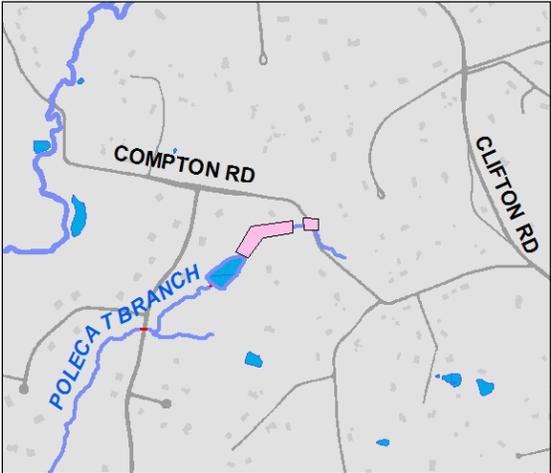


JM9400 Culvert Retrofit



Vicinity Map

Address	13165 Compton Rd
Location	Open space
Landowner	Feriozi, Dan J and Anne T Gallotta, Mark A and Pamela Deal, Bruce C and Ilysia D Witschey, John F and Robyn N
PIN	0751 01 0021 0751 01 0034B 0751 01 0033B 0753 01 0018A
Control Type	Water quality control
Drainage Area	75 acres
Receiving Waters	Polecat Branch

Description: Project JM9400 consists of a culvert retrofit where a tributary of Polecat Branch crosses Compton Rd. A small buffer restoration downstream of the culvert retrofit site is also included.



Project Area Map

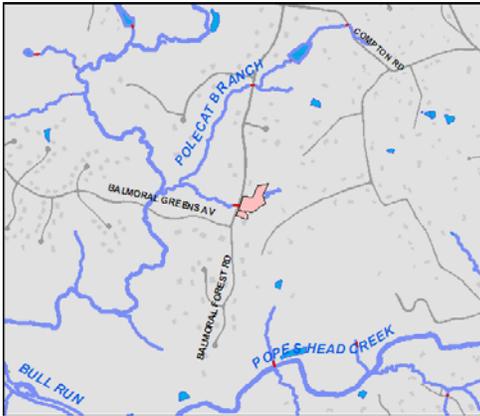
Project Benefits: JM9400 will address flooding issues along Compton Rd by providing more efficient stormwater conveyance at the culvert retrofit site. The buffer restoration portion of the project will reduce erosion and pollutant loading in addition to providing higher quality habitat for native wildlife. Increased shade will also decrease water temperatures, which will better maintain dissolved oxygen, providing better conditions for aquatic life.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
29.60	6.07	1.02

Project Design Considerations: As the buffer restoration portion of JM9400 is located partially on private property, the project will need to be coordinated with the landowners. Coordination with adjacent landowners and VDOT regarding the culvert retrofit may also be required, depending on site topography and access constraints. Permitting requirements for both the culvert retrofit and buffer restoration should be minimal.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.05	AC	\$8,500.00	\$425.00
Grading and Excavation	100	CY	\$35.00	\$3,500.00
New Storm Pipe	40	LF	\$100 - \$300	\$8,000.00
Organic Compost Soil Amendment	122	CY	\$40.00	\$4,880.00
Plantings	0.3	AC	\$114,030.00	\$34,209.00
		Base Construction Cost		\$51,014.00
		Mobilization (5%)		\$2,550.70
		Plantings (5%)		\$2,550.70
		Ancillary Items (5%)		\$2,550.70
		Erosion & Sediment Control (10%)		\$5,101.40
		Subtotal 1		\$63,767.50
		Contingency (25%)		\$15,941.88
		Subtotal 2		\$79,709.38
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$35,869.22
		Total		\$115,578.59
		Estimated Project Cost		\$120,000.00

JM9500 BMP/LID



Vicinity Map

Address	7051 Balmoral Forest Road
Location	Open Space
Landowner	Fairfax County Park Authority
PIN	0753 08 C
Control Type	Water quality control
Drainage Area	78 Acres
Receiving Waters	Unnamed Tributary to Polecat Branch

Description: Project JM9500 is a culvert retrofit upstream of Balmoral Forest Road on Polecat Branch. The culvert retrofit will provide water quality treatment for an uncontrolled area. Road drainage infrastructure may need to be realigned to allow for berm construction.



Project Area Map

Project Benefits: Project takes advantage of 'free' storage on upstream side of culvert. The project will provide water quality treatment for possible future estate residential development upstream, which is often exempt from stormwater regulations.

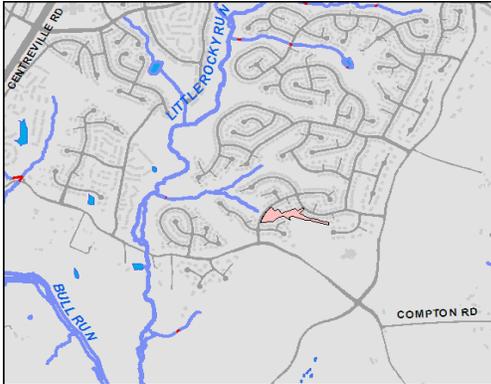
Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
72.85	14.31	3.02

