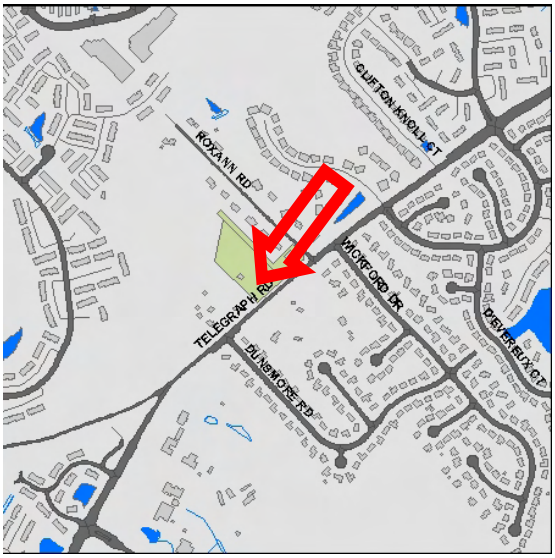
DC9400 Culvert Retrofit



Address:	7150 Telegraph Road
Location:	North side, Telegraph Road
Land Owner:	Private - Residential
PIN:	0914 01 0013
Control Type	Water Quality
Drainage Area	42.48 acres
Receiving Waters	Unknown tributary of Dogue Creek

Description: The project consists of providing an impoundment structure such as a weir wall across the existing stream channel on the upstream side of a culvert under Telegraph Road to provide stormwater management. The project will treat runoff from upstream low and high-density residential areas.

Project Area Map: Conceptual plan showing potential location of culvert retrofit

Project Benefits: A control structure installed on the upstream side of the existing cross culvert under Telegraph Road has potential to attenuate peak runoff volumes for a variety of design storm conditions. Reducing runoff volumes and slowing discharge velocities during storm events will promote settling of suspended particles and floatables, preserve future channel conditions, reduce erosion and promote habitat health downstream of the culvert. It is estimated that a total of 8,850 lbs of sediment, 108.0 lbs of nitrogen and 21.0 lbs of phosphorus would be reduced annually by this project

Project Design Considerations: During a storm event, the control structure will cause water levels on the upstream side of the cross culvert to elevate rapidly. This is a safety concern both for community residents and property. The base flow component of the control structure will require constant monitoring to prevent clogging. All components of the existing roadway and stream channel should be analyzed to ensure that the integrity of the culvert/stream is not compromised as a result of change in hydraulic characteristics at the crossing. Changes to the 100-year floodplain in this area due to a culvert retrofit must adhere to FEMA regulations.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
New Control Structure	1	LS	$12,000.00	$12,000.00
			Initial Project Costs	**$12,000**
Plantings	1	LS	5% of Project	$600
Ancillary Items	1	LS	5% of Project	$600
Erosion and Sediment Control	1	LS	10% of Project	$1,200
			Base Construction Cost	**$14,400**
			Mobilization (5%)	$720
			Subtotal 1	$15,120
			Contingency (25%)	$3,780
			Subtotal 2	$18,900
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	$8,505
			Estimated Project Cost	**$27,000**

DC9400_1.jpg: Location of proposed project

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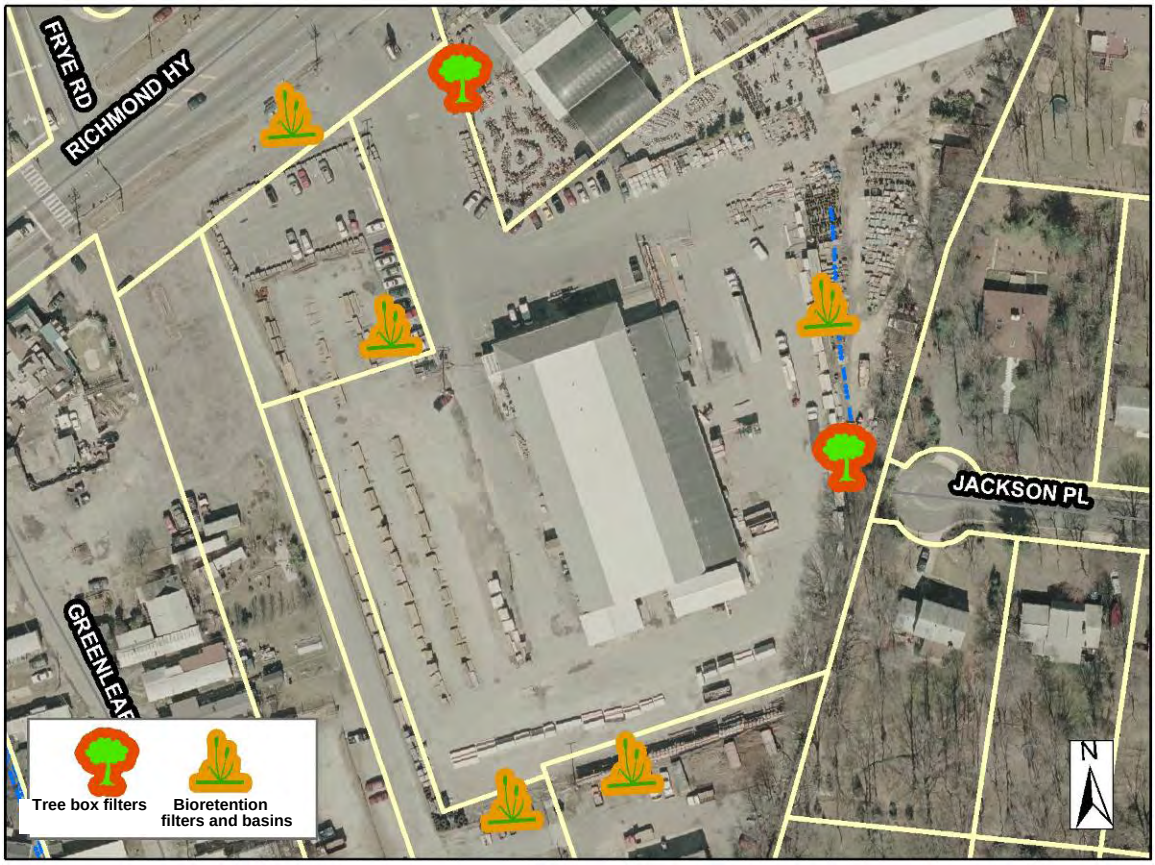
DC9500 BMP/LID

