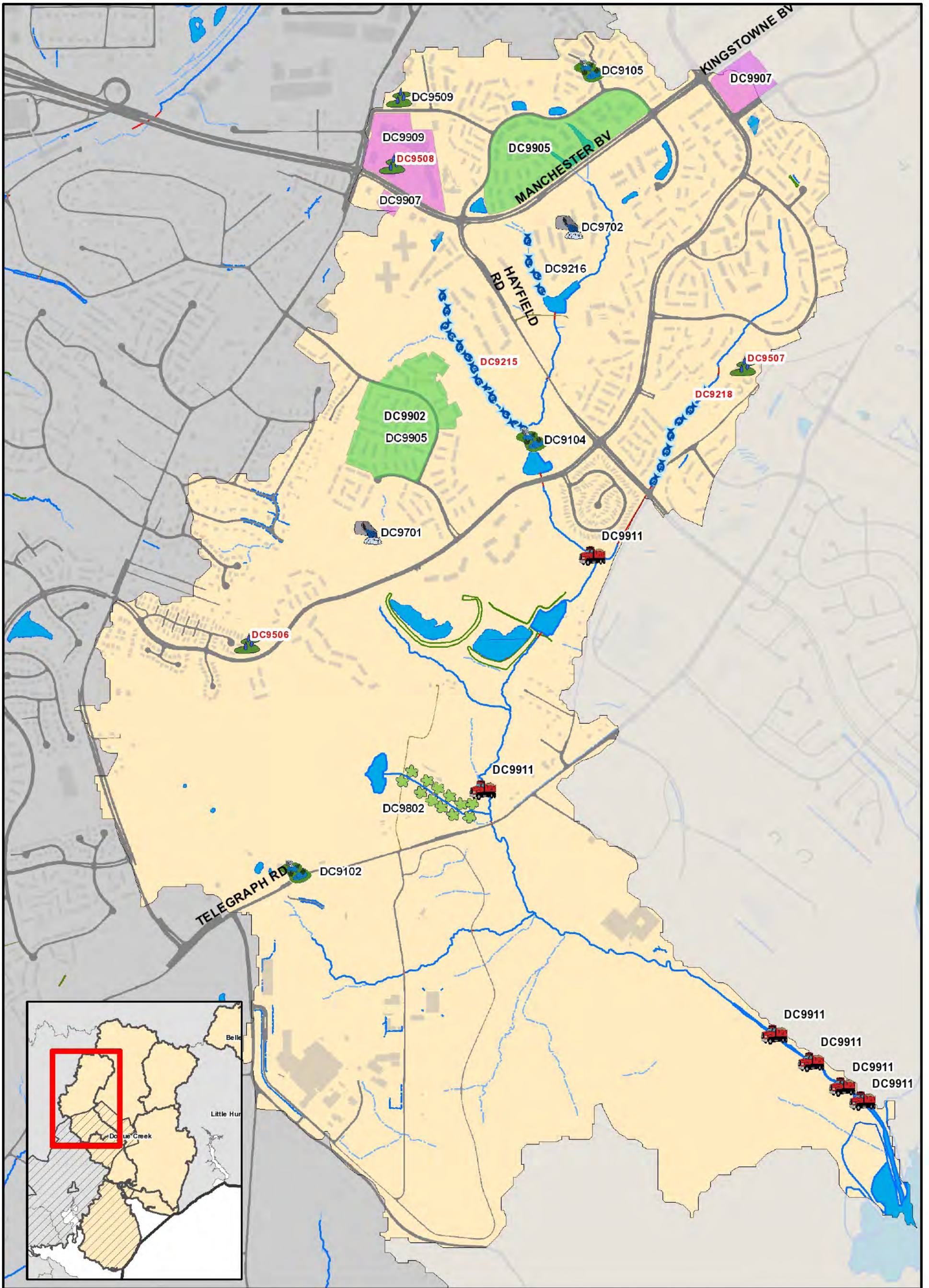
Table 5-5: Piney Run WMA Projects

Structural Projects¹						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	Phase
DC9215	Stream Restoration	DC-PY-0035	Behind Rockcliff Ln	Water Quality	Private - Residential	1 - 10
DC9218	Stream Restoration	DC-PY-0040	Banks Property	Water Quality	County – FCPA	1 - 10
DC9506	BMP/LID	DC-PY-0020	Alderman Dr	Water Quality	State - VDOT	1 - 10
DC9507	BMP/LID	DC-PY-0040	Parking lots along Westcott Way	Water Quality	Private - Residential	1 - 10
DC9508	BMP/LID	DC-PY-0050	Shopper's parking lot	Water Quality	Private - Commercial	1 - 10
DC9102	Stormwater Pond Retrofit	DC-PY-0020	Kingstowne Fire Station	Water Quality and Quantity	Private	11 - 25
DC9104	Stormwater Pond Retrofit	DC-PY-0025	Kingstowne Village Pkwy at Ashby Ln	Water Quality and Quantity	Public/Local	11 - 25
DC9105	Stormwater Pond Retrofit	DC-PY-0055	Manchester Lake Dr	Water Quality and Quantity	Private	11 - 25
DC9216	Stream Restoration	DC-PY-0045	Rock Ridge Ln	Water Quality	Private	11 - 25
DC9509	BMP/LID	DC-PY-0050	Calvary Baptist Church and Christian School	Water Quality	Private - Church	11 - 25
DC9701	Outfall Improvement	DC-PY-0030	Behind 6115 Summer Park Ln	Water Quality	Private	11 - 25
DC9702	Outfall Improvement	DC-PY-0045	Rock Ridge Ln	Water Quality	Public/Local	11 - 25
Non-Structural Projects						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	
DC9802	Buffer Restoration	DC-PY-0020	Hilltop Golf Course	Water Quality and Quantity	Private	
DC9902	Rain Barrel Programs – Rain Barrels	Multiple	Watershed-wide	Water Quality and Quantity	Private	
DC9905	Community Outreach/ Public Education – Tree Planting	Multiple	Watershed-wide	Water Quality and Quantity	Private	
DC9907	Inspection/Enforcement Enhancement Project – Dumpster Maintenance	Multiple	Watershed-wide	Water Quality	Private	

Non-Structural Projects					
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner
DC9909	Inspection/Enforcement Enhancement Project – Vehicle Maintenance	Multiple	Gas stations and auto repair shops	Water Quality	Private
DC9911	Dumpsite/Obstruction Removal – Obstruction Removal	DC-PY-0025	Beaver dams at two sites in mainstem of Piney Run	Water Quality	Private

¹Only the 10-year structural projects will have an associated project fact sheet.

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| Buffer Restoration | Stream Restoration | BMP/LID | Culvert Retrofit | Dumpsite/Obstruction Removal | New Stormwater Pond | Outfall Improvement | Stormwater Pond Retrofit | Other | Community Outreach/Public Education | Area-wide Drainage Improvement | Land Conservation Project | Flood Protection/Mitigation | Inspection/Enforcement Enhancement | Rain Barrel Program | Street Sweeping Program | Studies, Surveys and Assessments |