Project Design Considerations: There are access issues owing to steep slopes off the road. The stream valley is also very steep and in a forested area, requiring a clearing/grading effort of the access route as well as for construction of the berm. Consider gabion wall over earthen embankment to reduce footprint. Although it is zoned as Estate residential, the models show a large pollutant removal capacity at this site. There are no sequencing issues. By nature with any culvert retrofit, the project is in-line and more permitting requirements are likely. This is a perennial stream at this location. The site has an extremely high potential to contain Native American, historic and Civil War Sites. The Park Authority recommends that Phase I surveys be conducted prior to any work done in these areas. If sites of interest are found, Phase II archaeological testing should be conducted to determine eligibility for inclusion into the National Register of Historic Places. If sites are found eligible, avoidance or Phase III archaeological data recovery is recommended.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road	1000	SY	\$25.00	\$25,000.00
Access Road Gate	1	EA	\$2,500.00	\$2,500.00
Clear and Grub	0.3	AC	\$8,500.00	\$2,550.00
Structural BMP and Incidentals	1	LS	\$10,000 - \$20,000	\$10,000.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation		CY	\$35.00	\$0.00
Embankment	200	CY	\$50.00	\$10,000.00
Organic Compost Soil Amendment		CY	\$40.00	\$0.00
			Base Construction Cost	\$50,050.00
			Mobilization (5%)	\$2,502.50
			Plantings (5%)	\$2,502.50
			Ancillary Items (5%)	\$2,502.50
			Erosion & Sediment Control (10%)	\$5,005.00
			Subtotal 1	\$62,562.50
			Contingency (25%)	\$15,640.63
			Subtotal 2	\$78,203.13
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$35,191.41
			Total	\$113,394.53
			Estimated Project Cost	\$120,000.00

Little Rocky Run Watershed
Little Rocky Run – Lower Watershed Management Area

LR9504 BMP/LID



Vicinity Map

Address	13916 Rock Brook Ct
Location	Subdivision
Landowner	Little Rocky Run Homeowners Association
PIN	0654 07 E
Control Type	Water quality control
Drainage Area	56 Acres
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: Proposed project is to retrofit existing culvert crossing to allow for water quality control. Use a gabion wall to create shallow wetland marsh upstream.



Project Area Map

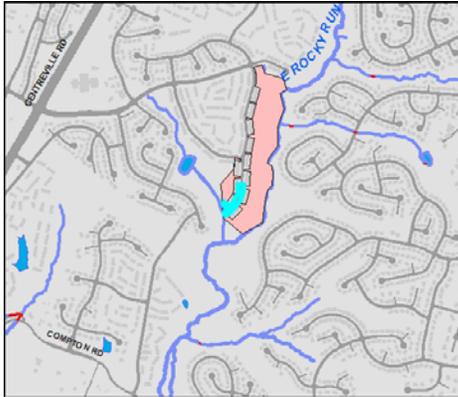
Project Benefits: The created wetland will provide an ideal environment for gravitational settling, biological uptake, and microbial activity. Project LR9504 will also provide habitat enhancement for insects, amphibians, and birds.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
136.51	17.79	1.34

Project Design Considerations: This project is within an existing storm drainage easement and part of Little Rocky Run Homeowners association, but the implementability is still low based on the proposal to remove mature trees in favor of a created wetland environment. The long-term benefits will outweigh the short-term environmental costs. There are a few different access options. There is a proposed retrofit (LR9100) in the same subwatershed, but sequencing/coordination is not an issue since they are both proposed quality control measures only.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road	250	SY	\$25.00	\$6,250.00
Access Road Gate	1	EA	\$2,500.00	\$2,500.00
Clear and Grub	0.45	AC	\$8,500.00	\$3,825.00
Grading and Excavation	450	CY	\$35.00	\$15,750.00
New Storm Pipe		LF	\$100 - \$300	
Organic Compost Soil Amendment	100	CY	\$40.00	\$4,000.00
		Base Construction Cost		\$32,325.00
		Mobilization (5%)		\$1,616.25
		Plantings (5%)		\$1,616.25
		Ancillary Items (5%)		\$1,616.25
		Erosion & Sediment Control (10%)		\$3,232.50
		Subtotal 1		\$40,406.25
		Contingency (25%)		\$10,101.56
		Subtotal 2		\$50,507.81
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$22,728.52
		Total		\$73,236.33
		Estimated Project Cost		\$80,000.00

LR9508 BMP/LID



Vicinity Map

Address	6612 Creek Run Drive
Location	Subdivision
Landowner	Green Trails Homeowners Association
PIN	0654 0304 K
Control Type	Water Quality
Drainage Area	1 Acre
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: LR9508 will construct a vegetated swale to collect runoff from the backside of townhouses (~0.2 acres of impervious surface) and direct flow to a small (~80 square yards) bioretention area. A new pipe will need to be placed through the existing paved trail to outlet to pond outfall. A tree box filter will also be placed at the bottom of the cul-de-sac.



Project Area Map

Project Benefits: Project LR9508 will create an ideal environment for filtration, biological uptake and microbial activity.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
8.95	1.38	0.13

Project Design Considerations: LR9508 is in the vicinity of a large stormwater pond and adjacent to its existing associated easement(s), but is bordered on the opposite side by private property. Access will not be an issue, but the project resides primarily on HOA property. There are no known permitting issues. Sequencing/coordination with neighboring projects is not critical for the proposed water quality measures.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale	275	SY	\$50.00	\$13,750.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Bioretention Filters & Basin	80	SY	\$150.00	\$12,000.00
Manufactured BMP (ie:Tree Box Filter)	1	EA	\$10,000.00	\$10,000.00
Organic Compost Soil Amendment	20	CY	\$40.00	\$800.00
		Base Construction Cost		\$36,550.00
		Mobilization (5%)		\$1,827.50
		Plantings (5%)		\$1,827.50
		Ancillary Items (5%)		\$1,827.50
		Erosion & Sediment Control (10%)		\$3,655.00
		Subtotal 1		\$45,687.50
		Contingency (25%)		\$11,421.88
		Subtotal 2		\$57,109.38
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$25,699.22
		Total		\$82,808.59
		Estimated Project Cost		\$90,000.00

