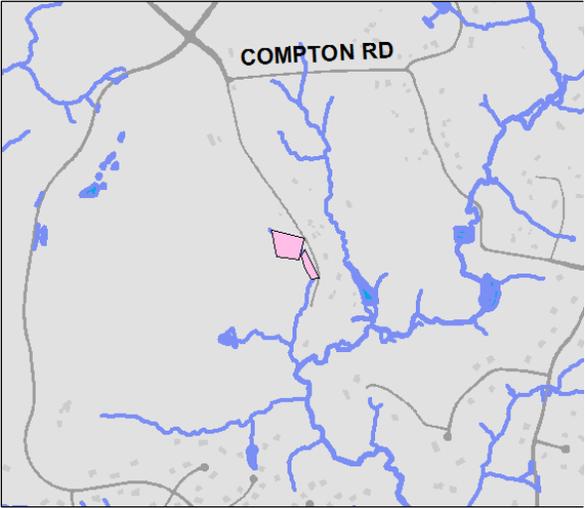


JM9100 Pond Retrofit



Vicinity Map

Address	7005 Union Mill Rd
Location	Golf course
Landowner	Balmoral Golf Assoc LC Garfield Henry TR
PIN	0742 05 B1 0751 06 F
Control Type	Water quality and quantity control
Drainage Area	63 acres
Receiving Waters	Unnamed tributary to Johnny Moore Creek

Description: Pond retrofit JM9100 addresses a stormwater pond that has fallen into disrepair and currently provides little to no detention or treatment. JM9100 calls for pond embankment repairs, new micropools and wetland plantings, and removal of debris downstream of the pond.



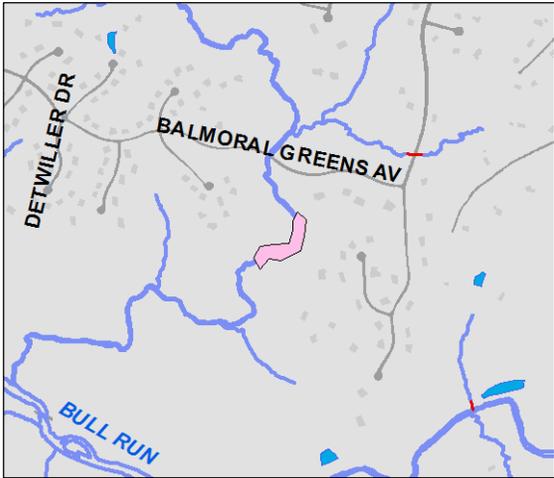
Project Benefits: JM9100 will eliminate a significant amount of water pollution, and will improve wildlife habitat by restoring a wetland area.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Suspended Solids Removed (tons/yr)
36.69	13.41	5.17

Project Design Considerations: Stream restoration JM9202 is located approximately 1200 feet downstream of JM9100. Coordination and sequencing of these projects must be considered. The pond retrofit portion of JM9100 is located on Balmoral Golf Association property and is surrounded by conservation easements. The debris removal portion of JM9100 is located on private property, and is not within any easements. 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	100	SY	\$25.00	\$2,500.00
Access Road Gate	1	EA	\$2,500.00	\$2,500.00
Clear and Grub	0.4	AC	\$8,500.00	\$3,400.00
Structural BMP and Incidentals	1	LS	\$10,000 - \$20,000	\$15,000.00
New Storm Pipe	30	LF	\$100 - \$300	\$6,000.00
Grading and Excavation	700	CY	\$35.00	\$24,500.00
Embankment	500	CY	\$50.00	\$25,000.00
Organic Compost Soil Amendment	175	CY	\$40.00	\$7,000.00
			Base Construction Cost	\$85,900.00
			Mobilization (5%)	\$4,295.00
			Plantings (5%)	\$4,295.00
			Ancillary Items (5%)	\$4,295.00
			Erosion & Sediment Control (10%)	\$8,590.00
			Subtotal 1	\$107,375.00
			Contingency (25%)	\$26,843.75
			Subtotal 2	\$134,218.75
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$60,398.44
			Total	\$194,617.19
			Estimated Project Cost	\$200,000.00

JM9200 Stream Restoration



Vicinity Map

Address	13309 Balmoral Greens Ave
Location	Stream valley park
Landowner	Fairfax County Park Authority
PIN	0744 03 V 0851 07 G
Control Type	Water quality control
Drainage Area	2984 acres
Receiving Waters	Johnny Moore Creek

Description: Johnny Moore Creek suffers from severe bank erosion in the area shown below. Project JM9200 will restore the stream to a more stable, natural state to prevent future erosion and promote habitat health and diversity.



Project Area Map

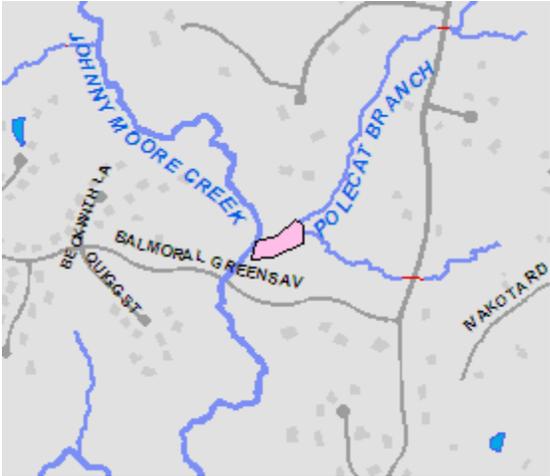
Project Benefits: JM9200 will remove a very large amount of water pollution caused by instream erosion. Higher quality habitat for fish and wildlife will also be provided.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Suspended Solids Removed (tons/yr)
299.08	115.90	186.93

Project Design Considerations: Buffer restoration JM8800 is located just upstream of the project site, where Balmoral Greens Avenue crosses Johnny Moore Creek. Stream restoration JM9201 is also located further upstream. Coordination of these three projects should be considered. The project site can be accessed from Balmoral Greens Avenue, and is located within floodplain/stormwater and conservation easements. Significant construction issues exist – especially site access – such that it may be worthwhile to extend the restoration project even further upstream to where Balmoral Greens Avenue crosses Johnny Moore Creek. As with any stream restoration, there are significant environmental permitting requirements for this project. Impacts to trees will be inevitable, but the long-term environmental benefits of the Johnny Moore Creek Stream Restoration will outweigh the short-term environmental costs. 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
Clear and Grub	1.5	AC	\$10,000.00	\$15,000.00
Construct New Channel	1000	LF	\$200.00	\$200,000.00
Add'l Cost, first 500 LF	500	LF	\$200.00	\$100,000.00
Plantings	1.5	AC	\$25,000.00	\$37,500.00
		Base Construction Cost		\$352,500.00
		Mobilization (5%)		\$17,625.00
		Ancillary Items (5%)		\$17,625.00
		Erosion & Sediment Control (10%)		\$35,250.00
		Subtotal 1		\$423,000.00
		Contingency (25%)		\$105,750.00
		Subtotal 2		\$528,750.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$237,937.50
		Total		\$766,687.50
		Estimated Project Cost		\$770,000.00

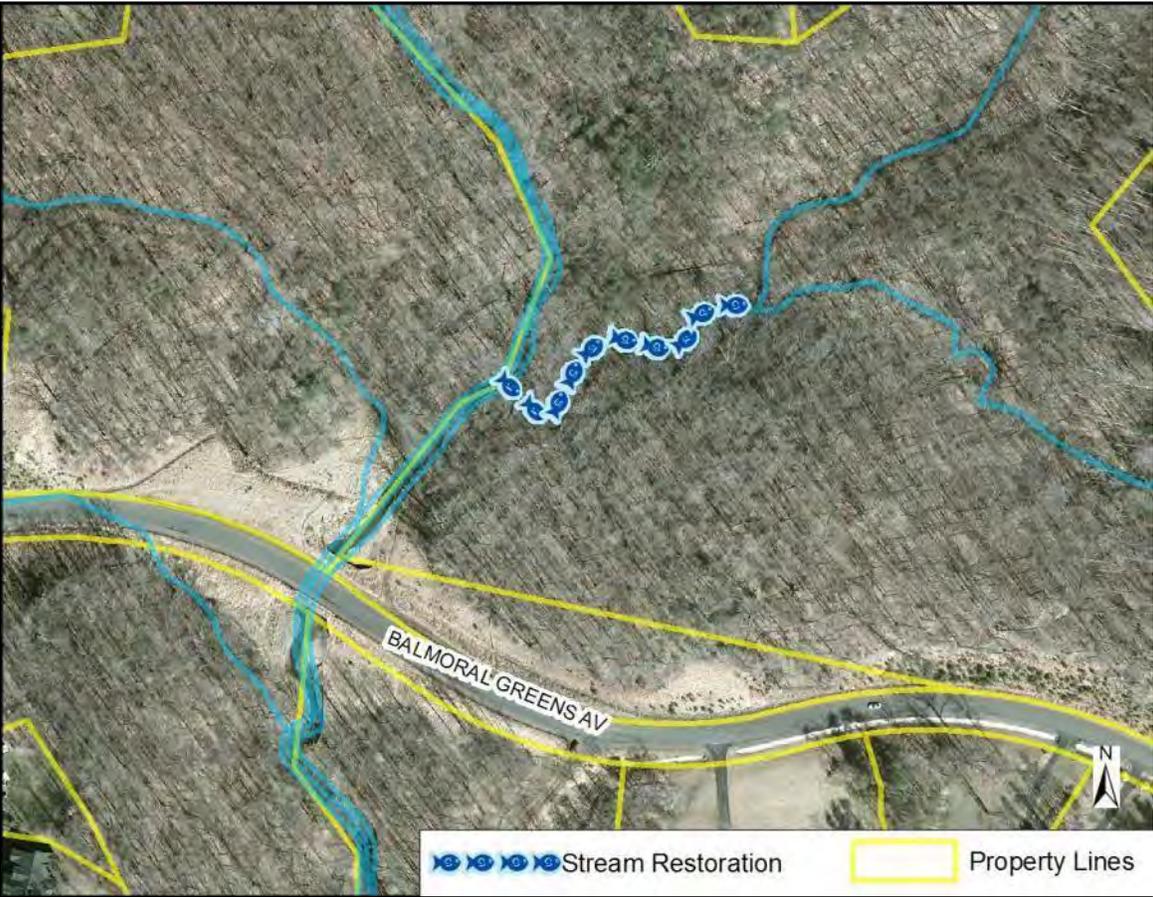
JM9201 Stream Restoration



Vicinity Map

Address	13309 Balmoral Greens Ave
Location	Wooded area
Landowner	Fairfax County Park Authority
PIN	0753 08 A
Control Type	Water quality control
Drainage Area	310 acres
Receiving Waters	Johnny Moore Creek

Description: Stream restoration project JM9201 addresses erosion in the downstream portion of Polecat Branch. Project JM9201 will restore the stream to a more stable, natural state to prevent future erosion and promote habitat health and diversity.



Project Area Map

Project Benefits: Project JM9201 will reduce phosphorus and nitrogen loading in the Polecat Branch. Higher quality habitat for wildlife will also be provided.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
4.59	1.78	2.87

Project Design Considerations: Buffer restoration JM8800 is located about 250 feet downstream of the project site, where Balmoral Greens Avenue crosses Johnny Moore Creek. Stream restoration JM9200 is also located further downstream on Johnny Moore Creek. Coordination and sequencing of these three projects should be considered, especially due to site access issues for JM9201 and JM9200 – both are densely wooded and somewhat remote. As with any stream restoration, there are significant environmental permitting requirements for this project. Impacts to mature trees will be inevitable, but the long-term environmental benefits of the Polecat Creek Stream Restoration will outweigh the short-term environmental costs. This project area contains many known cultural resources sites. They consist of important Native American soapstone (steatite) quarries and campsites. The Detwiler Mill Complex is located downstream of the confluence of Johnny Moore Creek and Polecat Branch. It is recommended that the known sites be evaluated with Phase II archaeological testing for eligibility to the National Register of Historic Places prior to any ground disturbing activity. If the sites are found eligible, avoidance or Phase III data recovery is recommended.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.57	AC	\$10,000.00	\$5,700.00
Construct New Channel	425	LF	\$200.00	\$85,000.00
Add'l Cost, first 500 LF	425	LF	\$200.00	\$85,000.00
Plantings	0.57	AC	\$25,000.00	\$14,250.00
		Base Construction Cost		\$189,950.00
		Mobilization (5%)		\$9,497.50
		Ancillary Items (5%)		\$9,497.50
		Erosion & Sediment Control (10%)		\$18,995.00
		Subtotal 1		\$227,940.00
		Contingency (25%)		\$56,985.00
		Subtotal 2		\$284,925.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$128,216.25
		Total		\$413,141.25
		Estimated Project Cost		\$420,000.00