|--------------------|--------------------|---------|------------------|------------------------------|---------------------|---------------------|--------------------------|-------|-------------------------------------|--------------------------------|---------------------------|-----------------------------|------------------------------------|---------------------|-------------------------|----------------------------------|

Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years and non-structural projects.

Map 5.5

WMA: Piney Run
Proposed Projects

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5.6 Four Mile Run Results

The results of the subwatershed ranking analysis showed that all the subwatersheds in Four Mile Run were impaired in some form. All but one were among the lowest ranking for the composite score of impacts and sources. All the subwatersheds in this WMA are headwaters and all were reviewed for potential improvements.

A considerable length of Upper Long Branch (tributary to Four Mile Run) has been channelized with concrete. Because of the channelization, most of the streambanks are stable; however, there were a few severely eroded stream areas upstream of the concrete channel. Several residential structures along the channel are within the modeled 100-year flood limits. No crossings were flooded beyond the design level-of-service.

Water quality modeling showed high loads of total suspended solids, total nitrogen and total phosphorus. Much of the WMA is completely developed prior to regulations requiring stormwater management facilities with commercial, transportation, and medium or high-density residential land uses.

5.6.1 Structural Projects

5.6.1.1 10-Year Projects

FM9102 New Stormwater Pond

This project would create a stormwater management facility at Hollybrook II Condominiums upstream of the culvert on Patrick Henry Drive immediately downstream of a 66" outfall. Stream banks both upstream and downstream of the proposed facility are eroded. The proposed project will treat runoff from a large drainage area consisting of commercial and high density residential areas.

FM9104 Stormwater Pond Retrofit

An existing detention basin located adjacent to Hampton Inn hotel parking lot would be converted to an extended detention basin by removing the existing concrete low flow channels, excavating the existing bottom to incorporate wetland planting zones and meandering flow channels and installing a new control structure on the existing barrel pipe.