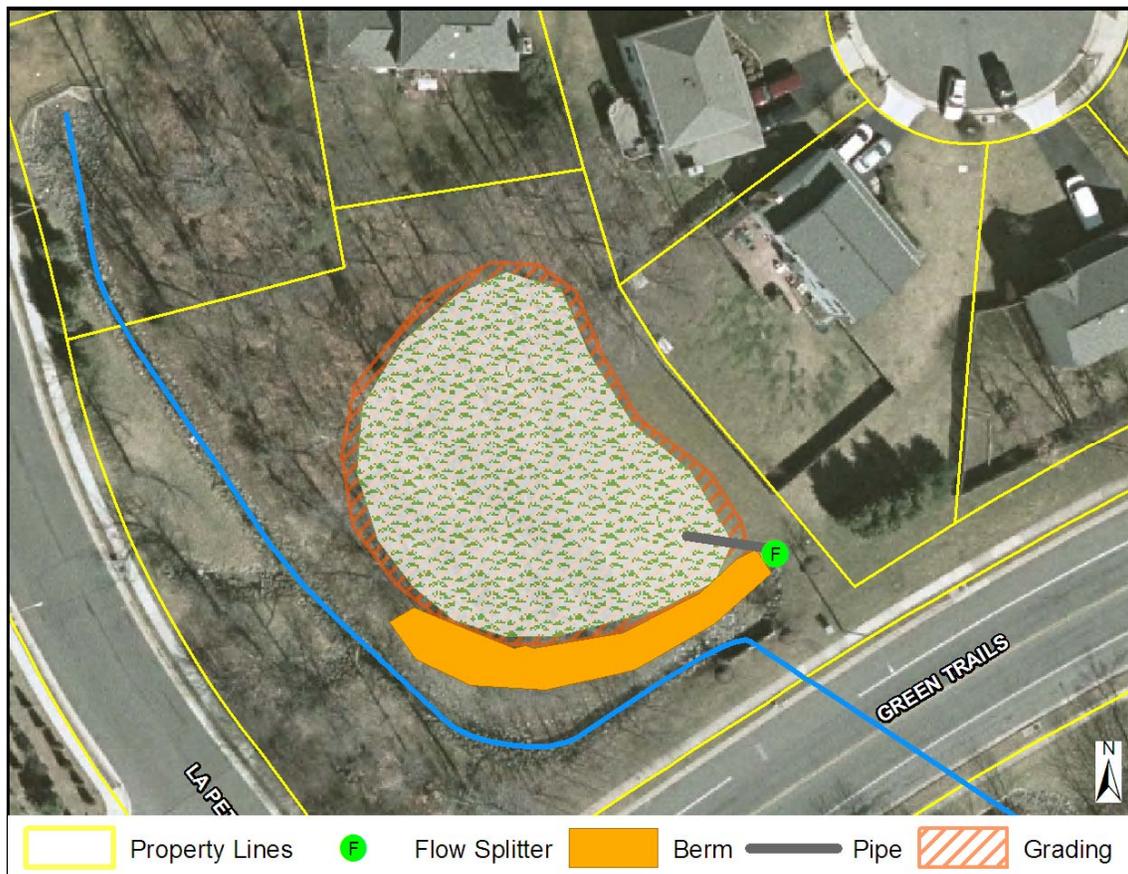
LR9509 BMP/LID



Vicinity Map

Address	6600 La Petite Place
Location	Subdivision
Landowner	Green Trails Homeowners Association
PIN	0651 0403 F
Control Type	Water quality and quantity control
Drainage Area	15 Acres
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: Divert flow from outlet into a created wetland detention system, designed for water quality and channel protection treatment. Relief is set by culvert invert, but there is room to add storage because common area inside easement averages 4 ft above invert.



Property Lines
 F Flow Splitter
 Berm
 Pipe
 Grading

Project Area Map

Project Benefits: Project LR9509 will reduce nitrogen, phosphorus, and sediment pollution draining to Little Rocky Run. Project will also result in reduced 2-yr peak flow to degrading stream reach immediately downstream. System drains to an existing regional pond downstream for quality and quantity control.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
32.07	4.73	0.42

Project Design Considerations: Proposed Stream Restoration LR9201 is immediately downstream and addresses erosion area. Adding channel protection at existing culvert will impact this design and footprint. The site can be accessed from several locations; the cost estimate is based on access by way of Green Trails Boulevard (existing floodplain and storage easements). Common area is approximately 4 ft above culvert invert and is full of mature trees. Access and requirement to remove mature trees result in low implementability score.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road	100	SY	\$25.00	\$2,500.00
Access Road Gate	1	EA	\$2,500.00	\$2,500.00
Structural BMP and Incidentals	1	LS	\$10,000 - \$20,000	\$10,000.00
Clear and Grub	0.2	AC	\$8,500.00	\$1,700.00
Organic Compost Soil Amendment	300	CY	\$40.00	\$12,000.00
Grading and Excavation	800	CY	\$35.00	\$28,000.00
New Storm Pipe	25	LF	\$100 - \$300	\$5,000.00
		Base Construction Cost		\$61,700.00
		Mobilization (5%)		\$3,085.00
		Plantings (5%)		\$3,085.00
		Ancillary Items (5%)		\$3,085.00
		Erosion & Sediment Control (10%)		\$6,170.00
		Subtotal 1		\$77,125.00
		Contingency (25%)		\$19,281.25
		Subtotal 2		\$96,406.25
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$43,382.81
		Total		\$139,789.06
		Estimated Project Cost		\$140,000.00