Address:	8453 Richmond Hwy
Location:	Smittys Building Supply
Land Owner:	Private - Commercial
PIN:	1013 01 0030
Control Type	Water Quality
Drainage Area	5.11 acres
Receiving Waters	Unknown tributary of Dogue Creek

Description: 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. Two existing inlets will be retrofitted with tree box filters and unsed portions of the parking lot will be removed and graded to implement bioretention areas. The runoff will be treated to improve water quality.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: Implementation of tree box filters and bioretention filters and basins will provide water quality treatment for this commercial/industrial area during storm events. These facilities remove suspended solids, heavy metals, nutrients including phosphorus and nitrogen, oil and grease from storm water runoff. It is estimated that a total of 1.480 lbs of sediment, 20.0 lbs of nitrogen and 3.1 lbs of phosphorus would be reduced annually by this project. They also prevent trash and debris from entering the storm drain system and have the ability to cool down warm runoff.

Project Design Considerations: No environmental constraints or permitting issues are anticipated. No tree removal is required for these sites. Access to the proposed sites is excellent from the parking lot around Smitty's Building Supply. Property ownership is private and coordination with the owner/management will be necessary for these sites.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Tree Box Filters	2	EA	$10,000.00	$20,000
Bioretention Filters & Basin	632	SY	$150.00	$94,800
			Initial Project Cost	**$114,800**
Plantings	1	LS	5% of project (excluding pervious pavement)	$5,740
Ancillary Items	1	LS	5% of project	$5,740
Erosion and Sediment Control	1	LS	10% of project	$11,480
			Base Construction Cost	**$137,760**
			Mobilization (5%)	$6,888
			Subtotal 1	**$144,648**
			Contingency (25%)	$36,162
			Subtotal 2	**$180,810**
Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)				$81,365
			Estimated Project Cost	**$262,000**

DC9500_1.jpg: View of parking lot

DC9500_2.jpg: View of existing inlet

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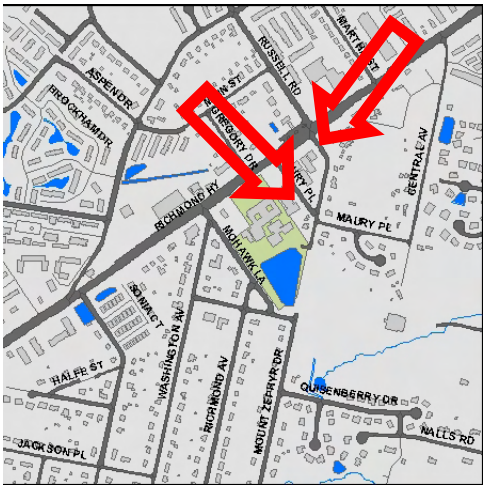
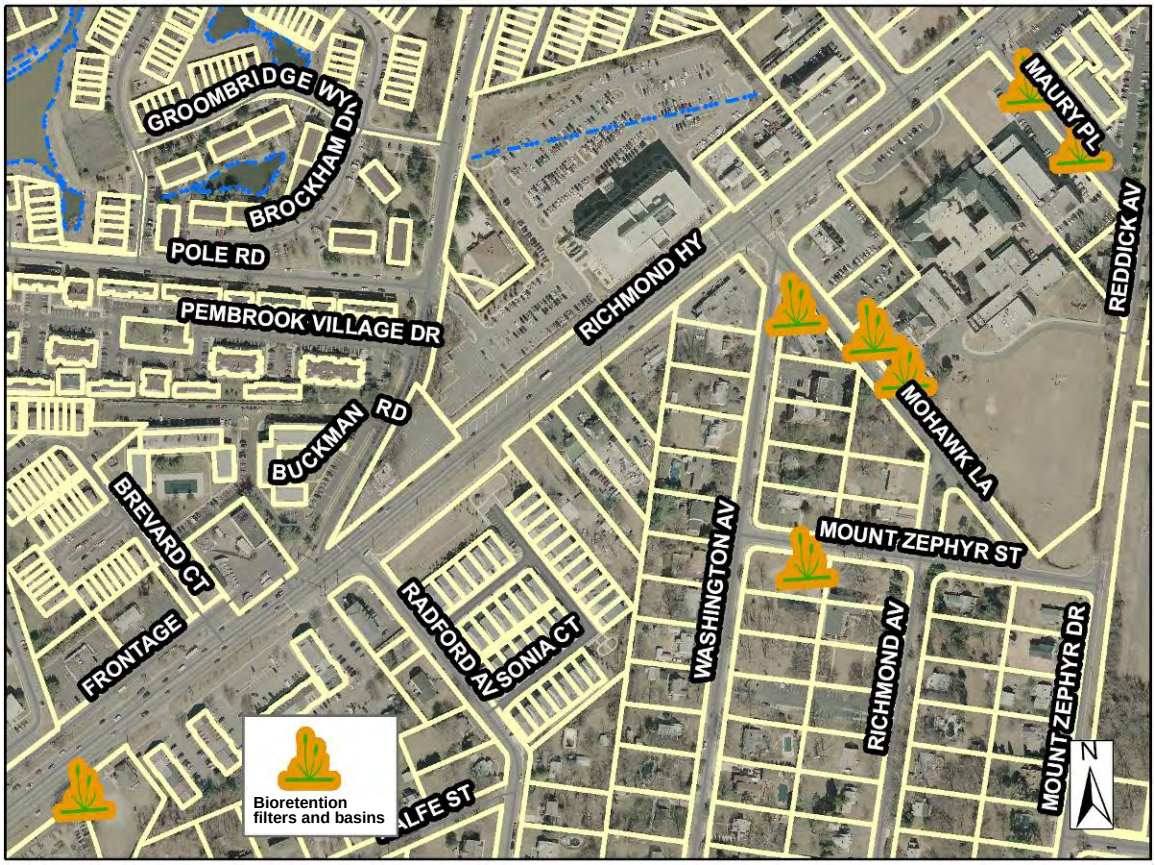
DC9501 BMP/LID