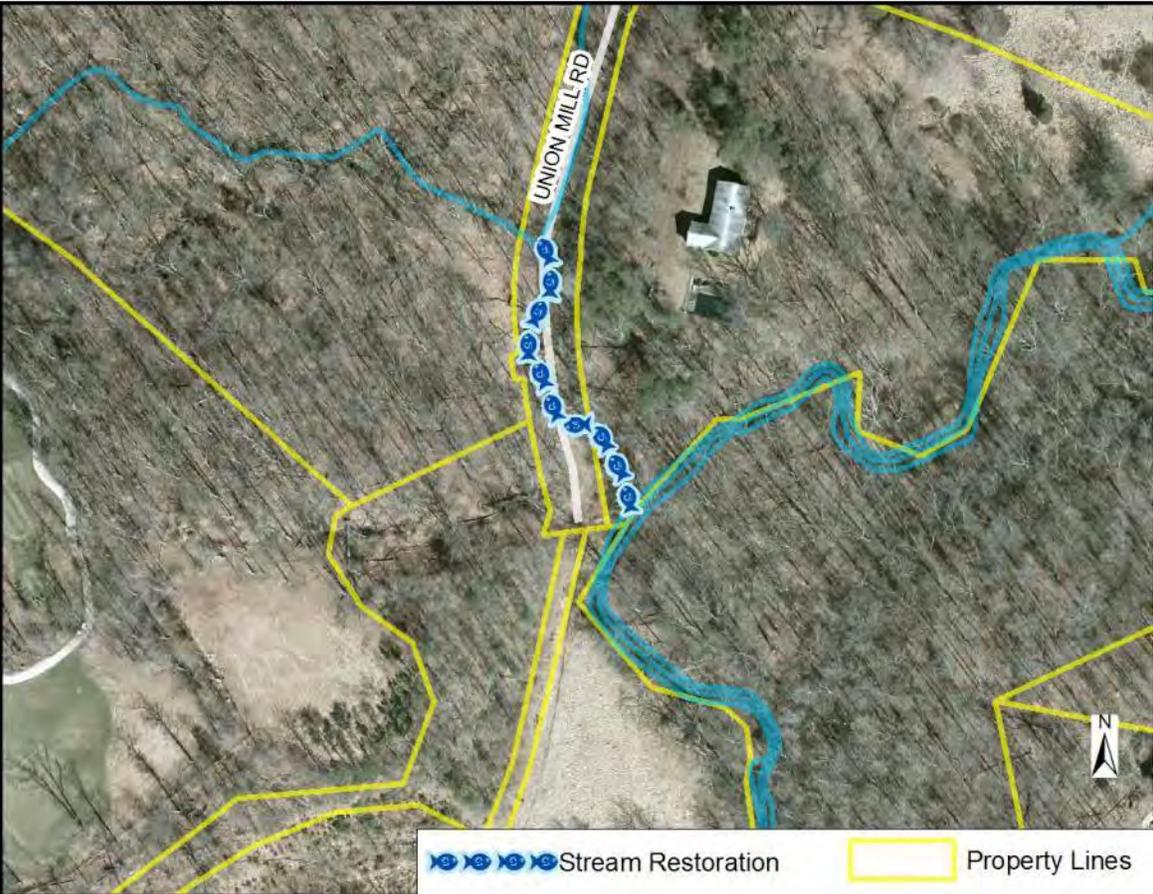
JM9202 Stream Restoration



Vicinity Map

Address	7029 Union Mill Rd
Location	Stream valley park
Landowner	Fairfax County Park Authority Garfield Henry TR
PIN	0744 03 S 0751 06 E
Control Type	Water quality control
Drainage Area	174 acres
Receiving Waters	Johnny Moore Creek

Description: The tributary to Johnny Moore Creek that crosses Union Mill Rd (as shown below) suffers from erosion. Project JM9202 will restore the stream to a more stable, natural state to prevent future erosion and promote habitat health and diversity.



Project Area Map

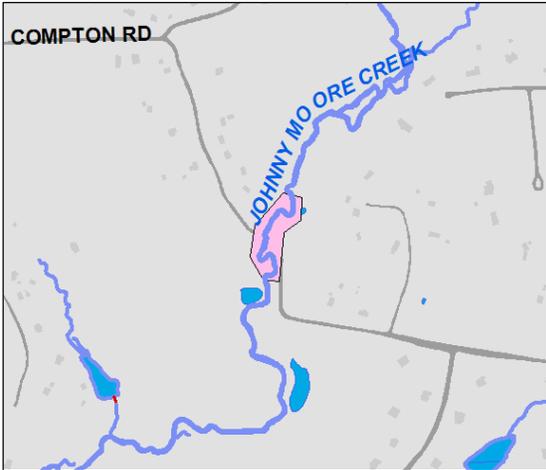
Project Benefits: The Tributary to Johnny Moore Creek Stream Restoration (JM9202) will reduce phosphorus, nitrogen and sediment loading, and restore approximately 325 linear feet of degraded stream channel. Higher quality habitat for fish and wildlife will also be provided.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
3.31	1.28	2.07

Project Design Considerations: Buffer restoration JM8801 is located approximately 500' downstream of JM9202 – coordination of these two projects should be considered. JM9202 is located partially within floodplain/stormwater and conservation easements, and is also partially located on private property. The project site can be accessed from Union Mill Rd. Significant construction issues exist – especially site access. As with any stream restoration, there are significant environmental permitting requirements for this project. Impacts to trees will be inevitable, but the long-term environmental benefits of the Johnny Moore Creek Stream Restoration will outweigh the short-term environmental costs. This area has many known historical sites primarily consisting of important Native American soapstone (steatite) quarries and campsites. In addition, the entire area has potential Civil War resources. The Clifton Soapstone Quarry Complex is located within the project area. It is recommended that all project sites be evaluated with Phase II archaeological testing for eligibility to the National Register of Historic Places prior to any ground disturbing activity. If the sites are found eligible, avoidance or Phase III data recovery is recommended.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.45	AC	\$10,000.00	\$4,500.00
Construct New Channel	325	LF	\$200.00	\$65,000.00
Add'l Cost, first 500 LF	325	LF	\$200.00	\$65,000.00
Plantings	0.45	AC	\$25,000.00	\$11,250.00
		Base Construction Cost		\$145,750.00
		Mobilization (5%)		\$7,287.50
		Ancillary Items (5%)		\$7,287.50
		Erosion & Sediment Control (10%)		\$14,575.00
		Subtotal 1		\$174,900.00
		Contingency (25%)		\$43,725.00
		Subtotal 2		\$218,625.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$98,381.25
		Total		\$317,006.25
		Estimated Project Cost		\$320,000.00

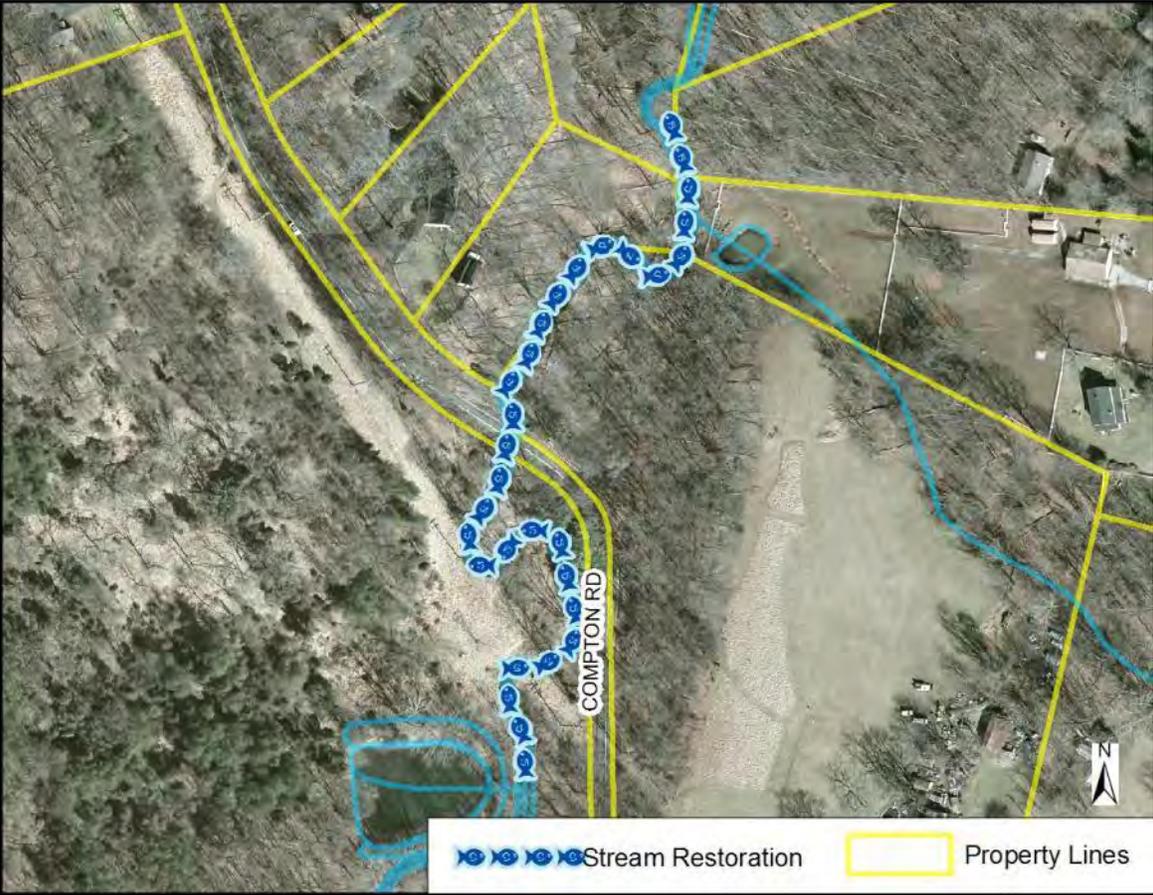
JM9203 Stream Restoration



Vicinity Map

Address	13400 Compton Rd
Location	Private property
Landowner	Boyd, Donald E. TR MA Properties
PIN	0751 01 0026 0751 01 0011Z
Control Type	Water quality control
Drainage Area	2022 acres
Receiving Waters	Bull Run

Description: Johnny Moore Creek suffers from moderate bank erosion in this area. Project JM9203 will restore the stream to a more stable, natural state to prevent future erosion and promote habitat health and diversity.



Project Area Map

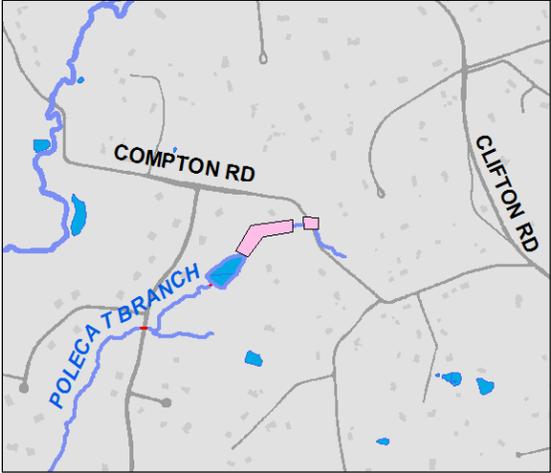
Project Benefits: Stream restoration JM9203 will reduce pollutant loads caused by erosion by restoring about 1070 linear feet of stream channel. Higher quality habitat for fish and wildlife will also be provided.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
16.05	6.22	10.03

Project Design Considerations: Culvert retrofit JM9400 is located approximately 0.6 miles east of JM9203 on Compton Rd. Although these projects are located in separate sub-watersheds, their proximity to each other along Compton Rd. warrants consideration of coordination and sequencing. JM9203 is located on private property. As with any stream restoration, there are significant environmental permitting requirements for this project. Impacts to trees will be inevitable, but the long-term environmental benefits of the Johnny Moore Creek Stream Restoration will outweigh the short-term environmental costs.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	1.1	AC	\$10,000.00	\$11,000.00
Construct New Channel	1070	LF	\$200.00	\$214,000.00
Add'l Cost, first 500 LF	500	LF	\$200.00	\$100,000.00
Plantings	1.1	AC	\$25,000.00	\$27,500.00
		Base Construction Cost		\$352,500.00
		Mobilization (5%)		\$17,625.00
		Ancillary Items (5%)		\$17,625.00
		Erosion & Sediment Control (10%)		\$35,250.00
		Subtotal 1		\$423,000.00
		Contingency (25%)		\$105,750.00
		Subtotal 2		\$528,750.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$237,937.50
		Total		\$766,687.50
		Estimated Project Cost		\$770,000.00

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

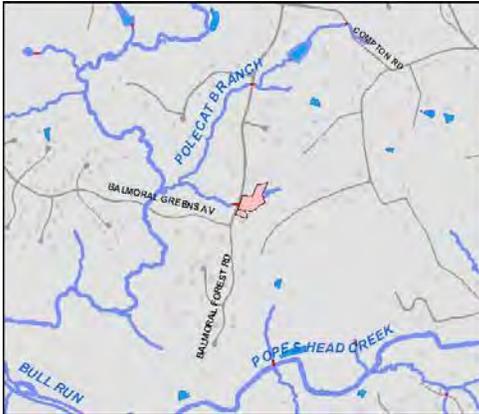
Project Benefits: JM9400 will address flooding issues along Compton Rd by providing more efficient stormwater conveyance at the culvert retrofit site. The buffer restoration portion of the project will reduce erosion and pollutant loading in addition to providing higher quality habitat for native wildlife. 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

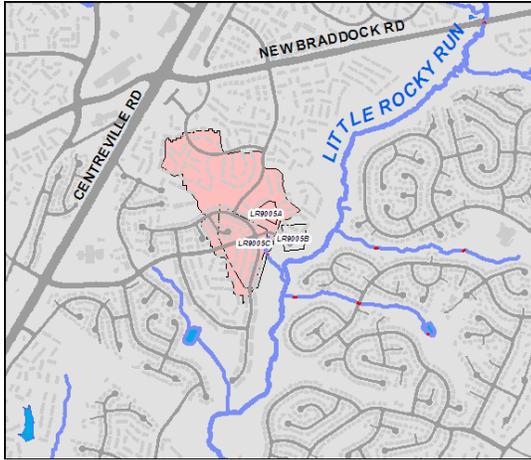
Project Benefits: Project takes advantage of 'free' storage on upstream side of culvert. The project will provide water quality treatment for possible future estate residential development upstream, which is often exempt from stormwater regulations.

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

LR9005 Regional Pond Alternative Group



Vicinity Map

Address	13915 Green Trails Ct
Location	Subdivision
Landowner	Green Trails Homeowners Association/Heritage Forest Homeowners Association
PIN	0654 0304 K 0654 1004 A 0652 09 L
Control Type	Water quality and quantity control
Drainage Area	65 Acres
Receiving Waters	Little Rocky Run

Description: Project suite is alternative to Regional Pond R-05. LR9005A is a retrofit to existing facility 0829DP. Quality enhancements as well as storage increases are proposed. LR9005B is an LID application (3 tree box filters to replace curb drop inlets) to a small untreated portion of the subdivision. This area was not originally expected to be treated by the regional facility, but was added to the alternative suite because it is a strategic location to manage untreated runoff to obtain similar cumulative pollutant removal results as the original proposed pond. LR9005C involves treating the portion of the drainage area intended to drain to R-05 that is not treated by existing facility 0829DP for water quality. A combination of tree box filters (11) and bioretention areas (3) are proposed in order to eliminate the need for a pond at the outfall.



Project Area Map

Project Benefits: This project suite will simulate removal efficiencies of proposed Regional Pond R-05. Loading summaries can be found in Section 6 of the plan.