Little Rocky Run Watershed
Little Rocky Run – Lower Watershed Management Area

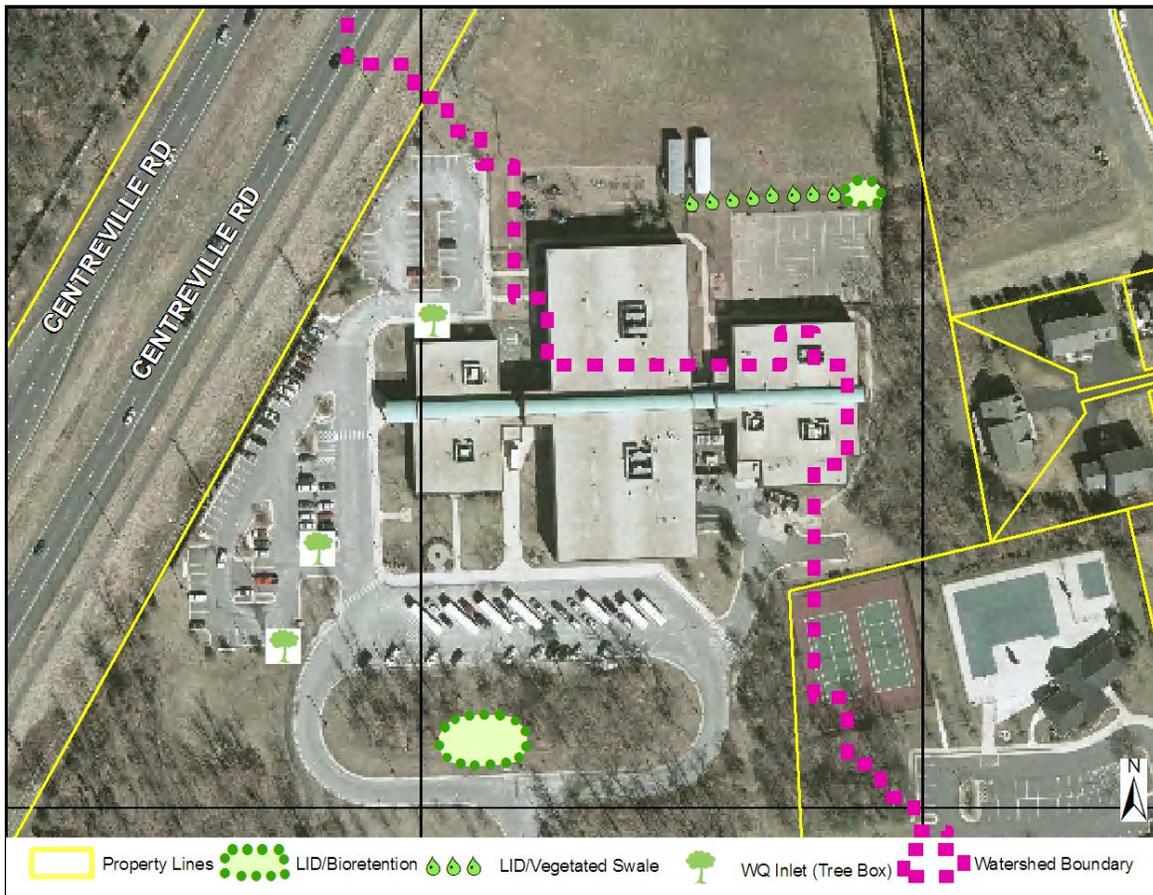
LR 9510 Low Impact Development Project Suite



Vicinity Map

Address	14330 Green Trails Bv
Location	Centreville Elementary School
Landowner	School Board of Fairfax County
PIN	0653 04 A
Control Type	Water Quality
Drainage Area	4.5 Acres
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: Construct bioretention areas and a vegetated swale to treat runoff from the roof, parking lots and all-purpose courts. Replace three curb inlets with tree box filters. This is a school site, allowing for high visibility and affording educational opportunities.



Project Area Map

Project Benefits: Project will enhance filtration, biological uptake and microbial activity. Educational opportunities exist for students.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
1.18	0.22	0.01

Project Design Considerations: This is a headwater site, but the school resides only partially within the Littler Rocky Run watershed. It is adjacent to the Cub Run watershed, where a project was not originally proposed. A field visit was conducted to verify stormwater infrastructure outside of Little Rocky Run and additional LID measures have been included to treat the site as a whole. Bioretention areas were sized based on approximating impervious drainage area and determining the water quality volume, but additional effort is required to accurately determine roof top drainage. Within the Little Rocky Run watershed there are two downstream projects along this tributary, an additional LID retrofit (LR9509L) and a Stream Restoration (LR9201L) that is located downstream of both retrofit sites – coordination and sequencing should be considered. The curb will have to be cut to allow drainage to the larger proposed bioretention area.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale	120	SY	\$50.00	\$6,000.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Bioretention Filters & Basin	480	SY	\$150.00	\$72,000.00
Manufactured BMP (i.e. Tree Box Filter)	3	EA	\$10,000.00	\$30,000.00
Organic Compost Soil Amendment	150	CY	\$40.00	\$6,000.00
		Base Construction Cost		\$114,000.00
		Mobilization (5%)		\$5,700.00
		Plantings (5%)		\$5,700.00
		Ancillary Items (5%)		\$5,700.00
		Erosion & Sediment Control (10%)		\$11,400.00
		Subtotal 1		\$142,500.00
		Contingency (25%)		\$35,625.00
		Subtotal 2		\$178,125.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$80,156.25
		Total		\$258,281.25
		Estimated Project Cost		\$260,000.00

Little Rocky Run Watershed
Little Rocky Run – Lower Watershed Management Area

LR9514 BMP/LID



Vicinity Map

Address	13611 Springstone Dr
Location	Union Mills Elementary School
Landowner	School Board of Fairfax County
PIN	0652 07 B
Control Type	Water Quality
Drainage Area	1 acre
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: The site drains to existing facility 0612DP. Construct two bioretention areas to collect runoff from highly impervious areas. One will collect runoff currently entering a curb inlet. Two tree box filters will replace existing curb drop inlets.