Address:	SE of 8300 Block of Richmond Hwy
Location:	Various
Land Owner:	County and Private
PIN:	1014 01 0005A
Control Type	Water Quality
Drainage Area	2.99 acres
Receiving Waters	Unknown tributary of Dogue Creek

Description: 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. The sites at the church on Mt. Zephyr Street and Wesley Pre-school on Mohawk Lane may be a good volunteer opportunities.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: Bioretention filters and basins can remove oil and grease, heavy metals, nutrients including phosphorus and nitrogen, and suspended solids from storm water runoff. It is estimated that a total of 70 lbs of sediment, 4.0 lbs of nitrogen and 0.6 lbs of phosphorus would be reduced annually by this project. They also prevent trash and debris from entering the storm drain system and have the ability to cool down warm runoff. Since a number of these sites are located on publicly-owned land or institutional properties, implementation is likely to be easier. It will also provide an environmental education/stewardship opportunity for residents in the community.

Project Design Considerations: Because of the intensity of existing development, no environmental constraints or permitting issues are anticipated. In the publicly-owned and cultural sites, signs promoting environmental education/stewardship could be used to educate residents. No tree removal is required for the proposed sites. Access is excellent.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Bioretention Filters & Basin	202	SY	$150.00	$30,300
			Initial Project Cost	**$30,300**
Plantings	1	LS	5% of project (excluding pervious pavement)	$1,515
Ancillary Items	1	LS	5% of project	$1,515
Erosion and Sediment Control	1	LS	10% of project	$3,030
			Base Construction Cost	**$36,360**
			Mobilization (5%)	$1,818
			Subtotal 1	**$38,178**
			Contingency (25%)	$9,545
			Subtotal 2	**$47,723**
Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)				$21,475
			Estimated Project Cost	**$69,000**