FM9105 New Stormwater Pond

This project proposes creation of an extended detention dry pond with a sediment forebay at Leesburg Pike Plaza. The project will be sited in the open area adjacent to a parking lot.

FM9300 Area Wide Drainage Improvement

The entire subwatershed FM-FM-0035 has medium density residential area land use and there are no existing stormwater management facilities. The project is distributed throughout the subwatershed and involves replacing the existing inlets with tree box filters or other inlet filters and adding other types of localized facilities to treat the runoff for water quality.

FM9500 BMP/LID

This project proposes creation of bioretention areas to receive the runoff from roof top and parking lot at the St. Andrew Parish. The open area in front of the church and grassy area adjacent to the parking lots will be graded and used for the implementation of bioretention.

FM9501 BMP/LID

Installation of bioretention filters and basins are proposed to treat runoff from St. Katherine's Greek Orthodox Church parking lot. The southern portion of the parking lot presents the best opportunity for retrofit.

FM9502 BMP/LID

This project would treat runoff from the Target Greatland parking lot by implementing bioretention filters and basins in the southern portion of the parking lot where parking islands are located. Tree box filters are proposed on the edges of the strip mall parking lot. Portions of this site may already be treated by underground storage for quantity control.

FM9503 BMP/LID

Runoff characteristics can be improved by removing concrete immediately adjacent to the Korean Cultural Center. The storm inlet next to playground could also be replaced with a rain garden. Bioretention filters and basins would be installed in the median and edges of the parking lot.

5.6.1.2 25-Year Projects

FM9100 Stormwater Pond Retrofit

The existing concrete channel would be removed as part of this stormwater pond retrofit at Fallswood Glen Court. The channel is currently filled with weedy vegetation and would be removed to excavate and allow for water quality treatment.

FM9101 Stormwater Pond Retrofit

This retrofit of a stormwater pond retrofit along Arlington Boulevard near Kelsey Court would remove the concrete and excavate to allow for water quality treatment. The site would be kept for a grassy swale receiving water from rooftops and parking areas.

FM9103 Stormwater Pond Retrofit

This project is a retrofit of a stormwater pond at the commercial center at Arlington Boulevard and Wilson Boulevard. The project would remove the concrete channel and excavate to create an area for water quality treatment. Plants would be added as well as a forebay.

FM9106 Stormwater Pond Retrofit

This is a retrofit of a stormwater management pond at Diehl Court. The project would remove existing concrete channels and excavate the bottom to allow for water quality treatment.

FM9200 Stream Restoration

This stream restoration project at Henry Drive and Brook Drive would stabilize unstable banks by grading and either natural or hard-armoring. There would be only minor changes in channel dimensions. Additionally, a narrow riparian buffer would be established on the left bank.

5.6.2 *Non-Structural Projects*

DC9901 Rain Barrel Programs – Downspout Disconnection

The upland reconnaissance identified several commercial sites where downspouts were directly connected to storm drains and a watershed-wide outreach program could be beneficial in reducing runoff volume or peak flows. In this WMA, they included a strip mall, gas station, fast food restaurant, and the church / school complex at Columbia Crossroads Church, Corpus Christi School and St. Anthony Parish.

DC9902 Rain Barrel Programs – Rain Barrels

This project would be a watershed-wide outreach program to encourage the use of rain barrels in a medium-density residential area with no stormwater treatment. The area, Brilyn Park, Westmore Gardens and Westmoreland Park, was identified as suitable during the upland reconnaissance.

DC9904 Community Outreach/ Public Education – Storm Drain Marking

This project is intended as a watershed-wide outreach program to provide stencils or other markings on storm drain inlets to educate the public, reduce dumping and reduce the amount of litter entering the storm drain system. Several locations were identified in this WMA through the upland reconnaissance assessment, including Brilyn Park, Westmoreland Park, Lee Boulevard Heights and Glen Forest.

DC9905 Community Outreach/ Public Education – Tree Planting

This project is intended as a watershed-wide outreach program to encourage tree planting and restoration of the urban forest. The upland reconnaissance identified several residential areas that could benefit, including Hollybrook Condominiums, Munson Hill, Glen Acres and Westmore Gardens.

DC9907 Inspection/Enforcement Enhancement Project – Dumpster Maintenance

This project is a watershed-wide enforcement and outreach approach to properties where problems with dumpsters were identified during the upland reconnaissance. Dumpsters in this WMA were identified with evidence of leakage and direct connection to storm drain inlets.