Property Lines
 🌳 WQ Inlet (Tree Box)
 LID/Bioretention

Project Area Map

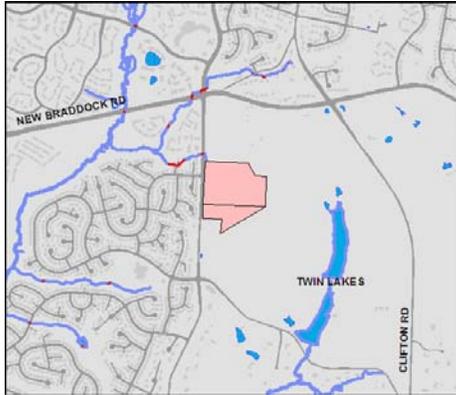
Project Benefits: The bioretention areas promote filtration, biological uptake and microbial activity. Bioretention areas can also have high amenity value. The project affords educational opportunities at the school.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
0.75	0.20	0.01

Project Design Considerations: This site drains directly to existing facility 0612DP. Though for smaller storm events there will be runoff reduction, the primary goal is to provide water quality benefits at an accessible and visible site. As a result, this project is independent of the proposed projects downstream, requiring little emphasis on sequencing/coordination. There are no known construction or permitting constraints. Replacement of existing pavement with pervious pavement can be incorporated into the design, but should be coordinated with typical maintenance/repaving activities and was not included specifically in this conceptual layout.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale		SY	\$50.00	\$0.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Bioretention Filters & Basin	130	SY	\$150.00	\$19,500.00
Manufactured BMP (i.e. Tree Box Filter)	2	EA	\$10,000.00	\$20,000.00
Organic Compost Soil Amendment	11	CY	\$40.00	\$440.00
		Base Construction Cost		\$39,940.00
		Mobilization (5%)		\$1,997.00
		Plantings (5%)		\$1,997.00
		Ancillary Items (5%)		\$1,997.00
		Erosion & Sediment Control (10%)		\$3,994.00
		Subtotal 1		\$49,925.00
		Contingency (25%)		\$12,481.25
		Subtotal 2		\$62,406.25
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$28,082.81
		Total		\$90,489.06
		Estimated Project Cost		\$100,000.00

LR9516 BMP/LID



Vicinity Map

Address	6001 Union Mill Road
Location	Centreville High School
Landowner	School Board of Fairfax County
PIN	0661 01 0012A 0661 01 0012B
Control Type	Water quality control
Drainage Area	4 Acres
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: This site drains to existing facility 0325DP. Replace five curb drop inlets with tree box filters. Construct bioretention area near the parking lot. Proposed measures drain areas that are nearly 100% impervious.



Project Area Map

Project Benefits: The bioretention area will promote filtration, biological uptake and microbial activity and has a high amenity value. The project also affords educational opportunities at the school.

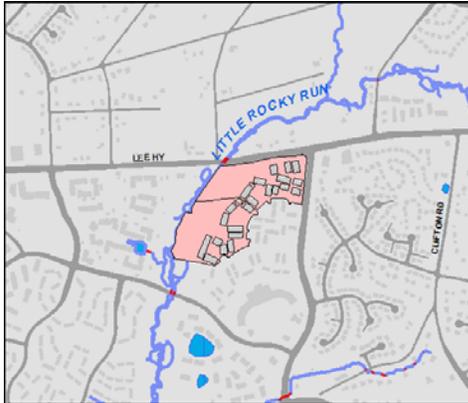
Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
18.74	4.36	0.76

Project Design Considerations: This site drains directly to existing facility 0325DP. Though for smaller storm events there will be runoff reduction, the primary goal is to provide water quality benefits at an accessible and visible site. As a result, this project is independent of the proposed projects downstream, requiring little emphasis on sequencing/coordination. There are no known construction or permitting constraints. Replacement of existing pavement with pervious pavement can be incorporated into the design, but should be coordinated with typical maintenance/repaving activities and was not included specifically in this conceptual layout.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale		SY	\$50.00	\$0.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Bioretention Filters & Basin	605	SY	\$150.00	\$90,750.00
Manufactured BMP (i.e. Tree Box Filter)	5	EA	\$10,000.00	\$50,000.00
Organic Compost Soil Amendment	101	CY	\$40.00	\$4,040.00
		Base Construction Cost		\$144,790.00
		Mobilization (5%)		\$7,239.50
		Plantings (5%)		\$7,239.50
		Ancillary Items (5%)		\$7,239.50
		Erosion & Sediment Control (10%)		\$14,479.00
		Subtotal 1		\$180,987.50
		Contingency (25%)		\$45,246.88
		Subtotal 2		\$226,234.38
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$101,805.47
		Total		\$328,039.84
		Estimated Project Cost		\$330,000.00

Little Rocky Run Watershed
Little Rocky Run – Upper Watershed Management Area

LR9521 BMP/LID



Vicinity Map

Address	13516 Canada Goose Ct
Location	Subdivision
Landowner	Union Mills Community Association
PIN	0553 0701 A1 0553 0702 A1
Control Type	Water quality control
Drainage Area	2 Acres
Receiving Waters	Little Rocky Run

Description: LID stormwater treatment is proposed for Project LR9521 for this uncontrolled area near Canada Goose Court. The project proposes collecting runoff from an existing grass swale in a new bioretention area and replacing two curb inlets with tree box filters. Two existing facilities 0738DP (to the North) and 0739DP will be retrofitted to include wetland plantings, micropools, and improved pond geometry.