DC9501_1.jpg: Parking lot at Wesley PreSchool

DC9501_2.jpg: Parking lot along Mohawk Lane

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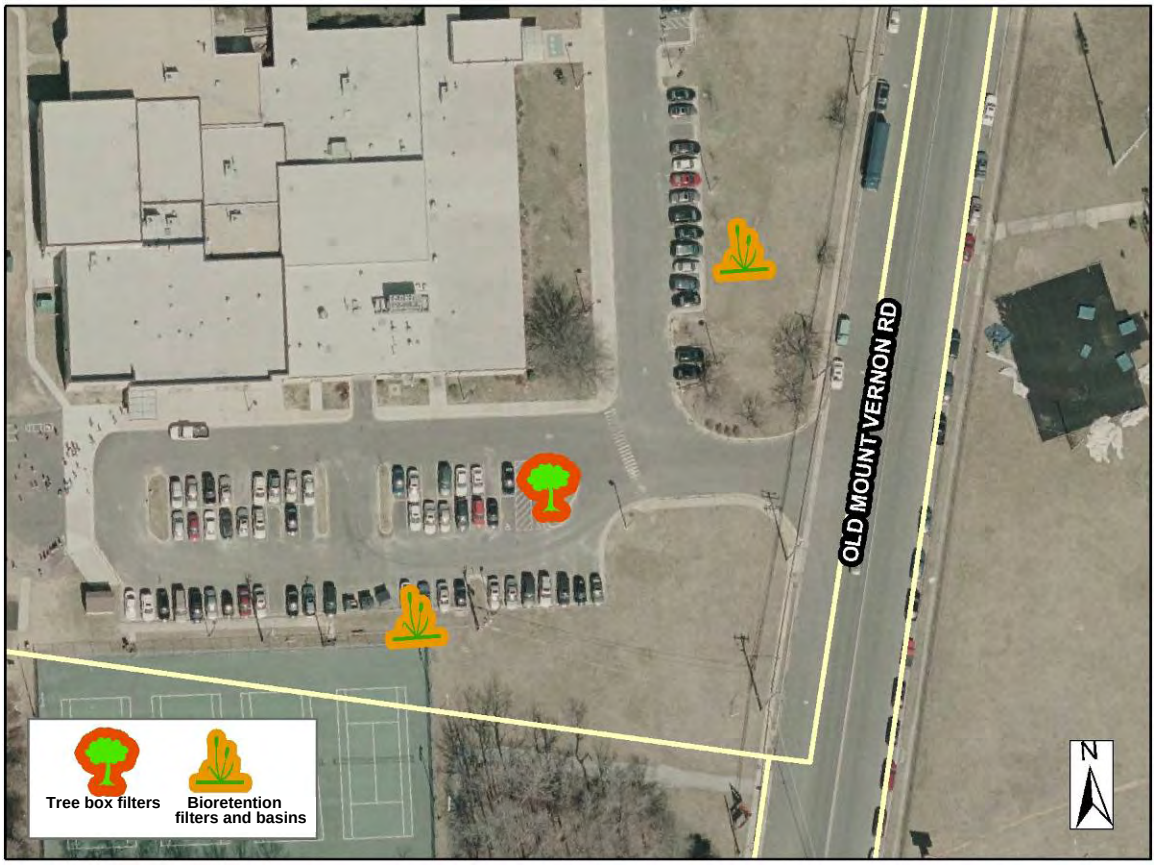
DC9503 BMP/LID

Address:	8410 Old Mt Vernon Rd
Location:	Riverside Elementary School
Land Owner:	County - FCPS
PIN:	1014 06 0011
Control Type	Water Quality
Drainage Area	2.03 acres
Receiving Waters	Unknown tributary of Dogue Creek

Description: 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. One tree box filter will be added to the existing inlet in the south parking lot. The bioretention areas will be created by grading the open space adjacent to the parking lots. The primary indicators are pollutants nitrogen, phosphorus and total suspended solids.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: Tree box filters and bioretention filters and basins remove oil and grease, heavy metals, nutrients including phosphorus and nitrogen, and suspended solids from storm water runoff. It is estimated that a total of 246 lbs of sediment, 3.0 lbs of nitrogen and 0.7 lbs of phosphorus would be reduced annually by this project. They also prevent trash and debris from entering the storm drain system and have the ability to cool down warm runoff. Since this site is located on school grounds, the need for land purchase or acquisition is eliminated while providing an environmental education/stewardship opportunity for students and parents within the community.

Project Design Considerations: No environmental constraints or permitting issues are anticipated. Signs promoting environmental education/stewardship could be used at this site to educate students and parents in the community. Access to the proposed sites is excellent from the school parking lots.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Tree Box Filters	1	EA	$10,000.00	$10,000
Bioretention Filters & Basin	150	SY	$150.00	$22,500
			Initial Project Cost	**$32,500**
Plantings	1	LS	5% of project (excluding pervious pavement)	$1,625
Ancillary Items	1	LS	5% of project	$1,625
Erosion and Sediment Control	1	LS	10% of project	$3,250
			Base Construction Cost	**$39,000**
			Mobilization (5%)	$1,950
			Subtotal 1	**$40,950**
			Contingency (25%)	$10,238
			Subtotal 2	**$51,188**
Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)				$23,035
			Estimated Project Cost	**$74,000**