DC9909 Inspection/Enforcement Enhancement Project – Vehicle Maintenance

This project would provide watershed-wide targeted enforcement of spill prevention and pollution prevention regulations for sites where vehicles are maintained. The upland reconnaissance identified five sites, primarily along Leesburg Pike and Arlington Blvd with uncovered fueling areas, vehicles were maintained, washed, repaired and stored outside where materials were stored outside without cover and where discharges were directly connected to the storm drains.

DC9912 Street Sweeping Program

Two neighborhoods and a church site were identified during the upland reconnaissance with a buildup of trash, litter, organic matter, leaves, or lawn clippings in curb and gutter. This project consists of developing or extending a street sweeping program to remove potential pollutants from the street before they can wash off in a storm.

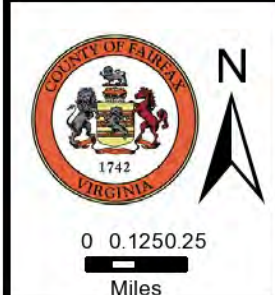
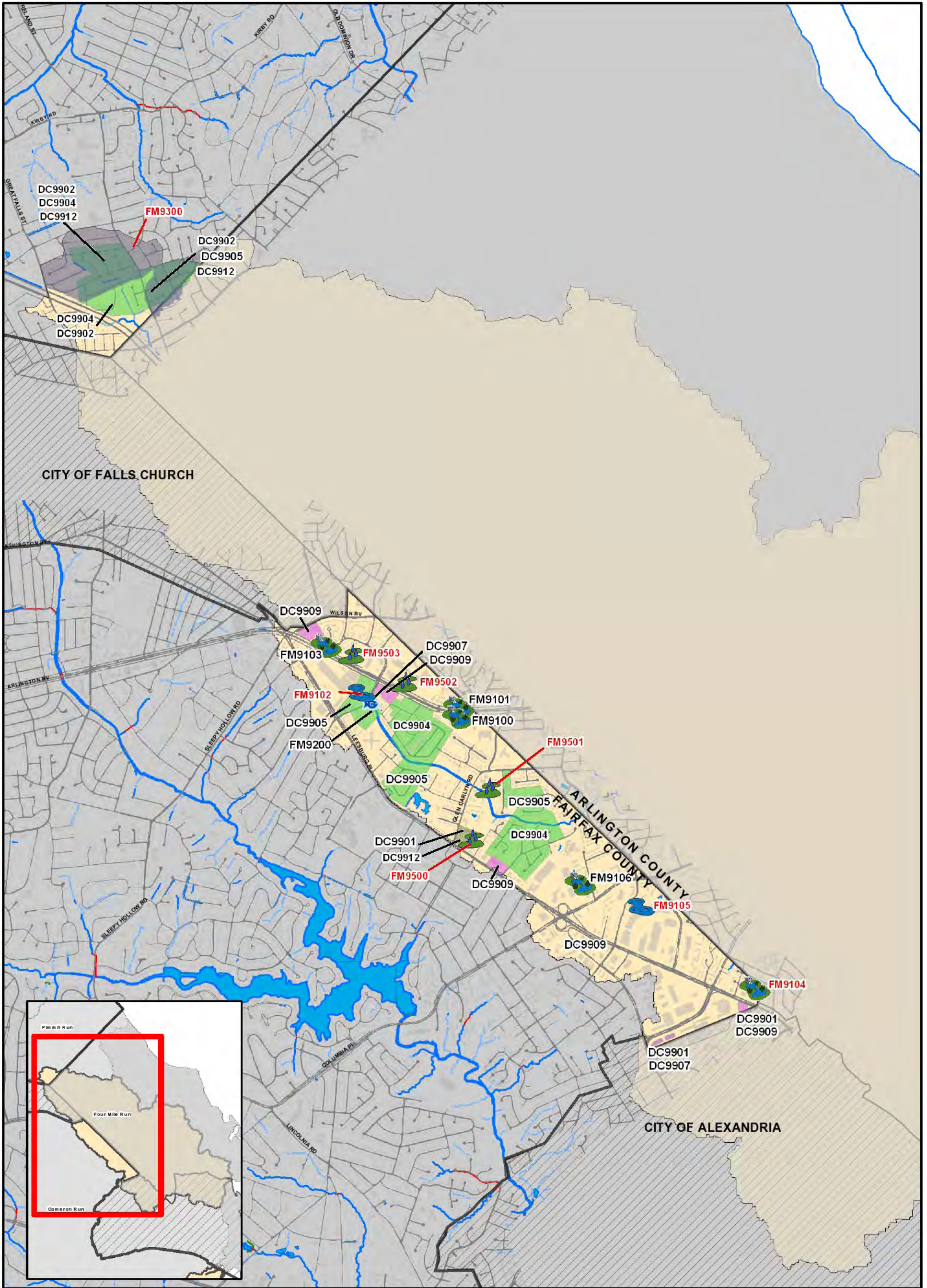
Table 5-6: Four Mile Run Projects