Project	Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
LR9005A	24.19	6.14	0.21
LR9005B	12.84	2.85	0.65
LR9005C	38.85	8.17	1.83

Project Design Considerations: LR9005A - Adding storage to existing facility (0829DP) encroaches into HOA property and is not contained within existing easement. LR9005B was not broken out separately below due to its similar nature and proximity to LR9005C. LR9005C - Bioretention areas are proposed within HOA property and outside of existing easements and in some cases are close in proximity to private property as well as existing utilities. Treatment was provided throughout the subwatershed to reduce the footprint of treatment at the outfall (where the original regional facility was proposed).

Total Cost (9005A-9005C):

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	275	SY	\$150.00	\$41,250.00
Manufactured BMP (i.e. Tree Box Filter)	14	EA	\$10,000.00	\$140,000.00
Grading and Excavation	2500	CY	\$35.00	\$87,500.00
Remove Trickle Ditch	150	SY	\$10.71	\$1,606.50
Organic Compost Soil Amendment	320	CY	\$40.00	\$12,800.00
			Base Construction Cost	\$283,156.50
			Mobilization (5%)	\$14,157.83
			Plantings (5%)	\$14,157.83
			Ancillary Items (5%)	\$14,157.83
			Erosion & Sediment Control (10%)	\$28,315.65
			Subtotal 1	\$353,945.63
			Contingency (25%)	\$88,486.41
			Subtotal 2	\$442,432.03
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$199,094.41
			Total	\$641,526.45
			Estimated Project Cost	\$650,000.00

Project LR9005A:



Description: LR9005A is a proposed retrofit to existing facility 0829DP. Remove the existing trickle ditches. Add micropools and wetland plantings. Modify internal pond geometry – focus on extending the low flow path. Adding storage will depend on cooperation from HOA. Costs are summarized below:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub		AC	\$8,500.00	\$0.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	2500	CY	\$35.00	\$87,500.00
Embankment		CY	\$50.00	\$0.00
Remove Trickle Ditch	150	SY	\$10.71	\$1,606.50
Organic Compost Soil Amendment	250	CY	\$40.00	\$10,000.00
			Base Construction Cost	\$99,106.50
			Mobilization (5%)	\$4,955.33
			Plantings (5%)	\$4,955.33
			Ancillary Items (5%)	\$4,955.33
			Erosion & Sediment Control (10%)	\$9,910.65
			Subtotal 1	\$123,883.13
			Contingency (25%)	\$30,970.78
			Subtotal 2	\$154,853.91
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$69,684.26
			Total	\$224,538.16
			Estimated Project Cost	\$230,000.00

Projects LR9005B and LR9005C:



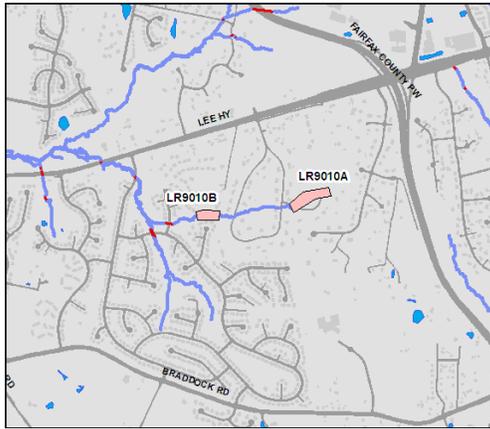
Project Area Map

Description: LR9005B proposes three tree box filters as shown in the Project Area Map. It's been combined with LR9005C due to its similar nature and proximity with the larger subproject. LR9005C treats all of the area that drains to the proposed regional facility that is not treated by existing 0829DP. The HOA is on record saying that a pond is not a viable solution, so LID measures are proposed throughout the subwatershed. Treatment is still proposed at the outfall, but only a bioretention area that can be constructed with minimal impact to mature trees. The existing StormNet data is inaccurate in this area.

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	275	SY	\$150.00	\$41,250.00
Manufactured BMP (i.e. Tree Box Filter)	14	EA	\$10,000.00	\$140,000.00
Organic Compost Soil Amendment	70	CY	\$40.00	\$2,800.00
		Base Construction Cost		\$184,050.00
		Mobilization (5%)		\$9,202.50
		Plantings (5%)		\$9,202.50
		Ancillary Items (5%)		\$9,202.50
		Erosion & Sediment Control (10%)		\$18,405.00
		Subtotal 1		\$230,062.50
		Contingency (25%)		\$57,515.63
		Subtotal 2		\$287,578.13
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$129,410.16
		Total		\$416,988.28
		Estimated Project Cost		\$420,000.00

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

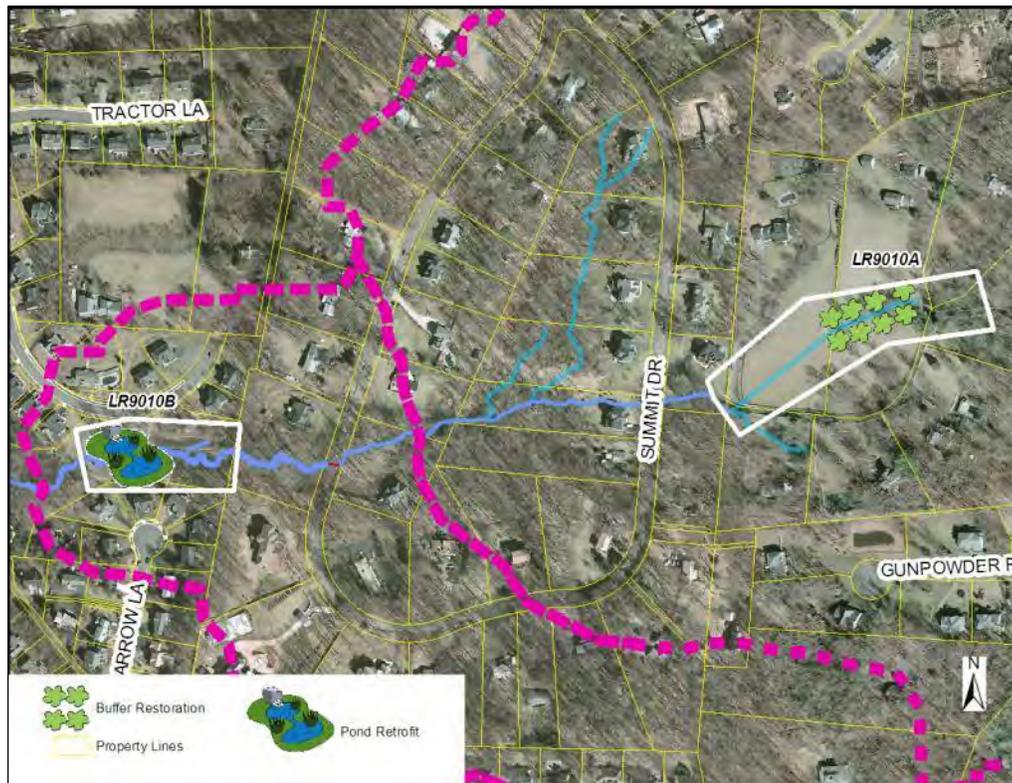
LR9010 Regional Pond Alternative Group



Vicinity Map

Address	5378 Harrow Lane
Location	Subdivision
Landowner	Hampton Woods II Homeowners Association Ellsworth Steven K Smith Arthur Jr (Heirs of)
PIN	0554 13 A 0554 05 0001 0554 05 0002
Control Type	Water quality and quantity control
Drainage Area	162 acres
Receiving Waters	Unnamed Tributary to Willow Springs Branch

Description: This project suite is an alternative to constructing Regional Pond R-10. LR9010A is a buffer restoration project that resides on private property. Just downstream of the proposed buffer restoration, the stream is piped for approximately 350 feet and would benefit from being daylighted, but it also resides on private property. LR9010B is a retrofit of existing stormwater pond 1452DP which proposes removing existing trickle ditches, increasing storage capacity, adding micropools and wetland plantings and altering pond geometry.



Project Area Map

Project Benefits: Project suite will partially simulate pollutant removal of proposed Regional Pond R-10. Loading summaries can be found in Section 6 of the plan. The drainage area consists primarily of private property and the retrofit of the downstream facility is the most practical option. While this suite doesn't achieve the same results as the hypothetical regional, it will still positively impact water quality issues, as described in the individual project components below.

Project	Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
LR9010A*	-	-	-
LR9010B	288.83	38.12	7.04

* Pollutant removals were not calculated for buffer restoration or other non-structural projects.

Project Design Considerations: LR9010A - Main obstacle is that the proposed buffer restoration is on private property. The downstream reach that is piped is currently a mowed lawn for recreational purposes possibly horse riding. There is no existing easement but the site is accessible through Chronical Drive. There are no permitting/sequencing issues. LR9010B - This facility (R-19) is downstream of proposed regional facility R-10. The drainage area primarily consists of low density residential areas. Proposed grading limits are restricted by property boundaries. The available storage volume without acquiring land is small. There are no sequencing/ access issues. A wetland permit may be needed.

Total Cost (9010A & 9010B):

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.5	AC	\$8,500.00	\$4,250.00
Grading and Excavation	2500	CY	\$35.00	\$87,500.00
Structural BMP Retrofit and Incidentals		LS	\$10,000 - \$20,000	\$0.00
Embankment		CY	\$50.00	\$0.00
Outflow Pipe		LF	\$125.00	\$0.00
Rip Rap Stabilization		SY	\$100.00	\$0.00
Organic Compost Soil Amendment	900	CY	\$40.00	\$36,000.00
Remove Trickle Ditch	335	SY	\$10.71	\$3,587.85
Plantings		1 AC	\$25,000.00	\$25,000.00
			Base Construction Cost	\$156,337.85
			Mobilization (5%)	\$7,816.89
			Ancillary Items (5%)	\$7,816.89
			Erosion & Sediment Control (10%)	\$15,633.79
			Subtotal 1	\$187,605.42
			Contingency (25%)	\$46,901.36
			Subtotal 2	\$234,506.78
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$105,528.05
			Total	\$340,034.82
			Estimated Project Cost	\$350,000.00

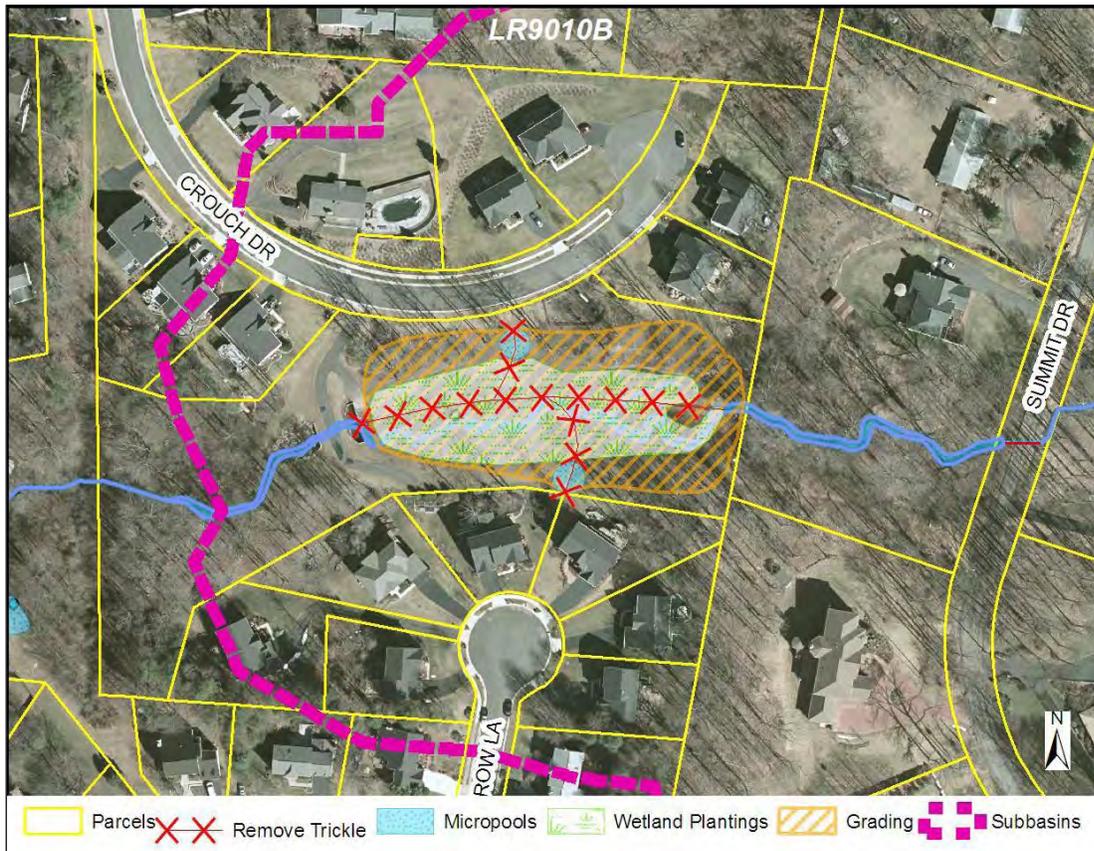
Project LR9010A:



Description: LR9010A is a proposed buffer restoration. There is insufficient riparian buffer for a 260' reach upstream of Chronical Drive.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Plantings	1	AC	\$25,000.00	\$25,000.00
Organic Compost Soil Amendment	600	CY	\$40.00	\$24,000.00
			Base Construction Cost	\$49,000.00
			Mobilization (5%)	\$2,450.00
			Ancillary Items (5%)	\$2,450.00
			Invasive Plant Eradication (10%)	\$4,900.00
			Erosion & Sediment Control (10%)	\$4,900.00
			Subtotal 1	\$63,700.00
			Contingency (25%)	\$15,925.00
			Subtotal 2	\$79,625.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$35,831.25
			Total	\$115,456.25
			Estimated Project Cost	\$120,000.00