DC9503_1.jpg: Parking lot at Riverside Elementary School

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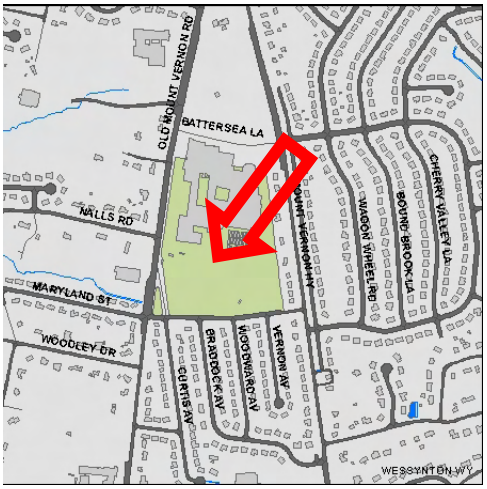
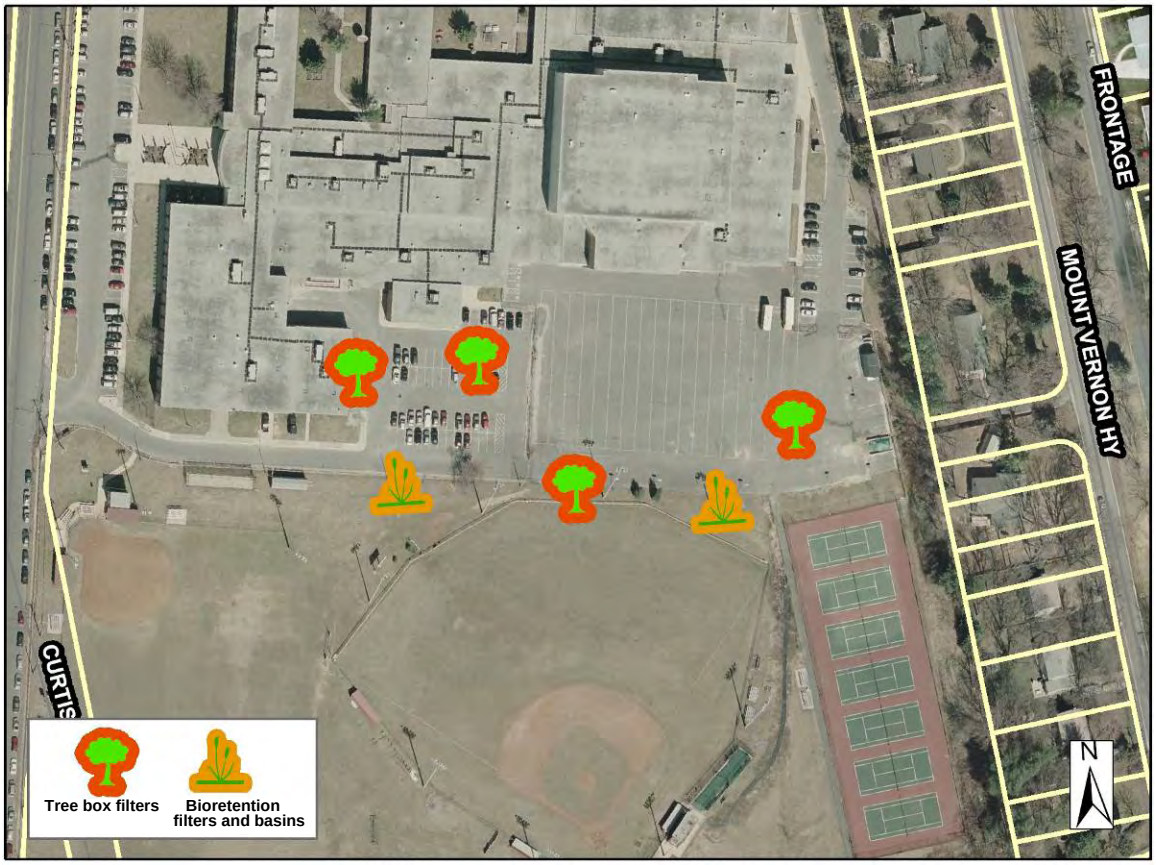
DC9504 BMP/LID



Address:	8515 Old Mt Vernon Rd
Location:	Mount Vernon High School
Land Owner:	County - FCPS
PIN:	1014 10010016
Control Type	Water Quality
Drainage Area	2.80 acres
Receiving Waters	Unknown tributary of Dogue Creek

Description: Mount Vernon High School 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 added to the four existing inlets in the parking lot and bioretention filters will be created by grading the open area along the southern edge of the parking lot.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: Bioretention filters and basins and tree box filters remove oil and grease, heavy metals, nutrients including phosphorus and nitrogen, and suspended solids from storm water runoff. It is estimated that a total of 210 lbs of sediment, 7.4 lbs of total nitrogen and 0.3 lbs of total phosphorus would be reduced annually by this project. They also prevent trash and debris from entering the storm drain system and have the ability to cool down warm runoff. Since this site is located on school grounds, the need for land purchase or acquisition is eliminated while providing an environmental education/stewardship opportunity for students and parents within the community.

Project Design Considerations: No environmental constraints or permitting issues are anticipated. Signs promoting environmental education/stewardship could be used at this site to educate students and parents in the community. Access to the proposed sites is excellent from the school parking lots. A temporary or permanent loss of parking spaces may occur with these sites.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Tree Box Filters	4	EA	$10,000.00	$40,000
Bioretention Filters & Basin	284	SY	$150.00	$42,600
			Initial Project Cost	**$82,600**
Plantings	1	LS	5% of project (excluding pervious pavement)	$4,130
Ancillary Items	1	LS	5% of project	$4,130
Erosion and Sediment Control	1	LS	10% of project	$8,260
			Base Construction Cost	**$99,120**
			Mobilization (5%)	$4,956
			Subtotal 1	**$104,076**
			Contingency (25%)	$26,019
			Subtotal 2	**$130,095**
Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)				$58,543
			Estimated Project Cost	**$189,000**

DC9504_1.jpg: Parking lot at Mount Vernon High School

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DC9505 BMP/LID

Address:	8515 Old Mt Vernon Rd
Location:	Mount Vernon High School
Land Owner:	County - FCPS
PIN:	1014 01 0034
Control Type	Water Quality
Drainage Area	4.883 acres
Receiving Waters	Unknown tributary of Dogue Creek

Description: Mount Vernon High School 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.