Structural Projects¹						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	Phase
FM9102	New Stormwater Pond	FM-LO-0000	Hollybrook II Condos	Water Quality and Quantity	Private - Residential	1 - 10
FM9104	Stormwater Pond Retrofit	FM-FM-0000	Hampton Inn off 14th St and Leesburg Pike	Water Quality and Quantity	Private - Commercial	1 - 10
FM9105	New Stormwater Pond	FM-FM-0010	Off Carlin Springs Rd	Water Quality and Quantity	Private - Commercial	1 - 10
FM9300	Area-wide Drainage Improvements	FM-FM-0035	North of Williamsburg Blvd and Custis Memorial Pkwy and south of Haycock Rd	Water Quality	Private – Residential, State - VDOT	1 - 10
FM9500	BMP/LID	FM-LO-0000	St. Andrews Parish	Water Quality	Private - Church	1 - 10
FM9501	BMP/LID	FM-LO-0000	St. Katherine's Greek Orthodox	Water Quality	Private - Church	1 - 10
FM9502	BMP/LID	FM-LO-0000	Target Greatland	Water Quality	Private - Commercial	1 - 10
FM9503	BMP/LID	FM-LO-0000	Korean Cultural Center	Water Quality	Private	1 - 10
FM9100	Stormwater Pond Retrofit	FM-FM-0020	Fallswood Glen Ct	Water Quality and Quantity	Private	11 - 25
FM9101	Stormwater Pond Retrofit	FM-FM-0020	Along Arlington Blvd near Kelsey Ct	Water Quality and Quantity	Private	11 - 25
FM9103	Stormwater Pond Retrofit	FM-LO-0000	Commercial center at Arlington Blvd and Wilson Blvd	Water Quality and Quantity	Private	11 - 25
FM9106	Stormwater Pond Retrofit	FM-FM-0015	Diehl Ct	Water Quality and Quantity	Public/Local	11 - 25
FM9200	Stream Restoration	FM-LO-0000	Upstream of Henry Dr and Brook Dr	Water Quality	Private - Residential	11 - 25
Non-Structural Projects						
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner	
DC9901	Rain Barrel Programs – Downspout Disconnection	Multiple	Watershed-wide	Water Quality and Quantity	Private	
DC9902	Rain Barrel Programs – Rain Barrels	Multiple	Watershed-wide	Water Quality and Quantity	Private	

Non-Structural Projects					
Project #	Project Type	Subshed	Location	Watershed Benefit	Land Owner
DC9904	Community Outreach/ Public Education – Storm Drain Marking	Multiple	Watershed-wide	Water Quality	Private
DC9905	Community Outreach/ Public Education – Tree Planting	Multiple	Watershed-wide	Water Quality and Quantity	Private
DC9907	Inspection/Enforcement Enhancement Project – Dumpster Maintenance	Multiple	Watershed-wide	Water Quality	Private
DC9909	Inspection/Enforcement Enhancement Project – Vehicle Maintenance	Multiple	Gas stations and auto repair shops	Water Quality	Private
DC9912	Street Sweeping Program	Multiple	Watershed-wide	Water Quality	Private

¹Only the 10-year structural projects will have an associated project fact sheet.

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| Buffer Restoration | Stream Restoration | New Stormwater Pond | Community Outreach/Public Education |
| BMP/LID | Culvert Retrofit | Outfall Improvement | Area-wide Drainage Improvement |
| Dumpsite/Obstruction Removal | Other | Stormwater Pond Retrofit | Land Conservation Project |
| | | Stormwater Pond Retrofit | Flood Protection/Mitigation |
| | | | Inspection/Enforcement Enhancement |
| | | | Rain Barrel Program |
| | | | Street Sweeping Program |
| | | | Studies, Surveys and Assessments |

Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years and non-structural projects.

Map 5.6
WMA: Four Mile Run
Proposed Projects

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5.7 Project Fact Sheets

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