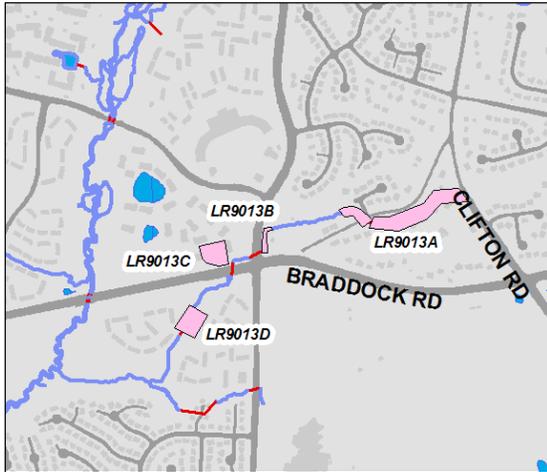
Project LR9010B:



Description: LR9010B is a retrofit to existing facility R-19. Remove the existing trickle ditches. Add micropools and wetland plantings. Modify internal pond geometry – focus on extending the low flow path.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.5	AC	\$8,500.00	\$4,250.00
Grading and Excavation	2500	CY	\$35.00	\$87,500.00
Structural BMP Retrofit and Incidentals		LS	\$10,000 - \$20,000	\$0.00
Embankment		CY	\$50.00	\$0.00
Outflow Pipe		LF	\$125.00	\$0.00
Rip Rap Stabilization		SY	\$100.00	\$0.00
Organic Compost Soil Amendment	300	CY	\$40.00	\$12,000.00
Remove Trickle Ditch	335	SY	\$10.71	\$3,587.85
			Base Construction Cost	\$107,337.85
			Mobilization (5%)	\$5,366.89
			Ancillary Items (5%)	\$5,366.89
			Erosion & Sediment Control (10%)	\$10,733.79
			Subtotal 1	\$128,805.42
			Contingency (25%)	\$32,201.36
			Subtotal 2	\$161,006.78
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$72,453.05
			Total	\$233,459.82
			Estimated Project Cost	\$240,000.00

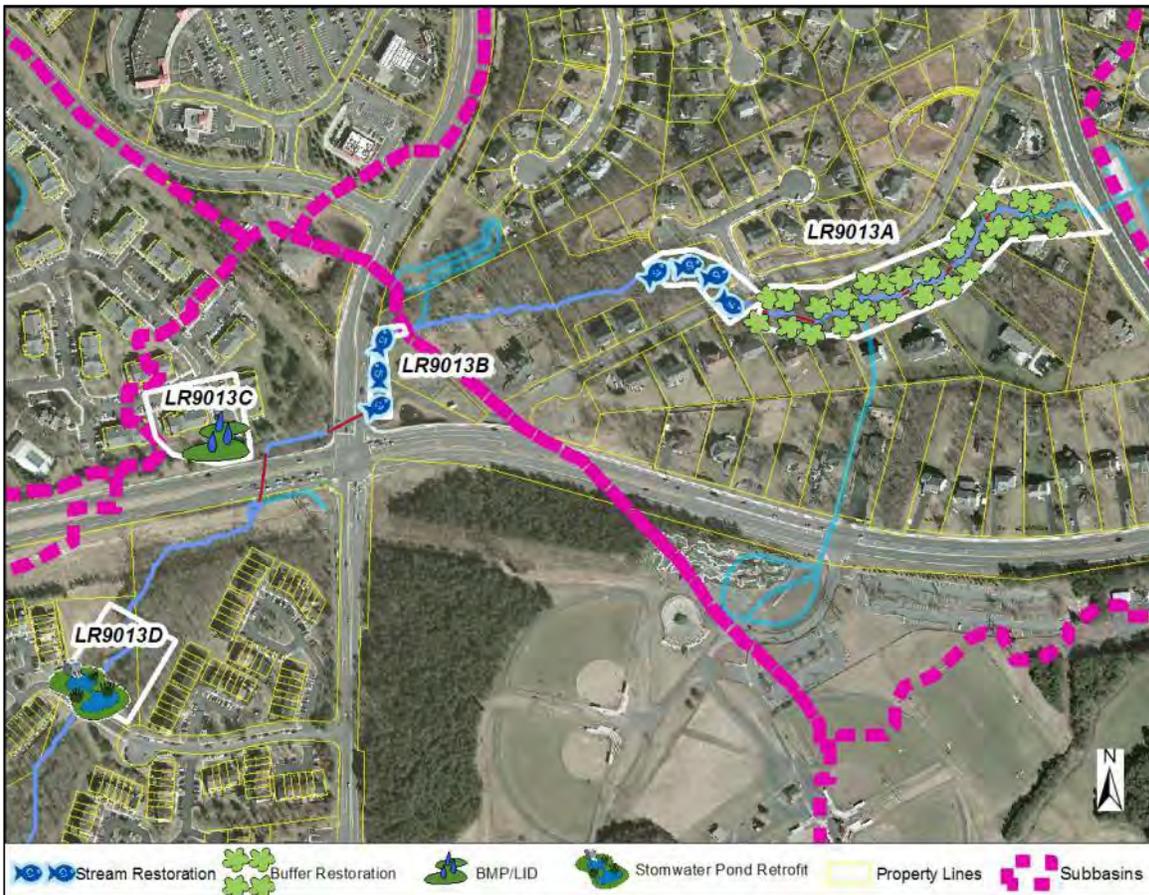
LR9013 Regional Pond Alternative Group



Vicinity Map

Address	13400 Braddock Rd
Location	Subdivision
Landowner	Clifton Pines II HOA VDOT Little Rocky Run HOA The Ponds at Centreville Multiple private landowners
PIN	Multiple PINs
Control Type	Water quality and quantity control
Drainage Area	185 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: The LR9013 Regional Pond Alternative Group is a replacement for regional pond R-13. It consists of a stream and buffer restoration (LR9013A), a second stream restoration (LR9013B), a new BMP (LR9013C) and a pond retrofit (LR9013D).



LR9013 Project Area Map

Project Benefits: Project suite will simulate removal efficiencies from proposed Regional Pond R-13. Loading summaries can be found in Section 6 of the Watershed Management Plan.

Project	Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
LR9013A	1.50	0.58	0.94
LR9013B	2.89	1.12	1.80
LR9013C	13.65	2.18	0.23
LR9013D	16.90	4.18	0.81

Design Considerations: LR9013A: The stream restoration portion of LR9013A is located within a floodplain and stormwater easement on Clifton Pines II HOA property, but most of the buffer restoration is not located within an easement. Coordinate with landowners to restore the riparian buffer. LR9013B: Steep side slopes make access to the project site difficult and must be accounted for in the restoration design, along with the narrow site footprint. LR9013B is partially located on private property (within a storm drainage easement) and is also partially located on VDOT property. LR9013C: LR9013C is not located within an existing easement. The site can be accessed from Orchard Dr. LR9013D: LR9013D is located on Little Rocky Run HOA property within an existing stormwater management easement. The designer must be cautious about expanding either the pond footprint or the floodplain – there appears to be ample room for increased detention, but the pond is surrounded by houses.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Construct New Channel	480	LF	\$200.00	\$96,000.00
Add'l Cost, first 500 LF	480	LF	\$200.00	\$96,000.00
Bioretention Filters & Basin	220	SY	\$150.00	\$33,000.00
Clear and Grub	0.3	AC	\$10,000.00	\$3,000.00
Grading and Excavation	1400	CY	\$35.00	\$49,000.00
Organic Compost Soil Amendment	370	CY	\$40.00	\$14,800.00
Plantings	1	AC	\$25,000.00	\$25,000.00
Structural BMP Retrofit and Incidentals	1	LS	\$10,000 - \$20,000	\$15,000.00
Vegetated Swale	90	SY	\$50.00	\$4,500.00
			Base Construction Cost	\$336,300.00
			Mobilization (5%)	\$16,815.00
			Ancillary Items (5%)	\$16,815.00
			Erosion & Sediment Control (10%)	\$33,630.00
			Subtotal 1	\$403,560.00
			Contingency (25%)	\$100,890.00
			Subtotal 2	\$504,450.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$227,002.50
			Total	\$731,452.50
			Estimated Project Cost	\$740,000.00



LR9013A Project Area Map

LR9013A Description: LR9013A will reduce pollutant loading, restore eroded areas and prevent future erosion. The riparian buffer will be improved creating important habitat for native wildlife. It will also provide the opportunity to educate property owners about the importance of preserving stream buffers.

LR9013A Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	\$10,000.00	\$2,000.00
Construct New Channel	250	LF	\$200.00	\$50,000.00
Add'l Cost, first 500 LF	250	LF	\$200.00	\$50,000.00
Plantings	1	AC	\$25,000.00	\$25,000.00
		Base Construction Cost		\$127,000.00
		Mobilization (5%)		\$6,350.00
		Ancillary Items (5%)		\$6,350.00
		Erosion & Sediment Control (10%)		\$12,700.00
		Subtotal 1		\$152,400.00
		Contingency (25%)		\$38,100.00
		Subtotal 2		\$190,500.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$85,725.00
		Total		\$276,225.00
		Estimated Project Cost		\$280,000.00



LR9013B Project Area Map

LR9013B Description: LR9013B will reduce pollutant loading, provide higher-quality habitat for native wildlife and reduce the potential for future erosion problems.

LR9013B Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	\$10,000.00	\$1,000.00
Construct New Channel	230	LF	\$200.00	\$46,000.00
Add'l Cost, first 500 LF	230	LF	\$200.00	\$46,000.00
Plantings	0.1	AC	\$25,000.00	\$2,500.00
			Base Construction Cost	\$95,500.00
			Mobilization (5%)	\$4,775.00
			Ancillary Items (5%)	\$4,775.00
			Erosion & Sediment Control (10%)	\$9,550.00
			Subtotal 1	\$114,600.00
			Contingency (25%)	\$28,650.00
			Subtotal 2	\$143,250.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$64,462.50
			Total	\$207,712.50
			Estimated Project Cost	\$210,000.00



LR9013C Project Area Map

LR9013C Description: Project LR9013C will provide new water quality treatment for previously untreated stormwater runoff.

LR9013C Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale	90	SY	\$50.00	\$4,500.00
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	220	SY	\$150.00	\$33,000.00
Manufactured BMP (i.e. Tree Box Filter)	0	EA	\$10,000.00	\$0.00
Organic Compost Soil Amendment	20	CY	\$40.00	\$800.00
Base Construction Cost				\$38,300.00
			Mobilization (5%)	\$1,915.00
			Plantings (5%)	\$1,915.00
			Ancillary Items (5%)	\$1,915.00
			Erosion & Sediment Control (10%)	\$3,830.00
			Subtotal 1	\$47,875.00
			Contingency (25%)	\$11,968.75
			Subtotal 2	\$59,843.75
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$26,929.69
			Total	\$86,773.44
			Estimated Project Cost	\$90,000.00



LR9013D Project Area Map

LR9013D Description: Project LR9013D will essentially upgrade an existing pond to a new regional facility. It will eliminate a large amount of phosphorus pollution and will increase storage volume and decrease peak flow. It will also create higher-quality wetland habitat for native wildlife.

LR9013D Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub		AC	\$8,500.00	\$0.00
Grading and Excavation	1400	CY	\$35.00	\$49,000.00
Structural BMP Retrofit and Incidentals	1	LS	\$10,000 - \$20,000	\$15,000.00
Embankment		CY	\$50.00	\$0.00
Outflow Pipe		LF	\$125.00	\$0.00
Rip Rap Stabilization		SY	\$100.00	\$0.00
Organic Compost Soil Amendment	350	CY	\$40.00	\$14,000.00
Remove Trickle Ditch		SY	\$10.71	\$0.00
			Base Construction Cost	\$78,000.00
			Mobilization (5%)	\$3,900.00
			Plantings (5%)	\$3,900.00
			Ancillary Items (5%)	\$3,900.00
			Erosion & Sediment Control (10%)	\$7,800.00
			Subtotal 1	\$97,500.00
			Contingency (25%)	\$24,375.00
			Subtotal 2	\$121,875.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$54,843.75
			Total	\$176,718.75
			Estimated Project Cost	\$180,000.00

LR9100 Stormwater Pond Retrofit



Vicinity Map

Address	13943 Stonefield Dr
Location	Subdivision
Landowner	Little Rocky Run Homeowners Association
PIN	0654 02 H1
Control Type	Water quality control
Drainage Area	75 Acres
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: Project LR9100 involves the retrofit of an existing pond to include wetland plantings and alter the existing pond geometry to extend the flow path. The project will also include removal of existing trickle ditches and the addition of micropools.



Project Area Map

Project Benefits: Nutrient uptake, gravitational settling and sediment trapping will be improved along with pond aesthetics. Wetland plantings can replicate ecosystems for a variety of wildlife (insects, birds, amphibians, etc.).

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
17.69	2.76	0.03

Project Design Considerations: Permitting and access issues are minimal for this existing facility. Stream/Buffer Restoration LR9200 is downstream of this project, but because only quality measures have been proposed, sequencing is not critical. This project can be considered independent from other proposed sites.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub	0.05	AC	\$8,500.00	\$425.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	933	CY	\$35.00	\$32,655.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment	233	CY	\$40.00	\$9,320.00
Remove Trickle Ditch	25	SY	\$10.71	\$267.75
		Base Construction Cost		\$42,667.75
		Mobilization (5%)		\$2,133.39
		Plantings (5%)		\$2,133.39
		Ancillary Items (5%)		\$2,133.39
		Erosion & Sediment Control (10%)		\$4,266.78
		Subtotal 1		\$53,334.69
		Contingency (25%)		\$13,333.67
		Subtotal 2		\$66,668.36
		Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)		\$30,000.76
		Total		\$96,669.12
		Estimated Project Cost		\$100,000.00

LR9102 Stormwater Pond Retrofit



Vicinity Map

Address	6579 Rockland Dr
Location	Subdivision
Landowner	Little Rocky Run HOA
PIN	0654 02 A
Control Type	Water quality control
Drainage Area	57 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: Project LR9102 is a retrofit of an existing stormwater pond. LR9102 will remove existing trickle ditches, increase storage capacity and lower peak flows, and will add micropools and wetland plantings.