Project Area Map: Conceptual plan showing potential project location

Project Benefits: Bioretention filters and basins and tree box filters remove oil and grease, heavy metals, nutrients, and suspended solids from storm water runoff. It is estimated that a total of 525 lbs of sediment, 6.7 lbs of nitrogen and 1.5 lbs of phosphorus would be reduced annually by this project. They also prevent trash and debris from entering the storm drain system and have the ability to cool down warm runoff. Since this site is located on school grounds, the need for land purchase or acquisition is eliminated while providing an environmental education/stewardship opportunity for students and parents within the community.

Project Design Considerations: No environmental constraints or permitting issues are anticipated. Signs promoting environmental education/stewardship could be used at this site to educate students and parents in the community. Access to the proposed sites is excellent from the school parking lots. Modifications to the existing storm drain system may be necessary to drain these sites. A temporary or permanent loss of parking spaces may occur with these sites.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Tree Box Filters	2	EA	$10,000.00	$20,000
Bioretention Filters & Basin	478	SY	$150.00	$71,700
			Initial Project Cost	**$91,700**
Plantings	1	LS	5% of project (excluding pervious pavement)	$4,585
Ancillary Items	1	LS	5% of project	$4,585
Erosion and Sediment Control	1	LS	10% of project	$9,170
			Base Construction Cost	**$110,040**
			Mobilization (5%)	$5,502
			Subtotal 1	**$115,542**
			Contingency (25%)	$28,886
			Subtotal 2	**$144,428**
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	$64,993
			Estimated Project Cost	**$209,000**

DC9505_1.jpg: Parking lot at Mount Vernon High School

DC9505_2.jpg: Parking lot at Mount Vernon High School

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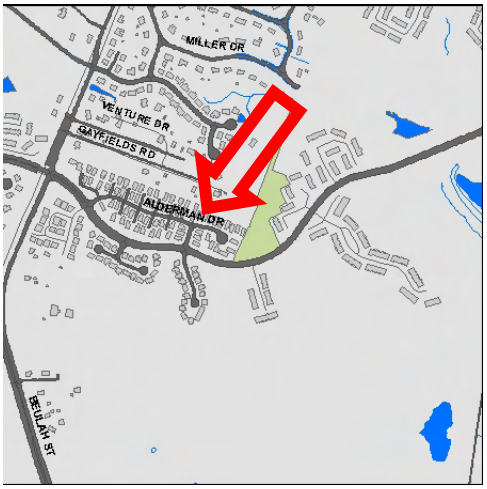
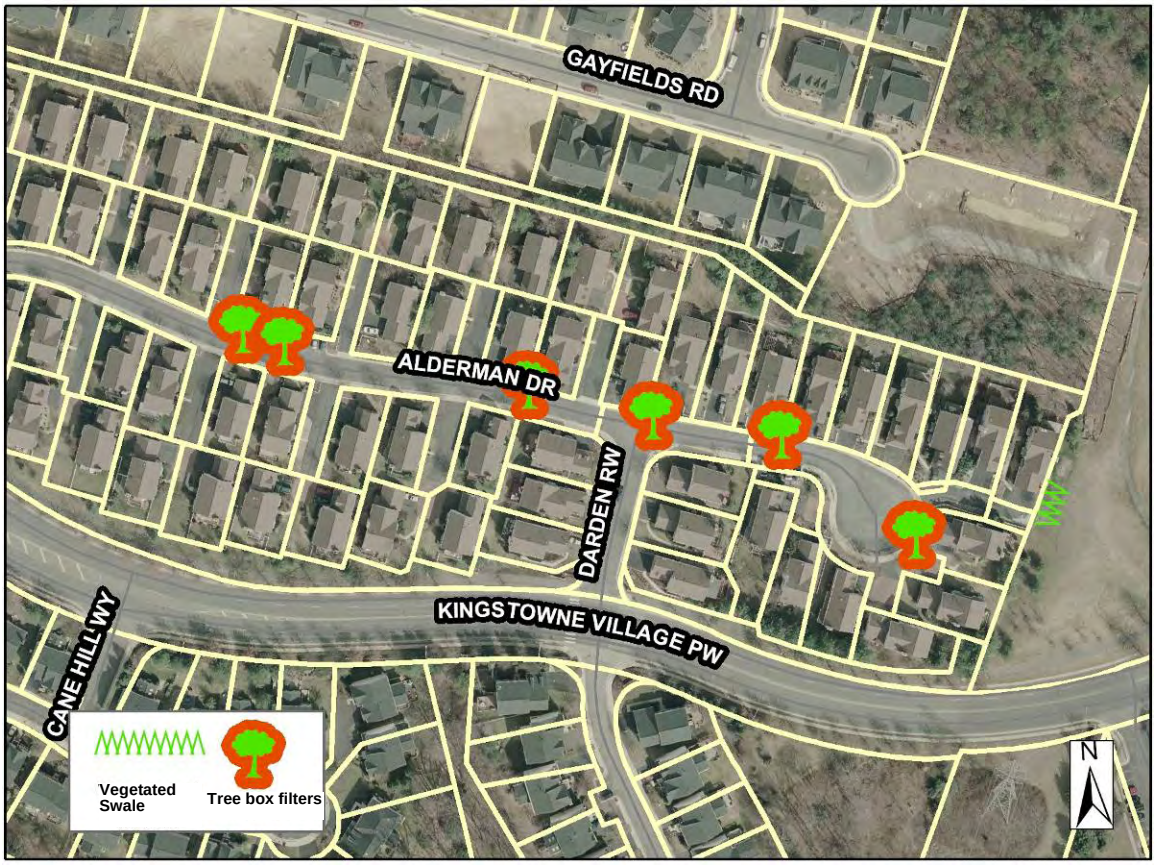
DC9506 BMP/LID