Project Area Map

Project Benefits: Bioretention areas and pond retrofits will enhance filtration, biological uptake and microbial activity. The pond retrofits will also provide critical habitat for birds and other wildlife.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
31.43	5.78	1.76

Project Design Considerations: No permitting, construction or access limitations exist. Drainage swale draining to proposed bioretention area was surveyed for potential enhancement, but there are several utility crossings which are likely to prohibit configuring the swale to infiltrate more water. Bioretention area proposed within existing floodplain easement, but outside 100-yr floodplain boundary.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale		SY	\$50.00	\$0.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Grading and Excavation	915	CY	\$35.00	\$32,025.00
Bioretention Filters & Basin	100	SY	\$150.00	\$15,000.00
Manufactured BMP (i.e. Tree Box Filter)	2	EA	\$10,000.00	\$20,000.00
Organic Compost Soil Amendment	255	CY	\$40.00	\$10,200.00
		Base Construction Cost		\$77,225.00
		Mobilization (5%)		\$3,861.25
		Plantings (5%)		\$3,861.25
		Ancillary Items (5%)		\$3,861.25
		Erosion & Sediment Control (10%)		\$7,722.50
		Subtotal 1		\$96,531.25
		Contingency (25%)		\$24,132.81
		Subtotal 2		\$120,664.06
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$54,298.83
		Total		\$174,962.89
		Estimated Project Cost		\$180,000.00

LR9522 BMP/LID



Vicinity Map

Address	13340 Leland Rd
Location	Colin Powell Elementary School
Landowner	School Board of Fairfax County
PIN	0553 01 0020A
Control Type	Water quality control
Drainage Area	3 Acres
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: Project LR9522 provides stormwater retrofits at the Colin Powell Elementary School. Retrofits include: cutting curbs and installing bioretention areas in grass medians at five locations and replacing one curb inlet with a tree box filter. This LID suite will treat most of the stormwater draining from the two parking lots.



Property Lines

 WQ Inlet (Tree Box)

 LID/Bioretenion

Project Area Map

Project Benefits: Project LR9522 will enhance filtration, biological uptake and microbial activity. Educational opportunities exist for students.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
2.78	0.75	0.51

Project Design Considerations: There are existing yard inlets on either side of the front entrance and behind the school which could be retrofitted for water quality treatment, but additional information on the pipe configuration and depths is required to determine feasibility. Consider collecting and storing roof drainage onsite. This site drains to R-161, where additional plantings have been proposed, but the two projects should not impact one another, nor do they need to be constructed in a particular order. No permitting, construction or access limitations exist. The project has limited impact potential to Arrowhead Park, except for the need to enter the Colin Powell ES grounds from Arrowhead Park Dr. to construct three of the bioretention areas and the tree box filter. The condition of the road/parking lot should be satisfactory to FCPS at completion of the project.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale		SY	\$50.00	\$0.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Bioretention Filters & Basin	550	SY	\$150.00	\$82,500.00
Manufactured BMP (i.e. Tree Box Filter)	1	EA	\$10,000.00	\$10,000.00
Organic Compost Soil Amendment	45	CY	\$40.00	\$1,800.00
		Base Construction Cost		\$94,300.00
		Mobilization (5%)		\$4,715.00
		Plantings (5%)		\$4,715.00
		Ancillary Items (5%)		\$4,715.00
		Erosion & Sediment Control (10%)		\$9,430.00
		Subtotal 1		\$117,875.00
		Contingency (25%)		\$29,468.75
		Subtotal 2		\$147,343.75
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$66,304.69
		Total		\$213,648.44
		Estimated Project Cost		\$220,000.00

Little Rocky Run Watershed
Little Rocky Run – Upper Watershed Management Area

LR9523 BMP/LID



Vicinity Map

Address	13006 Feldspar Ct
Location	Subdivision
Landowner	Hayden Village Community Association
PIN	0553 08 G
Control Type	Water quality control
Drainage Area	43 Acres
Receiving Waters	Willow Springs Branch

Description: Project LR9523 is located near Feldspar Court and includes constructing a wetland detention cell to treat for water quality only. This is a large untreated area where more decentralized retrofits would be very difficult due to private property constraints.