✕✕ Remove Trickle Ditch ▨ Grading ▨ Micropools ▨ Wetland Plantings ▨ Property Lines

Project Area Map

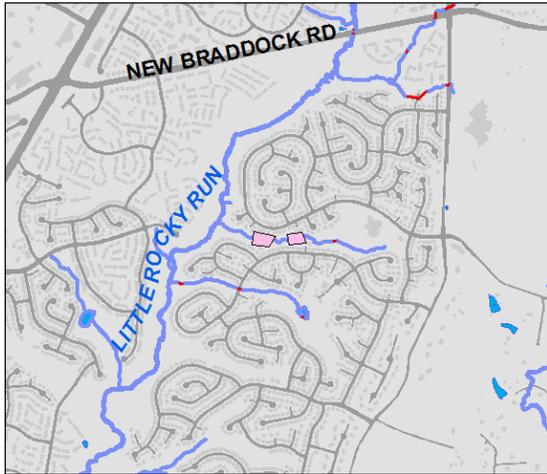
Project Benefits: LR9102 will improve nutrient uptake as well as increase storage volume and decrease peak flow. It will also create higher-quality wetland habitat for native wildlife.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
18.39	4.07	0.12

Project Design Considerations: LR9102 is located upstream of stream restoration project LR9202. Since LR9102 will reduce peak flow, these projects should be coordinated and sequenced so as not to overdesign LR9202. LR9102 is located on Little Rocky Run HOA property, within an existing stormwater management easement.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub	0.75	AC	\$8,500.00	\$6,375.00
Structural BMP and Incidentals	1	LS	\$10,000 - \$20,000	\$15,000.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	1750	CY	\$35.00	\$61,250.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment	290	CY	\$40.00	\$11,600.00
			Base Construction Cost	\$94,225.00
			Mobilization (5%)	\$4,711.25
			Plantings (5%)	\$4,711.25
			Ancillary Items (5%)	\$4,711.25
			Erosion & Sediment Control (10%)	\$9,422.50
			Subtotal 1	\$117,781.25
			Contingency (25%)	\$29,445.31
			Subtotal 2	\$147,226.56
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$66,251.95
			Total	\$213,478.52
			Estimated Project Cost	\$220,000.00

LR9103 Stormwater Pond Retrofit



Vicinity Map

Address	13815 Springstone Dr
Location	Subdivision
Landowner	Little Rocky Run HOA
PIN	0652 07 E 0654 04 L 0654 04 O 0654 04 P
Control Type	Water quality control
Drainage Area	147 acres
Receiving Waters	Little Rocky Run

Description: The LR9103 project area suffers from channel erosion and a clogged pond riser structure. LR9103 will restore the stream to a more stable, natural state to prevent future erosion and promote habitat health and diversity. The pond retrofit includes clearing the riser structure, constructing micropools and adding wetland plantings. New BMP/LID facilities will also be installed nearby.



Tree Box Filter Stream Restoration Remove Trickle Ditch Micropools Wetland Property Lines

Project Area Map

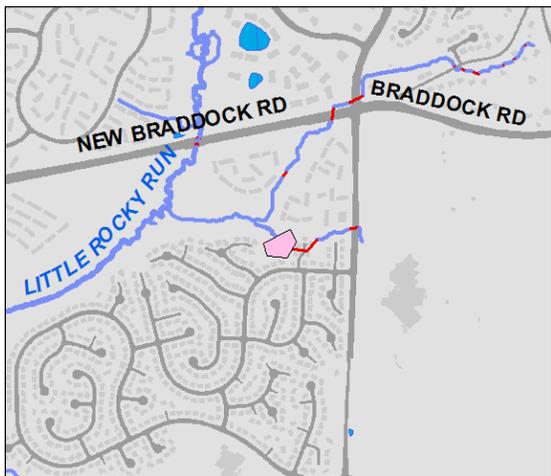
Project Benefits: Project LR9103 will mitigate nitrogen, phosphorus, and sediment by creating micropools, introducing wetland plantings, repairing instream erosion, and by installing tree box filters. Approximately 340 linear feet of stream channel will be restored, providing higher quality habitat for fish and wildlife.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
17.34	4.40	2.52

Project Design Considerations: Project LR9514 is located along Springstone Dr. Coordination and sequencing of these projects should be considered. LR9103 is accessible from Springstone Dr, and is located on Little Rocky Run HOA property within existing floodplain and stormwater management easements. As with any stream restoration, there are significant environmental permitting requirements for this project. Impacts to trees will be inevitable, but the long-term environmental benefits of the LR9103 stream restoration project will outweigh the short-term environmental costs.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate	1	EA	\$2,500.00	\$2,500.00
Clear and Grub	1	AC	\$8,500.00	\$8,500.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	1025	CY	\$35.00	\$35,875.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment	512.5	CY	\$40.00	\$20,500.00
Construct New Channel	340	LF	\$200.00	\$68,000.00
Add'l Cost, first 500 LF	340	LF	\$200.00	\$68,000.00
Manufactured BMP (ie: Tree Box Filter)	3	EA	\$10,000.00	\$30,000.00
Plantings	0.5	AC	\$25,000.00	\$12,500.00
		Base Construction Cost		\$245,875.00
		Mobilization (5%)		\$12,293.75
		Plantings (5%)		\$12,293.75
		Ancillary Items (5%)		\$12,293.75
		Erosion & Sediment Control (10%)		\$24,587.50
		Subtotal 1		\$307,343.75
		Contingency (25%)		\$76,835.94
		Subtotal 2		\$384,179.69
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$172,880.86
		Total		\$557,060.55
		Estimated Project Cost		\$560,000.00

LR9106 Stormwater Pond Retrofit



Vicinity Map

Address	13534 Union Village Circle
Location	Subdivision
Landowner	Little Rocky Run HOA
PIN	0661 04 B1
Control Type	Water quality control
Drainage Area	103 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: Project LR9106 will retrofit an existing stormwater pond to provide improved water quality control. Existing concrete trickle ditches will be removed in combination with constructing new micropools and adding wetland plantings.



Project Area Map

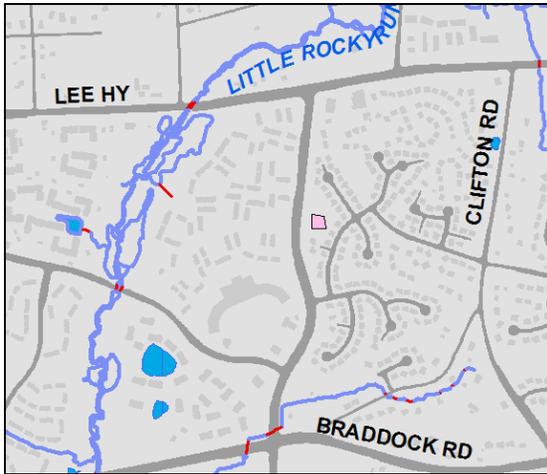
Project Benefits: Pond retrofit will improve nutrient uptake, sediment trapping, pond aesthetics, and wildlife habitat.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
14.51	3.18	0.10

Project Design Considerations: New BMP/LID LR9515 is located approximately 700 ft west of LR9106. Coordination of LR9106 and LR9515 should be considered. Permitting factors should be minimal. The pond is located near several houses, and care should be taken not to disturb adjacent private property.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub	1	AC	\$8,500.00	\$8,500.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	1670	CY	\$35.00	\$58,450.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment	420	CY	\$40.00	\$16,800.00
Remove Trickle Ditch	250	SY	\$10.71	\$2,677.50
		Base Construction Cost		\$83,750.00
		Mobilization (5%)		\$4,187.50
		Plantings (5%)		\$4,187.50
		Ancillary Items (5%)		\$4,187.50
		Erosion & Sediment Control (10%)		\$8,375.00
		Subtotal 1		\$104,687.50
		Contingency (25%)		\$26,171.88
		Subtotal 2		\$130,859.38
		Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)		\$58,886.72
		Total		\$189,746.09
		Estimated Project Cost		\$190,000.00

LR9109 Stormwater Pond Retrofit



Vicinity Map

Address	5604 Cavalier Woods La
Location	Subdivision
Landowner	Cavalier Woods HOA
PIN	0553 05 A
Control Type	Water quality control
Drainage Area	10 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: Project LR9109 is a retrofit of the existing stormwater pond shown below. The existing trickle ditch will be removed in combination with constructing micropools and adding wetland plantings.



X X Remove Trickle Ditch
 Grading
 Wetland Plantings
 Micropools
 Property Lines

Project Area Map

Project Benefits: Stormwater pond retrofit LR9109 will improve nutrient uptake and sediment removal and 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)
4.59	1.51	0.97

Project Design Considerations: The stormwater pond, which can be accessed from Cavalier Woods Drive, is located on Cavalier Woods HOA property, within an existing storm drainage easement.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub	0.2	AC	\$8,500.00	\$1,700.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	300	CY	\$35.00	\$10,500.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment	75	CY	\$40.00	\$3,000.00
			Base Construction Cost	\$15,200.00
			Mobilization (5%)	\$760.00
			Plantings (5%)	\$760.00
			Ancillary Items (5%)	\$760.00
			Erosion & Sediment Control (10%)	\$1,520.00
			Subtotal 1	\$19,000.00
			Contingency (25%)	\$4,750.00
			Subtotal 2	\$23,750.00
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$10,687.50
			Total	\$34,437.50
			Estimated Project Cost	\$40,000.00

LR9110 Stormwater Pond Retrofit



Vicinity Map

Address	13214 Kilby Landing Ct
Location	Subdivision
Landowner	Clifton Manor Homeowners Association, Inc.
PIN	0661 12 A
Control Type	Water quality and quantity control
Drainage Area	82 Acres
Receiving Waters	Unnamed Tributary to Little Rocky Run

Description: Project LR9110 includes the retrofit of an existing facility to include wetland plantings and micropools, removal of trickle ditches and modification of the pond geometry to extend the low flow path.



Project Area Map

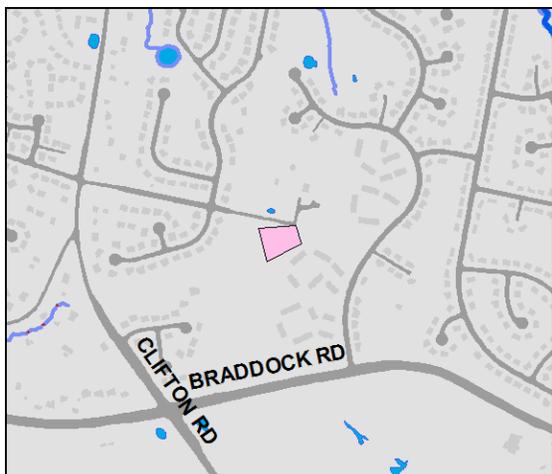
Project Benefits: Nutrient uptake, gravitational settling and sediment trapping will be improved along with pond aesthetics. Wetland plantings can replicate ecosystems for a variety of wildlife (insects, birds, amphibians, etc.).

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
42.21	2.32	0.35

Project Design Considerations: No increase in storage volume has been proposed, but pond geometry changes can be made without affecting storage volumes. Emergency spillway directs the flow across Clifton Road. There is no room to expand the foot print without tree impacts. The project is furthest upstream of a series of projects along this tributary to Little Rocky Run. The proposed measures benefit water quality only and therefore sequencing/coordination with neighboring projects is not critical.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub		AC	\$8,500.00	\$0.00
Grading and Excavation	1150	CY	\$35.00	\$40,250.00
Structural BMP Retrofit and Incidentals		LS	\$10,000 - \$20,000	\$0.00
Embankment		CY	\$50.00	\$0.00
Outflow Pipe		LF	\$125.00	\$0.00
Rip Rap Stabilization		SY	\$100.00	\$0.00
Organic Compost Soil Amendment	290	CY	\$40.00	\$11,600.00
Remove Trickle Ditch	270	SY	\$10.71	\$2,891.70
			Base Construction Cost	\$54,741.70
			Mobilization (5%)	\$2,737.09
			Ancillary Items (5%)	\$2,737.09
			Erosion & Sediment Control (10%)	\$5,474.17
			Subtotal 1	\$65,690.04
			Contingency (25%)	\$16,422.51
			Subtotal 2	\$82,112.55
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$36,950.65
			Total	\$119,063.20
			Estimated Project Cost	\$120,000.00

LR9111 Stormwater Pond Retrofit



Vicinity Map

Address	13022 Cobble La
Location	Subdivision
Landowner	Hayden Village Community Association
PIN	0661 10 A
Control Type	Water quality control
Drainage Area	25 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: Project LR9111 will retrofit an existing stormwater pond to provide improved water quality control. Existing concrete trickle ditches will be removed in combination with constructing new micropools and adding wetland plantings.



Project Area Map

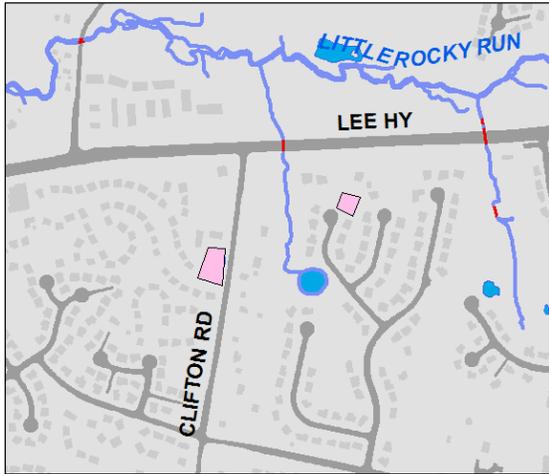
Project Benefits: Pond retrofit LR9111 will improve nutrient uptake, sediment trapping, pond aesthetics and wildlife habitat.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
2.67	0.42	0.01

Project Design Considerations: Spatial constraints for pond retrofit LR9111 should be considered, but are not anticipated to be severe enough to limit the project scope. Overhead lines located approximately 100 feet west of the project site should be avoided.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub	0.5	AC	\$8,500.00	\$4,250.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	800	CY	\$35.00	\$28,000.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment	200	CY	\$40.00	\$8,000.00
Remove Trickle Ditch	100	SY	\$10.71	\$1,071.00
		Base Construction Cost		\$40,250.00
		Mobilization (5%)		\$2,012.50
		Plantings (5%)		\$2,012.50
		Ancillary Items (5%)		\$2,012.50
		Erosion & Sediment Control (10%)		\$4,025.00
		Subtotal 1		\$50,312.50
		Contingency (25%)		\$12,578.13
		Subtotal 2		\$62,890.63
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$28,300.78
		Total		\$91,191.41
		Estimated Project Cost		\$100,000.00

LR9114 Stormwater Pond Retrofit



Vicinity Map

Address	13114 Blue Willow Pl 5574 Clifton Crest Way
Location	Subdivision
Landowner	Clifton Farm HOA Clifton Crest HOA
PIN	0553 06 C 0553 16 B
Control Type	Water quality control
Drainage Area	13 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: Project LR9114 will retrofit two existing stormwater ponds to provide improved water quality control. Existing concrete trickle ditches will be removed in combination with constructing new micropools and adding wetland plantings.