Address:	6300 Block, Alderman Drive
Location:	Alderman Drive
Land Owner:	State - VDOT
PIN:	0913 01 0064W
Control Type	Water Quality
Drainage Area	0.51 acres
Receiving Waters	Unknown tributary of Piney Run

Description: This proposed project includes installation of tree box filters and the implementation of a vegetated swale. Six tree box filters will be installed at the existing inlets and a vegetated swale will be implemented in the open area behind Alderman Dr. The proposed project will treat the rooftop and driveway runoff from the residential area.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: Implementation of the proposed improvements will provide water quality treatment for residential runoff during storm events. Both the tree box filters and the vegetated swale will trap suspended solids, reduce trace metals, and uptake nutrients including phosphorus and nitrogen from storm water runoff. It is estimated that a total of 315 lbs of sediment, 3.5 lbs of nitrogen and 0.7 lbs of phosphorus would be reduced annually by this project. They also promote infiltration and can reduce the flow velocity of storm water runoff.

Project Design Considerations: No environmental constraints or permitting issues are anticipated. Minimal tree removal is required for this site. Access to the proposed site is good from Alderman Drive; however, private driveways will need to be accessed to reach the proposed site. Property ownership is private and coordination with the homeowners/landowners will be necessary.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Tree Box Filters	6	EA	$10,000.00	$60,000
Vegetated Swale	73	SY	$50.00	$3,650
			Initial Project Cost	**$63,650**
Plantings	1	LS	5% of project (excluding pervious pavement)	$3,183
Ancillary Items	1	LS	5% of project	$3,183
Erosion and Sediment Control	1	LS	10% of project	$6,365
			Base Construction Cost	**$76,381**
			Mobilization (5%)	$3,819
			Subtotal 1	**$80,200**
			Contingency (25%)	$20,050
			Subtotal 2	**$100,250**
Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)				$45,113
			Estimated Project Cost	**$145,000**

DC9506_1.jpg: View open area behind Alderman Drive

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DC9507 BMP/LID

Address:	5800 Block, Wescott Hills Way
Location:	Parking lots along Wescott Way
Land Owner:	Private - Residential
PIN:	0914 0926 C
Control Type	Water Quality
Drainage Area	1.07 acres
Receiving Waters	Unknown tributary of Piney Run

Description: 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.

Project Area Map: Conceptual plan showing potential project location

Project Benefits: Tree box filters and bioretention filters and basins remove suspended solids, heavy metals, nutrients including phosphorus and nitrogen, oil and grease from storm water runoff. It is estimated that a total of 463 lbs of sediment, 5.0 lbs of nitrogen and 1.0 lb of phosphorus would be reduced annually by this project. They also prevent trash and debris from entering the storm drain system and have the ability to cool down warm runoff.

Project Design Considerations: No environmental constraints or permitting issues are anticipated. Access to the proposed sites is excellent in the parking lot; however, property ownership is private and coordination with the owners/management will be necessary. Modifications to the existing storm drain system may be necessary to drain the proposed sites. A temporary or permanent loss of parking spaces can be expected.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Tree Box Filters	4	EA	$10,000.00	$40,000
Bioretention Filters & Basin	88	SY	$150.00	$13,200
			Initial Project Cost	**$53,200**
Plantings	1	LS	5% of project (excluding pervious pavement)	$2,660
Ancillary Items	1	LS	5% of project	$2,660
Erosion and Sediment Control	1	LS	10% of project	$5,320
			Base Construction Cost	**$63,840**
			Mobilization (5%)	$3,192
			Subtotal 1	**$67,032**
			Contingency (25%)	$16,758
			Subtotal 2	**$83,790**
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	$37,706
			Estimated Project Cost	**$121,000**

DC9507_1.jpg: View of existing inlets at end of Wescott Hills Way

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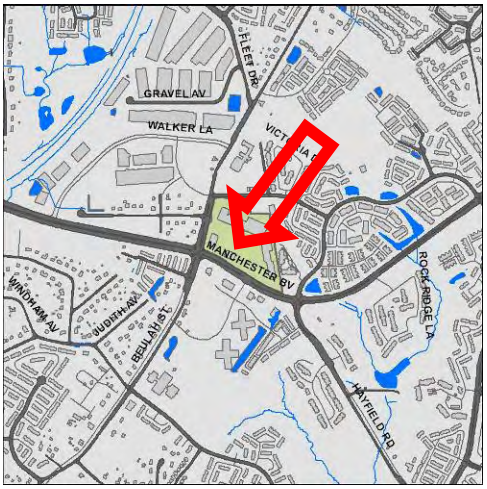
DC9508 BMP/LID



Address:	7000 Block, Manchester Blvd
Location:	Shoppers' parking lot
Land Owner:	Private - Commercial
PIN:	0911 12 N
Control Type	Water Quality
Drainage Area	5.83 acres
Receiving Waters	Unknown tributary of Piney Run

Description: Bioretention filters and basins are proposed in the medians of the Shoppers' parking lot to treat the runoff. Most of this parking lot drains to single inlets along medians. The medians will be graded to create bioretention areas that will treat the runoff for pollutants like nitrogen, phosphorus and total suspended solids.