Project Area Map

Project Benefits: The constructed wetland will replicate natural wetland ecosystems while allowing for gravitational settling, biological uptake, and microbial activity. It will possess high amenity and habitat value.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
35.94	14.83	5.74

Project Design Considerations: The feasibility of this project is low. There are significant access issues necessitating coordination with VDOT and the HOA. A wetlands permit may need to be obtained. The footprint was selected to avoid the 100 year floodplain and to be set back from existing property owners to the maximum extent practicable. Many mature trees would need to be removed. The project can be designed for channel protection volume or larger events, but the focus of this conceptual was to treat for water quality only. Floodplain and storm drainage easements exist currently. There are no sequencing concerns for this project.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road	1400	SY	\$25.00	\$35,000.00
Access Road Gate	1	EA	\$2,500.00	\$2,500.00
Clear and Grub	1.2	AC	\$8,500.00	\$10,200.00
Structural BMP and Incidentals	bmp riser	LS	\$10,000 - \$20,000	\$10,000.00
New Storm Pipe	40	LF	\$200.00	\$8,000.00
Grading and Excavation	2100	CY	\$35.00	\$73,500.00
Embankment	800	CY	\$50.00	\$40,000.00
Organic Compost Soil Amendment	1100	CY	\$40.00	\$44,000.00
			Base Construction Cost	\$223,200.00
			Mobilization (5%)	\$11,160.00
			Plantings (5%)	\$11,160.00
			Ancillary Items (5%)	\$11,160.00
			Erosion & Sediment Control (10%)	\$22,320.00
			Subtotal 1	\$279,000.00
			Contingency (25%)	\$69,750.00
			Subtotal 2	\$348,750.00
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$156,937.50
			Total	\$505,687.50
			Estimated Project Cost	\$510,000.00

LR9524 New BMP/LID



Vicinity Map

Address	5355 Ashleigh Rd
Location	Subdivision
Landowner	Hampton Forest HOA
PIN	0554 07 B1
Control Type	Water quality control
Drainage Area	7 acres
Receiving Waters	Unnamed tributary to Willow Springs Branch

Description: The stormwater outfall shown below provides no water quality treatment and suffers from minor erosion. LR9524 will provide new water quality treatment with a constructed wetland area and will prevent future upstream and downstream erosion by dissipating excess energy.



Project Area Map

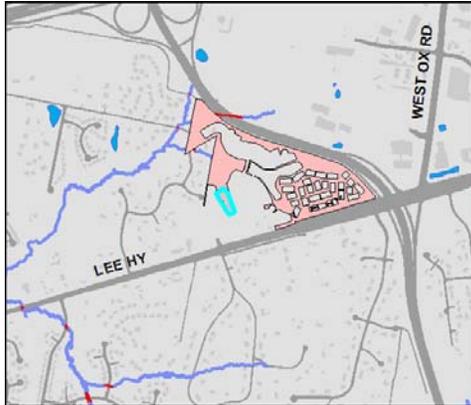
Project Benefits: LR9524 will improve water quality by removing nitrogen, phosphorus, and sediment. It will treat a portion of the flow draining from subwatershed LR-WS-0002. It will also provide critical wetland habitat for native wildlife.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
24.45	6.18	2.43

Project Design Considerations: LR9524 is located on Hampton Forest Homeowners Association property, is mostly contained by an existing floodplain and storm drainage easement. If necessary, the project footprint can easily be manipulated to fit completely within the easement without sacrificing significant water quality treatment. Impacts to mature trees should be minimal.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale		SY	\$50.00	\$0.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Bioretention Filters & Basin	500	SY	\$150.00	\$75,000.00
Manufactured BMP (i.e. Tree Box Filter)		EA	\$10,000.00	\$0.00
Organic Compost Soil Amendment		CY	\$40.00	\$0.00
Clear and Grub	0.2	AC	\$8,500.00	\$1,700.00
Grading and Excavation	250	CY	\$35.00	\$8,750.00
Embankment	100	CY	\$50.00	\$5,000.00
		Base Construction Cost		\$90,450.00
		Mobilization (5%)		\$4,522.50
		Plantings (5%)		\$4,522.50
		Ancillary Items (5%)		\$4,522.50
		Erosion & Sediment Control (10%)		\$9,045.00
		Subtotal 1		\$113,062.50
		Contingency (25%)		\$28,265.63
		Subtotal 2		\$141,328.13
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$63,597.66
		Total		\$204,925.78
		Estimated Project Cost		\$210,000.00

LR9526 BMP/LID



Vicinity Map

Address	4864 Muddler Way
Location	Subdivision
Landowner	Buckley's Reserve Homeowners Association
PIN	0554 17 A
Control Type	Water Quality
Drainage Area	22 Acres
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: Divert flow from outfall into a wetland marsh area. Wetland marsh to treat water quality volume only, channel protection treatment will require removal of trees or realigning storm sewer/outfall. There is a trail and a workout station within the proposed footprint which will need to be relocated.



Project Area Map

Project Benefits: The created wetland provides ideal environment for gravitational settling, biological uptake, and microbial activity. Signage can be provided and trail can be routed through or around wetland cell to promote quality benefit. Project will provide habitat enhancement for insects, amphibians, and birds.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
40.52	6.29	0.86

Project Design Considerations: This is the only project proposed for this subwatershed and sequencing is not an issue. Though not included as part of this estimate, channel-protection may be achieved at this location. There is an existing storm drainage easement to provide access, but the bulk of the work is on HOA property, outside of the easement.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road	210	SY	\$25.00	\$5,250.00
Access Road Gate	1	EA	\$2,500.00	\$2,500.00
Clear and Grub	0.1	AC	\$8,500.00	\$850.00
Structural BMP and Incidentals	1	LS	\$10,000 - \$20,000	\$10,000.00
Grading and Excavation	675	CY	\$35.00	\$23,625.00
Embankment	100	CY	\$50.00	\$5,000.00
New Storm Pipe	50	LF	\$100 - \$300	\$5,000.00
Organic Compost Soil Amendment	60	CY	\$40.00	\$2,400.00
			Base Construction Cost	\$54,625.00
			Mobilization (5%)	\$2,731.25
			Plantings (5%)	\$2,731.25
			Ancillary Items (5%)	\$2,731.25
			Erosion & Sediment Control (10%)	\$5,462.50
			Subtotal 1	\$68,281.25
			Contingency (25%)	\$17,070.31
			Subtotal 2	\$85,351.56
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$38,408.20
			Total	\$123,759.77
			Estimated Project Cost	\$130,000.00