Project Area Map

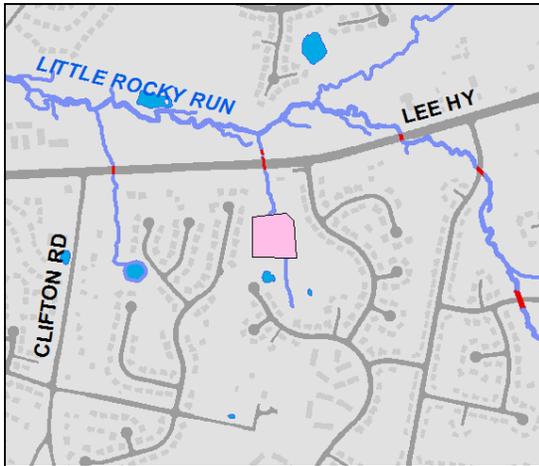
Project Benefits: Pond retrofit suite LR9114 will improve uptake, sediment trapping, pond aesthetics, and wildlife habitat.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
32.46	4.10	0.17

Project Design Considerations: LR9114A is located on Clifton Crest HOA property and LR9114B is located on Clifton Farm HOA property. Both are located within existing stormwater management easements. As space is somewhat limited at both pond retrofit locations, care should be taken to limit increases in ponded area.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub		AC	\$8,500.00	\$0.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	500	CY	\$35.00	\$17,500.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment	125	CY	\$40.00	\$5,000.00
Remove Trickle Ditch	100	SY	\$10.71	\$1,071.00
			Base Construction Cost	\$23,571.00
			Mobilization (5%)	\$1,178.55
			Plantings (5%)	\$1,178.55
			Ancillary Items (5%)	\$1,178.55
			Erosion & Sediment Control (10%)	\$2,357.10
			Subtotal 1	\$29,463.75
			Contingency (25%)	\$7,365.94
			Subtotal 2	\$36,829.69
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$16,573.36
			Total	\$53,403.05
			Estimated Project Cost	\$60,000.00

LR9115 Stormwater Pond Retrofit



Vicinity Map

Address	5403 Willow Valley Rd
Location	Subdivision
Landowner	Hayden Village Community Association
PIN	0553 08 L 0553 08 D1
Control Type	Water quality and quantity control
Drainage Area	39 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: Project LR9115 is a retrofit of R-7, an existing regional stormwater pond. Storage volume will be increased, existing trickle ditches will be removed and micropools and wetland plantings will be added.



Project Area Map

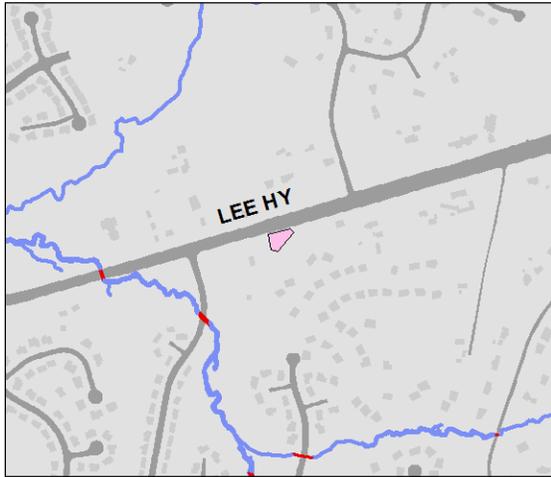
Project Benefits: Pond retrofit LR9115 will improve nutrient uptake and sediment removal, and will increase storage volume and decrease peak flow. It will also create higher-quality wetland habitat for native wildlife.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
66.37	2.02	0.16

Project Design Considerations: Pond retrofit LR9115 is located on Hayden Village Community Association property within an existing storm drainage easement. Sufficient space is available to increase the ponded area. The project site can be easily accessed from Sandy Point Lane. Some impacts to mature trees may occur.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub	1	AC	\$8,500.00	\$8,500.00
Structural BMP and Incidentals	1	LS	\$10,000 - \$20,000	\$15,000.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	2420	CY	\$35.00	\$84,700.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment	400	CY	\$40.00	\$16,000.00
			Base Construction Cost	\$124,200.00
			Mobilization (5%)	\$6,210.00
			Plantings (5%)	\$6,210.00
			Ancillary Items (5%)	\$6,210.00
			Erosion & Sediment Control (10%)	\$12,420.00
			Subtotal 1	\$155,250.00
			Contingency (25%)	\$38,812.50
			Subtotal 2	\$194,062.50
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$87,328.13
			Total	\$281,390.63
			Estimated Project Cost	\$290,000.00

LR9117 Stormwater Pond Retrofit



Vicinity Map

Address	12837 Lee Hwy
Location	Highway
Landowner	Herring W W LLLP
PIN	0554 01 0037
Control Type	Water quality control
Drainage Area	29 acres
Receiving Waters	Unnamed tributary to Willow Spring Branch

Description: Project LR9117 will retrofit an existing stormwater pond to provide improved water quality control. Existing concrete trickle ditches will be removed in combination with constructing new micropools and adding wetland plantings.



Project Area Map

Project Benefits: Pond retrofit LR9117 will improve nutrient uptake, sediment trapping, pond aesthetics and wildlife habitat.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
45.41	11.05	4.46

Project Design Considerations: Due to space constraints, the footprint of the pond cannot be significantly increased. LR9117 is located on private property within existing storm drainage and detention pond easements.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub	0.2	AC	\$8,500.00	\$1,700.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	280	CY	\$35.00	\$9,800.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment	70	CY	\$40.00	\$2,800.00
		Base Construction Cost		\$14,300.00
		Mobilization (5%)		\$715.00
		Plantings (5%)		\$715.00
		Ancillary Items (5%)		\$715.00
		Erosion & Sediment Control (10%)		\$1,430.00
		Subtotal 1		\$17,875.00
		Contingency (25%)		\$4,468.75
		Subtotal 2		\$22,343.75
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$10,054.69
		Total		\$32,398.44
		Estimated Project Cost		\$40,000.00

LR9201 Stream Restoration



Vicinity Map

Address	14104 Sorrel Chase Ct
Location	Subdivision
Landowner	Green Trails HOA
PIN	0654 03 C 0654 0304 M
Control Type	Water quality control
Drainage Area	188 acres
Receiving Waters	Little Rocky Run

Description: The Green Trails Homeowners Association has noted that the tributary to Little Rocky Run shown below suffers from erosion and poor flow. Subsequent field visits confirmed a stagnant system with little habitat support. Project LR9201 will restore the stream to a more stable, natural state to prevent future erosion and promote habitat health and diversity.



Project Area Map

Project Benefits: Project LR9201 will reduce phosphorus, nitrogen and sediment loading in the tributary to Johnny Moore Creek, and restore 1250 linear feet of stream channel. Higher quality habitat for fish and wildlife will also be provided. Successful implementation of LR9201 may also have positive effects on nearby property values.

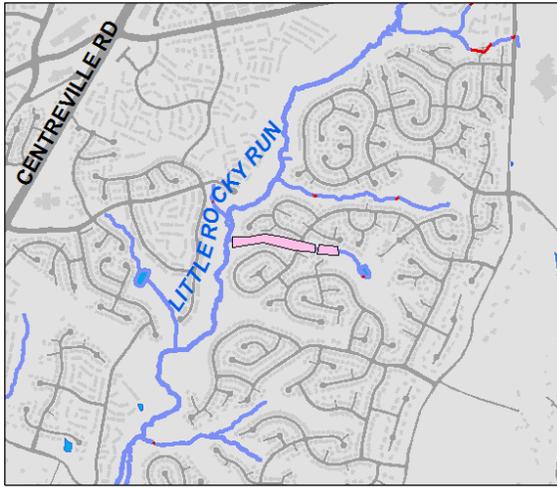
Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
12.58	4.87	7.86

Project Design Considerations: New BMP/LID project LR9509 is located just upstream of LR9201, on the north side of Green Trails Blvd. Coordination and sequencing of these two projects should be considered. The project site is accessible from Green Trails Blvd or Palisades Dr, and is located on Green Trails HOA property within existing floodplain/storm drainage easements. Given that the Green Trails HOA brought attention to the site, significant landowner support is likely. As with any stream restoration, there are significant environmental permitting requirements for this project. Impacts to trees will be inevitable, but the long-term environmental benefits of the LR9201 stream restoration project will outweigh the short-term environmental costs.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.85	AC	\$10,000.00	\$8,500.00
Construct New Channel	1250	LF	\$200.00	\$250,000.00
Add'l Cost, first 500 LF	500	LF	\$200.00	\$100,000.00
Plantings	0.85	AC	\$25,000.00	\$21,250.00
		Base Construction Cost		\$379,750.00
		Mobilization (5%)		\$18,987.50
		Ancillary Items (5%)		\$18,987.50
		Erosion & Sediment Control (10%)		\$37,975.00
		Subtotal 1		\$455,700.00
		Contingency (25%)		\$113,925.00
		Subtotal 2		\$569,625.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$256,331.25
		Total		\$825,956.25
		Estimated Project Cost		\$830,000.00

Little Rocky Run Watershed
Little Rocky Run - Lower Watershed Management Area

LR9202 Stream Restoration Project Suite



Vicinity Map

Address	6419 Stonehaven Ct
Location	Subdivision
Landowner	Little Rocky Run HOA
PIN	0654 04 N 0654 02 B 0654 04 Q 0654 04 R
Control Type	Water quality control
Drainage Area	141 acres
Receiving Waters	Little Rocky Run

Description: Project suite LR9202 will provide improved water quality control. It incorporates stream restoration, buffer restoration and pond retrofit techniques.



Project Area Map

Project Benefits: Project LR9202 will improve phosphorus, nitrogen and sediment uptake in the unnamed tributary to Little Rocky Run shown in the project area map. It will also provide improved habitat for wildlife.

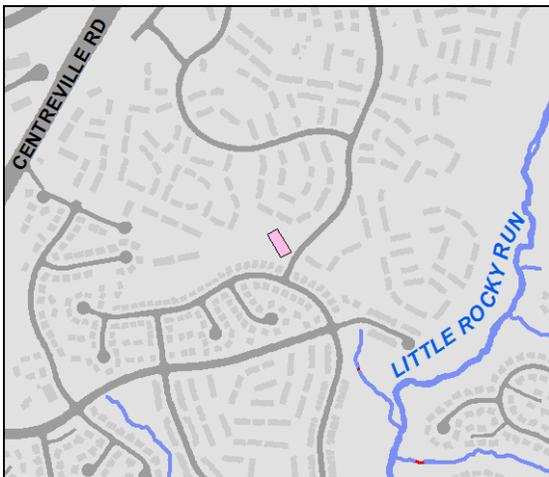
Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
69.41	10.53	0.54

Project Design Considerations: New BMP/LID project LR9507 is located approximately 0.3 miles southwest of LR9202 along South Springs Drive. Pond retrofit LR9102 is also located approximately 0.2 miles upstream of LR9202. Coordination and sequencing of these projects should be considered. Due to ongoing channel erosion, a more extensive site investigation should be conducted before implementation to determine the necessary extent of new stream channel design and construction. As with any stream restoration, there are significant environmental permitting requirements for this project. Impacts to trees will be inevitable, but the long-term environmental benefits of the Stream Restoration will outweigh the short-term environmental costs.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub (stream restoration)	0.35	AC	\$10,000.00	\$3,500.00
Construct New Channel	300	LF	\$200.00	\$60,000.00
Add'l Cost, first 500 LF	300	LF	\$200.00	\$60,000.00
Plantings (stream and buffer restoration)	2.35	AC	\$25,000.00	\$58,750.00
Access Road	3280	SY	\$25.00	\$82,000.00
Access Road Gate	2	EA	\$2,500.00	\$5,000.00
Clear and Grub (pond retrofits)	0.8	AC	\$8,500.00	\$6,800.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	1260	CY	\$35.00	\$44,100.00
Embankment		CY	\$50.00	\$0.00
Organic Compost Soil Amendment (pond retrofits and buffer restoration)	1120	CY	\$40.00	\$44,800.00
Remove Trickle Ditch	184	SY	\$10.71	\$1,970.64
			Base Construction Cost	\$366,920.64
			Mobilization (5%)	\$18,346.03
			Plantings (pond retrofits) (5%)	\$9,233.53
			Ancillary Items (5%)	\$18,346.03
			Erosion & Sediment Control (10%)	\$36,692.06
			Subtotal 1	\$449,538.30
			Contingency (25%)	\$112,384.58
			Subtotal 2	\$561,922.88
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$252,865.29
			Total	\$814,788.17
			Estimated Project Cost	\$820,000.00

LR9203 Stream Restoration



Vicinity Map

Address	14100 Wood Rock Way
Location	Subdivision
Landowner	Heritage Forest HOA
PIN	0652 09 F2
Control Type	Water quality control
Drainage Area	20 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: Project LR9203 will restore the existing paved ditch shown below with a natural channel system. This small stream restoration will use step pools to dissipate excess energy and prevent future erosion.