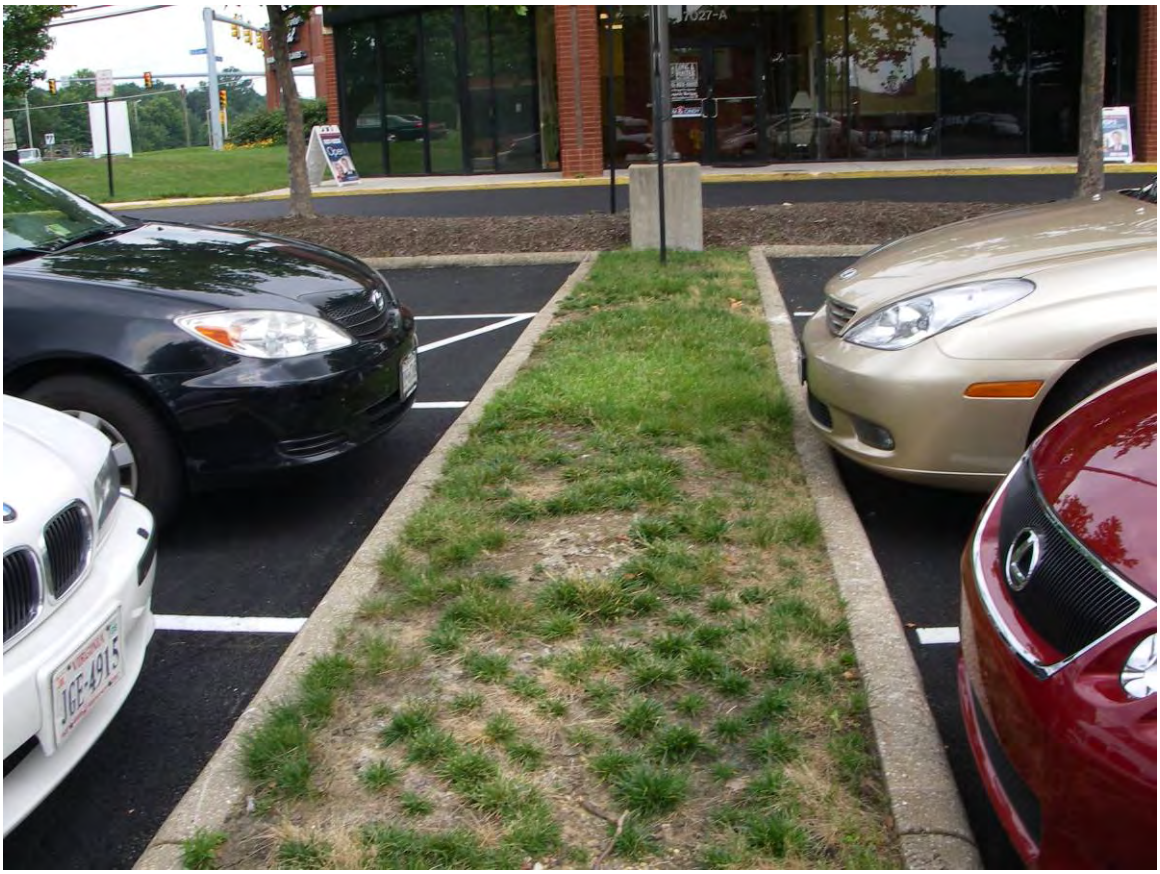
Project Area Map: Conceptual plan showing potential locations

Project Benefits: Implementation of bioretention filters and basins will provide water quality treatment for the Shoppers commercial parking lot runoff during storm events. These facilities can remove suspended solids, heavy metals, nutrients including phosphorus and nitrogen, and oil and grease from storm water runoff. It is estimated that a total of 2,040 lbs of sediment, 22.0 lbs of nitrogen and 4.1 lbs of phosphorus would be reduced annually by this project. They also prevent trash and debris from entering the storm drain system and have the ability to cool down warm runoff.

Project Design Considerations: No environmental constraints or permitting issues are anticipated. Access to the proposed sites is excellent from roads and the Shoppers commercial parking lot. Property ownership is most likely private and coordination with the shopping center owner/management will be necessary for these sites. A temporary or permanent loss of parking spaces can be expected with these sites.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Bioretention Filters & Basin	700	SY	$150.00	$105,000
			Initial Project Cost	**$105,000**
Plantings	1	LS	5% of project (excluding pervious pavement)	$5,250
Ancillary Items	1	LS	5% of project	$5,250
Erosion and Sediment Control	1	LS	10% of project	$10,500
			Base Construction Cost	**$126,000**
			Mobilization (5%)	$6,300
			Subtotal 1	**$132,300**
			Contingency (25%)	$33,075
			Subtotal 2	**$165,375**
Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)				$74,419
			Estimated Project Cost	**$240,000**



DC9508_1.jpg: View of existing medians in parking lot.

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