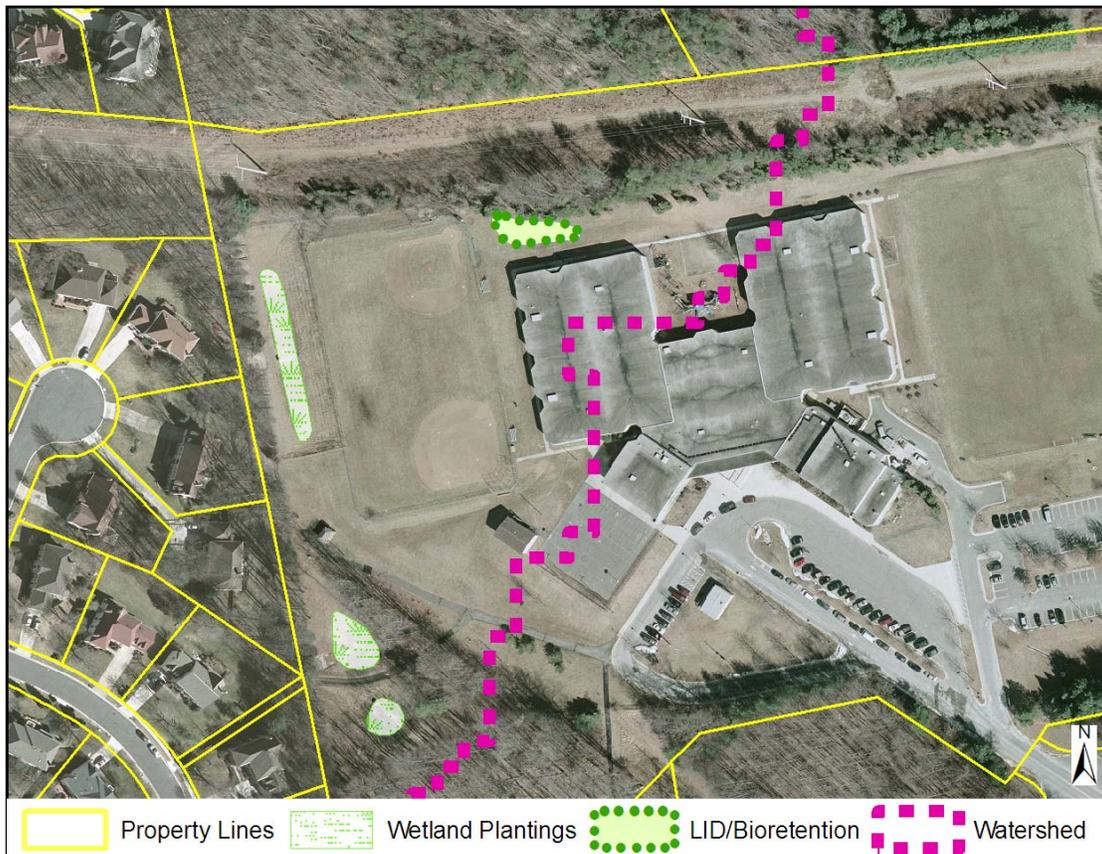
LR9527 BMP/LID



Vicinity Map

Address	5400 Willow Springs School Rd
Location	Willow Springs Elementary School
Landowner	School Board of Fairfax County
PIN	0662 01 0004A
Control Type	Water quality control
Drainage Area	7 Acres
Receiving Waters	Unnamed Tributary to Willow Springs Branch

Description: Project LR9527 provides stormwater retrofits at the Willow Springs Elementary School. Retrofits include altering the pond geometry of three existing dry ponds while adding wetland plantings and constructing a new bioretention area to capture untreated runoff from the roof.



Project Area Map

Project Benefits: Project will reduce phosphorus, nitrogen and sediment loads. Plantings/geometry adjustments will promote gravitational settling, biological uptake and microbial activity while providing habitat enhancement for insects, birds, amphibians, etc. The project will provide educational opportunities for students.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
3.95	0.87	0.42

Project Design Considerations: School site is on border between the Little Rocky Run watershed and the Pope’s Head Run watershed. A project was proposed in the latter plan on the site, so this proposal focuses solely on the drainage to Little Rocky Run. Roof drainage may need to be diverted to a bioretention area. The proposed measures are for quality treatment only and therefore sequencing/coordination is not critical. There are no access/permitting issues.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale		SY	\$50.00	\$0.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Grading and Excavation	400	CY	\$35.00	\$14,000.00
Bioretention Filters & Basin	250	SY	\$150.00	\$37,500.00
Manufactured BMP (i.e. Tree Box Filter)	0	EA	\$10,000.00	\$0.00
Organic Compost Soil Amendment	100	CY	\$40.00	\$4,000.00
			Base Construction Cost	\$55,500.00
			Mobilization (5%)	\$2,775.00
			Plantings (5%)	\$2,775.00
			Ancillary Items (5%)	\$2,775.00
			Erosion & Sediment Control (10%)	\$5,550.00
			Subtotal 1	\$69,375.00
			Contingency (25%)	\$17,343.75
			Subtotal 2	\$86,718.75
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$39,023.44
			Total	\$125,742.19
			Estimated Project Cost	\$130,000.00