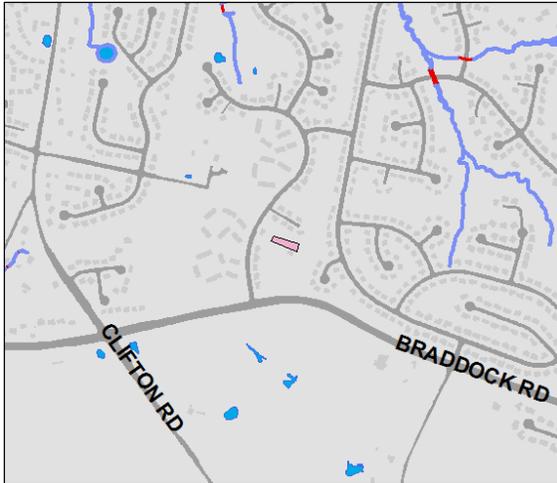
Project Benefits: LR9203 will reduce phosphorus, nitrogen and sediment loading by restoring 330 feet of paved channel with a more natural, permeable system. Higher quality habitat for native wildlife will be created and LR9203 may have beneficial effects on nearby property values.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
3.32	1.29	2.07

Project Design Considerations: The LR9203 project site is located on Heritage Forest HOA property, within an existing storm drainage easement. The site can be easily accessed from Singletons Way. Permitting requirements and impacts to mature trees will be minimal, if any.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub		AC	\$10,000.00	\$0.00
Remove Concrete Ditch	380	SY	\$10.71	\$4,069.80
Construct New Channel	330	LF	\$200.00	\$66,000.00
Add'l Cost, first 500 LF	330	LF	\$200.00	\$66,000.00
Plantings	0.1	AC	\$25,000.00	\$2,500.00
		Base Construction Cost		\$138,569.80
		Mobilization (5%)		\$6,928.49
		Ancillary Items (5%)		\$6,928.49
		Erosion & Sediment Control (10%)		\$13,856.98
		Subtotal 1		\$166,283.76
		Contingency (25%)		\$41,570.94
		Subtotal 2		\$207,854.70
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$93,534.62
		Total		\$301,389.32
		Estimated Project Cost		\$310,000.00

LR9204 Stream Restoration



Vicinity Map

Address	5587A Rockpointe Dr
Location	Subdivision
Landowner	Hayden Village Community Association
PIN	0661 11 K1
Control Type	Water quality control
Drainage Area	4 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: Stream restoration LR9204 will restore the concrete ditch shown below to a natural stream channel. This small restoration stream restoration project will consist of linear bioretention basins – a unique stream restoration technique which will significantly reduce construction costs.



Project Benefits: LR9204 will reduce phosphorus, nitrogen and sediment loading by restoring 230 feet of paved channel with a more natural, permeable system. Higher quality habitat for native wildlife will also be provided.

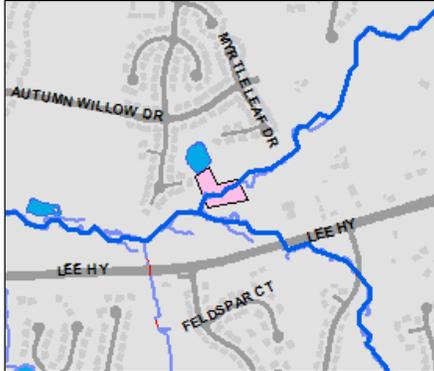
Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
2.44	0.95	1.53

Project Design Considerations: Pond retrofit LR9111 is located approximately 1000 feet downstream of the LR9204 project site. Coordination of these two projects should be considered due to their proximity.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	\$10,000.00	\$1,000.00
Remove Concrete Ditch	167	SY	\$10.71	\$1,788.57
Bioretention Filters & Basins	300	SY	\$150.00	\$45,000.00
		Base Construction Cost		\$47,788.57
		Mobilization (5%)		\$2,389.43
		Ancillary Items (5%)		\$2,389.43
		Erosion & Sediment Control (10%)		\$4,778.86
		Subtotal 1		\$57,346.28
		Contingency (25%)		\$14,336.57
		Subtotal 2		\$71,682.86
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$32,257.28
		Total		\$103,940.14
		Estimated Project Cost		\$110,000.00

LR9205 Stream Restoration



Vicinity Map

Address	5217 Whisper Willow Dr
Location	Pond outfalls near subdivision
Landowner	Fairfax County Park Authority
PIN	0553 10 S
Control Type	Water Quality
Drainage Area	632 acres
Receiving Waters	Little Rocky Run

Description: The pond outfalls shown below that drain to Little Rocky Run are causing scouring and erosion. Stream restoration project LR9205 will restore the stream to a more stable, natural state to prevent future erosion and promote habitat health and diversity.



Project Area Map

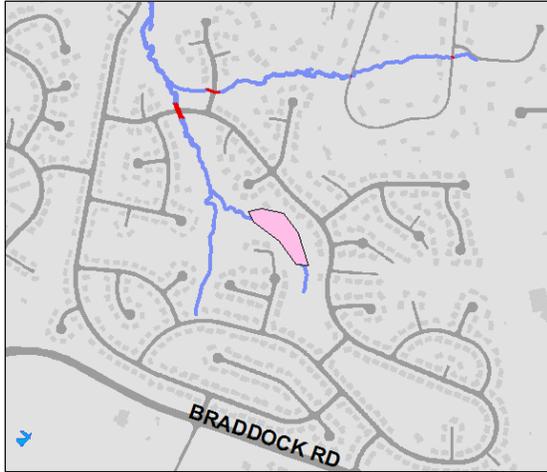
Project Benefits: Stream restoration project will remove nitrogen, phosphorus, and sediment pollution by restoring approximately 580 feet of natural stream channel. Higher quality habitat for fish and wildlife will also be provided.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
30.02	11.61	15.68

Project Design Considerations: Coordination with pond retrofit LR9116 should be considered, as the pond is located just upstream of the project site (and is visible on right side of the project area map for LR9205). The site is accessible from Whisper Willow Dr and is located on Fairfax County Park Authority property. As with any stream restoration, there are significant potential permitting requirements for this project, including dam safety permits. Impacts to trees will be inevitable due to the densely wooded site, but the long-term environmental benefits of stream restoration LR9205 will outweigh the short-term environmental costs. The project design/construction should include provisions to remove or trim trees which the Park Authority determines to have died or to have been irreparably damaged as a result of project impacts for a period of five years after completion of the project.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.46	AC	\$10,000.00	\$4,600.00
Construct New Channel	580	LF	\$200.00	\$116,000.00
Add'l Cost, first 500 LF	500	LF	\$200.00	\$100,000.00
Plantings	0.46	AC	\$25,000.00	\$11,500.00
		Base Construction Cost		\$232,100.00
		Mobilization (5%)		\$11,605.00
		Ancillary Items (5%)		\$11,605.00
		Erosion & Sediment Control (10%)		\$23,210.00
		Subtotal 1		\$278,520.00
		Contingency (25%)		\$69,630.00
		Subtotal 2		\$348,150.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$156,667.50
		Total		\$504,817.50
		Estimated Project Cost		\$510,000.00

LR9207 Stream Restoration



Vicinity Map

Address	5378 Ashleigh Rd
Location	Subdivision
Landowner	Hampton Chase HOA Hampton Forest HOA
PIN	0662 05 G1 0662 05 D 0554 07 C2
Control Type	Water quality control
Drainage Area	152 acres
Receiving Waters	Unnamed tributary to Willow Spring Branch

Description: The unnamed tributary to Willow Spring Branch shown below suffers from channel erosion. LR9207 will restore the stream to a more stable, natural state to prevent future erosion and promote habitat health and diversity.



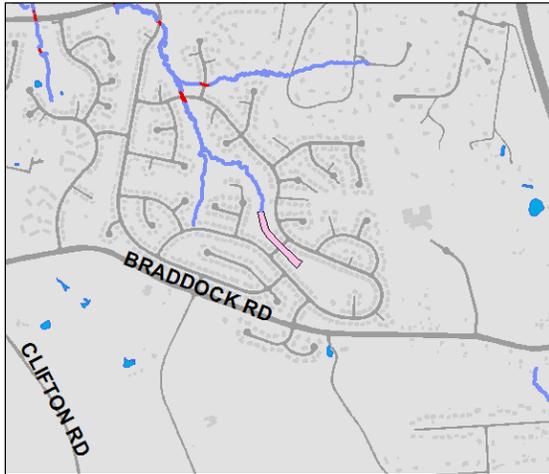
Project Benefits: LR9207 will restore 850 linear feet of stream channel to reduce phosphorus, nitrogen and sediment loading. Higher quality habitat for aquatic and terrestrial wildlife will also be provided. Successful implementation of LR9207 may also have positive effects on nearby property values.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
2.60	0.86	0.64

Project Design Considerations: LR9207 is located downstream of and in close proximity to stream restorations LR9208 and LR9209. Coordination of these projects should be considered to improve design and construction efficiency. It is also located on Hampton Chase HOA and Hampton Forest HOA property, within existing floodplain and stormwater easements. As with any stream restoration there are significant environmental permitting requirements for this project. Impacts to trees will be inevitable, but the long-term environmental benefits of LR9207 will outweigh the short-term environmental costs.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.75	AC	\$10,000.00	\$7,500.00
Construct New Channel	850	LF	\$200.00	\$170,000.00
Add'l Cost, first 500 LF	500	LF	\$200.00	\$100,000.00
Plantings	0.75	AC	\$25,000.00	\$18,750.00
			Base Construction Cost	\$296,250.00
			Mobilization (5%)	\$14,812.50
			Ancillary Items (5%)	\$14,812.50
			Erosion & Sediment Control (10%)	\$29,625.00
			Subtotal 1	\$355,500.00
			Contingency (25%)	\$88,875.00
			Subtotal 2	\$444,375.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$199,968.75
			Total	\$644,343.75
			Estimated Project Cost	\$650,000.00

LR9208 Stream Restoration



Vicinity Map

Address	5418 Ashleigh Rd
Location	Subdivision
Landowner	Hampton Forest HOA
PIN	0662 05 U 0662 05 V
Control Type	Water quality control
Drainage Area	152 acres
Receiving Waters	Willow Spring Branch

Description: The tributary to Willow Spring Branch shown below is lined by a concrete trapezoidal channel (currently being undermined) with turf grass on both sides. Stream restoration project LR9208 will remove the concrete channel and restore a natural stream system and riparian buffer area.



Project Area Map

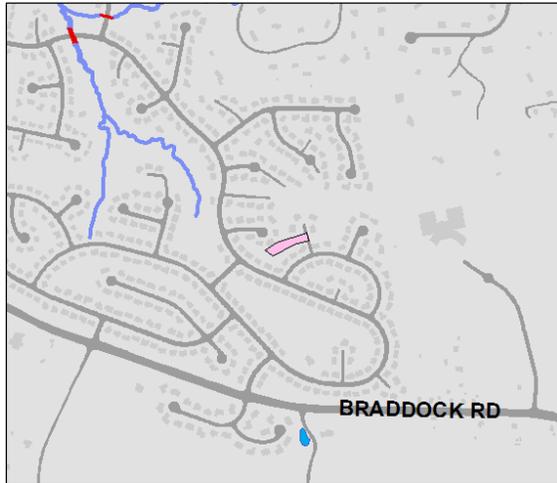
Project Benefits: Project LR9208 will reduce phosphorus and nitrogen loading in the tributary to Little Rocky Run, and will restore approximately 1020 linear feet of natural channel. Higher quality habitat for wildlife will also be provided. Successful implementation of LR9208 may also have positive effects on nearby property values.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
10.87	4.21	6.80

Project Design Considerations: Stream restoration projects LR9207, LR9208 and LR9209 are located in close proximity to each other. LR9207 is located approximately 250 feet downstream of LR9208 and LR9209 is located on a tributary to the north of LR9208. Coordination and sequencing of these three projects should be considered. The project site is located within existing floodplain/storm drainage easements on Hampton Forest Homeowners Association property. Significant design and construction issues exist – especially space constraints. As with any stream restoration, there are significant environmental permitting requirements for this project. Impacts to trees will be inevitable, but the long-term environmental benefits of stream restoration LR9208 will outweigh the short-term environmental costs.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	1.1	AC	\$10,000.00	\$11,000.00
Removal of Concrete Channel	2040	SY	\$10.71	\$21,848.40
Construct New Channel	1020	LF	\$200.00	\$204,000.00
Add'l Cost, first 500 LF	500	LF	\$200.00	\$100,000.00
Plantings	1.1	AC	\$25,000.00	\$27,500.00
		Base Construction Cost		\$364,348.40
		Mobilization (5%)		\$18,217.42
		Ancillary Items (5%)		\$18,217.42
		Erosion & Sediment Control (10%)		\$36,434.84
		Subtotal 1		\$437,218.08
		Contingency (25%)		\$109,304.52
		Subtotal 2		\$546,522.60
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$245,935.17
		Total		\$792,457.77
		Estimated Project Cost		\$800,000.00

LR9209 Stream Restoration



Vicinity Map

Address	12753 Ashleigh Ct
Location	Subdivision
Landowner	Hampton Forest HOA
PIN	0662 05 X
Control Type	Water quality control
Drainage Area	43 acres
Receiving Waters	Unnamed tributary to Willow Springs Branch

Description: The unnamed tributary to Willow Springs Branch shown below is lined by a concrete trapezoidal channel (currently being undermined) with turf grass on both sides. Stream restoration project LR9209 will remove the concrete channel and recreate a natural stream system and riparian buffer area. A new channel with a plunge pool and several step pools will help dissipate erosive energy.



Project Benefits: Project LR9209 will reduce phosphorus and nitrogen loading in the tributary to Johnny Moore Creek, and will restore approximately 400 linear feet of natural channel. Higher quality habitat for wildlife will also be provided. Successful implementation of LR9209 may also have positive effects on nearby property values.

Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
4.03	1.56	2.52

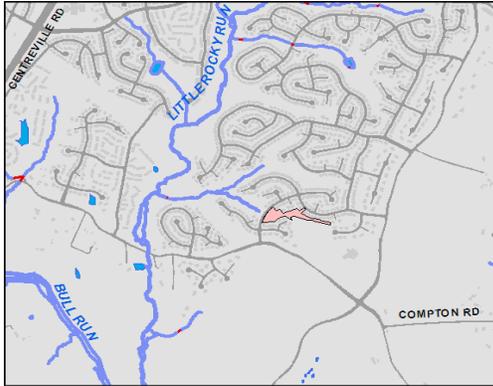
Project Design Considerations: LR9209 is located approximately 250 upstream of stream restoration LR9208. Due to their proximity and similar design aspects (both involve the replacement of a concrete channel with a natural stream system), coordination and sequencing should be considered. The project site is located within an existing storm drainage easement on Hampton Forest Homeowners Association property. Significant design and construction issues exist – especially space constraints. As with any stream restoration, there are significant environmental permitting requirements for this project. Impacts to trees will be inevitable, but the long-term environmental benefits of stream restoration LR9209 will outweigh its short-term environmental costs.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.3	AC	\$10,000.00	\$3,000.00
Construct New Channel	400	LF	\$200.00	\$80,000.00
Add'l Cost, first 500 LF	400	LF	\$200.00	\$80,000.00
Plantings	0.3	AC	\$25,000.00	\$7,500.00
Remove Concrete Ditch	230	SY	\$10.71	\$2,463.30
		Base Construction Cost		\$172,963.30
		Mobilization (5%)		\$8,648.17
		Ancillary Items (5%)		\$8,648.17
		Erosion & Sediment Control (10%)		\$17,296.33
		Subtotal 1		\$207,555.96
		Contingency (25%)		\$51,888.99
		Subtotal 2		\$259,444.95
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$116,750.23
		Total		\$376,195.18
		Estimated Project Cost		\$380,000.00

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

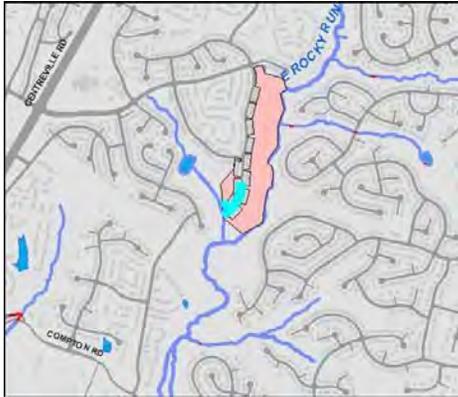
Project Benefits: The created wetland will provide an ideal environment for gravitational settling, biological uptake, and microbial activity. Project LR9504 will also provide habitat enhancement for insects, amphibians, and birds.

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.



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 \$10,000 -	\$2,500.00
Structural BMP and Incidentals	1	LS	\$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

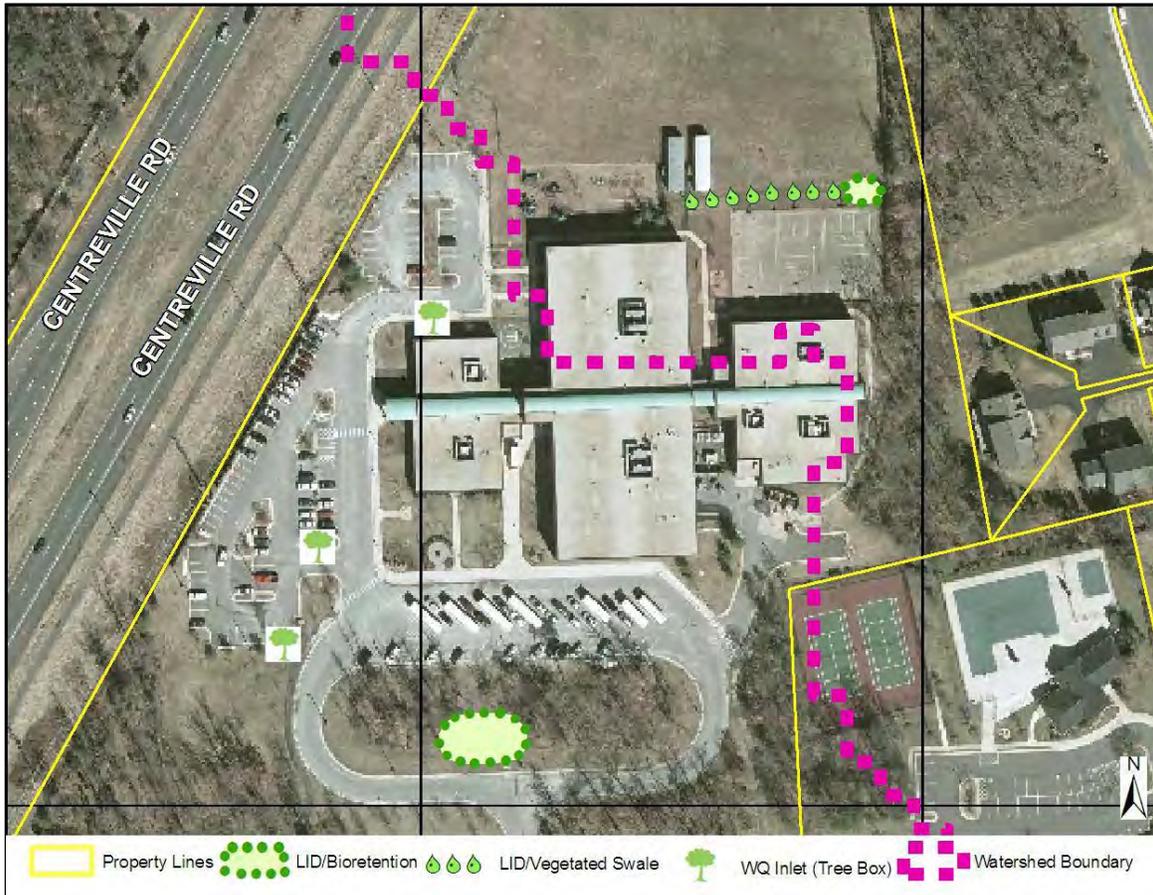
LR 9510 Low Impact Development Project Suite



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.



Property Lines
 LID/Bioretenion
 LID/Vegetated Swale
 WQ Inlet (Tree Box)
 Watershed Boundary

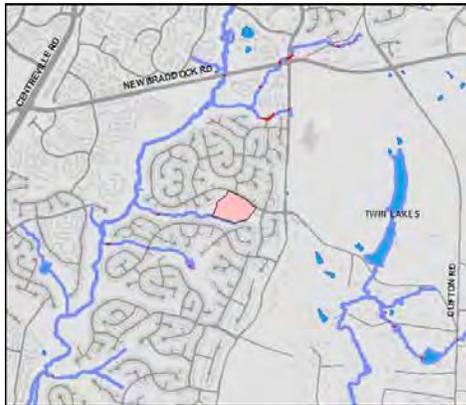
Project Benefits: Project will enhance filtration, biological uptake and microbial activity. Educational opportunities exist for students.

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 Little 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



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.



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.

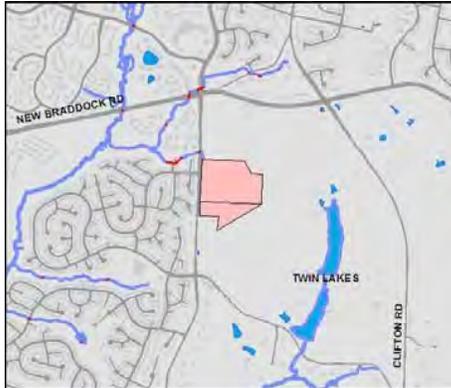
Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
0.75	0.20	0.01

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

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

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.

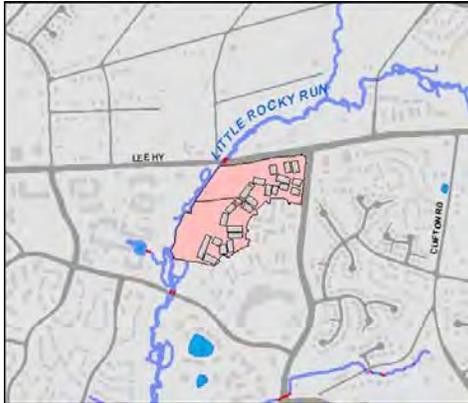
Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
18.74	4.36	0.76

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

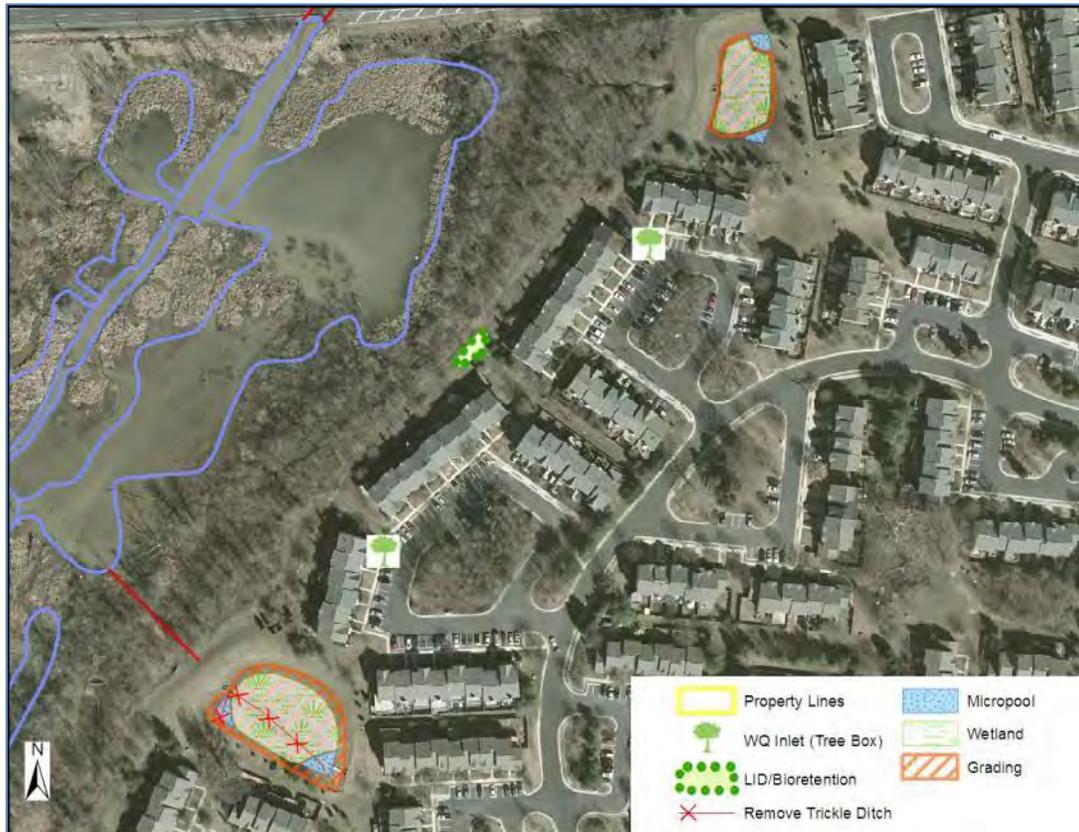
LR9521 BMP/LID



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

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

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.



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	\$	\$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 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.

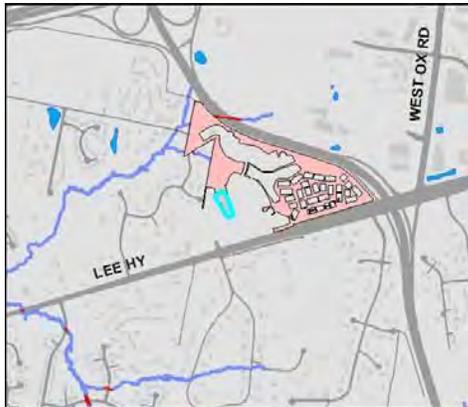
Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
24.45	6.18	2.43

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

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

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

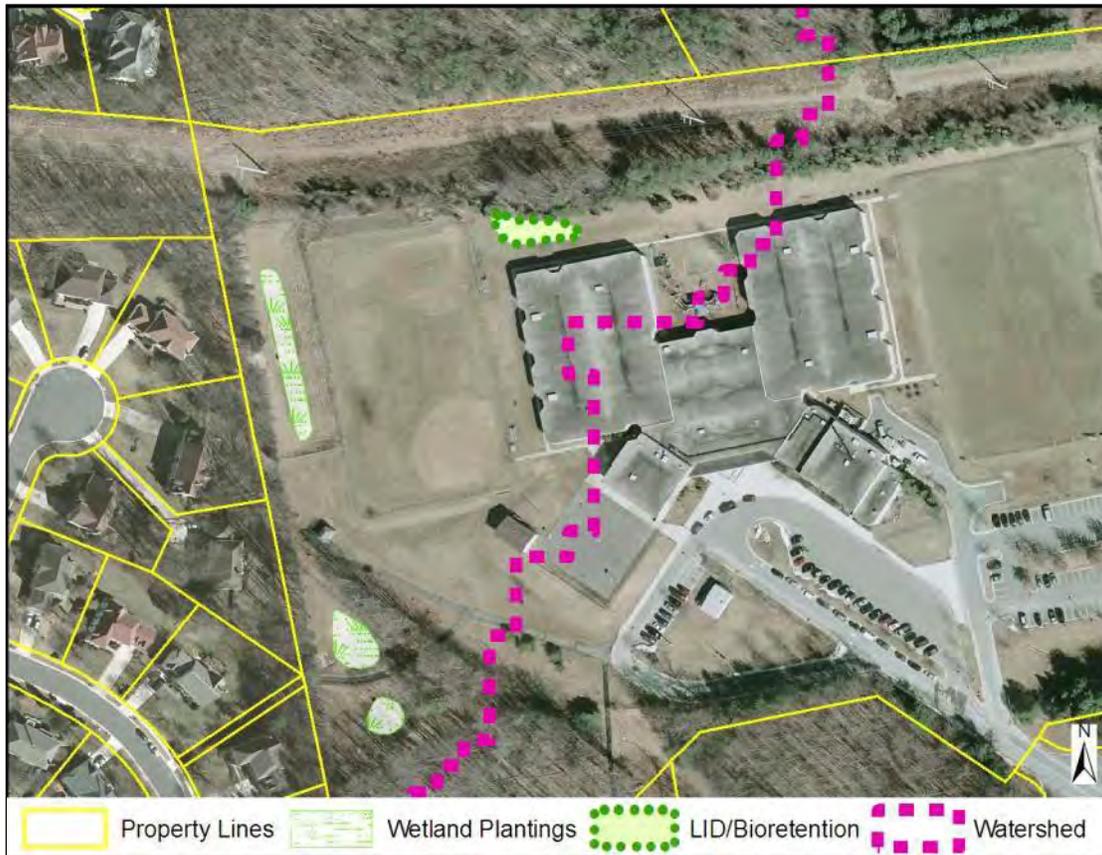
LR9527 BMP/LID



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