

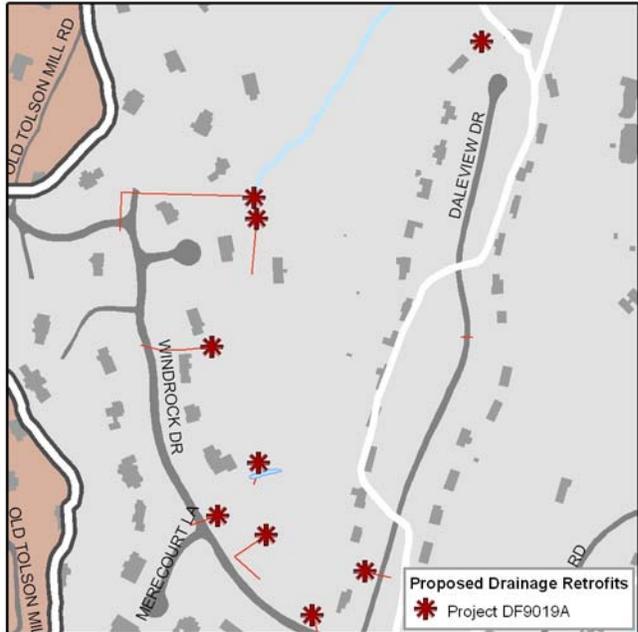
**Project Number:** DF9019A  
**Catchment Code:** DFRR9501  
**Candidate Site:** D-19

**Project Type:** Drainage Retrofit  
**Project Size:** 9 Outfalls

**Project Location:**  
 This project is distributed throughout the catchment.

**Project Description:**  
 This project consists of providing additional outlet protection to locations where the man-made drainage systems discharge into the natural channel. Significant erosion and scour was noted in these areas.

**Potential Project Benefits:**



Streamflow	The project will reduce velocity from the outfall and help reduce erosive potential immediately downstream.
Water Quality	Water quality improvements would be associated with the reduction of scour at outfall locations and within the downstream channels.

**Potential Project Constraints:**

Environmental	Projects in RPAs may require exceptions or waivers.
Facility Access	Access to these sites can be obtained from the roadway and driveways.
Design / Construction	No significant design or construction issues were identified for this project.

**Costs:**

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	9	EA	\$8,000.00	\$72,000
<b>Base Construction Cost</b>				<b>\$72,000</b>
Mobilization (5%)				\$3,600
<b>Subtotal 1</b>				<b>\$75,600</b>
Contingency (25%)				\$18,900
<b>Subtotal 2</b>				<b>\$94,500</b>
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$42,525
<b>Estimated Project Cost</b>				<b>\$137,000</b>

*This project is part of the alternative project group for Regional Pond D-19. See Table 5-2 for the recommended disposition.*

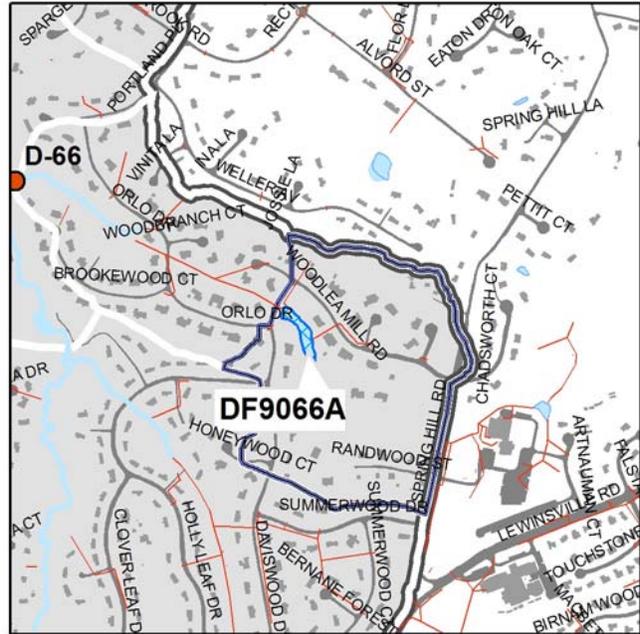
This page intentionally left blank.

**Project Number:** DF9066A  
**Catchment Code:** DFRR9801  
**Candidate Site:** D-66

**Project Type:** Pond Retrofit  
**Project Size:** 0.9 acres  
**Treated Area:** 58.0 acres

**Project Location:** This project is located upstream of Daviswood Drive.

**Project Description:** This wet pond is surrounded on all sides by private residences. There is little peak flow attenuation taking place. Installing a multi-stage control structure over the existing outlet will significantly improve peak flow attenuation and also meet the channel protection volume. The existing facility holds the necessary water quality volume to treat the full drainage area. To enhance the treatment function, the aquatic bench will be extended to encompass the entire perimeter of the facility.



**Potential Project Benefits:**

Streamflow	Installing a multistage riser will provide 100% of the channel protection volume.
Water Quality	100% of the water quality volume is met within the wet storage of this pond. The aquatic bench will provide wetland landscaping for nutrient uptake.

**Potential Project Constraints:**

Environmental	This project should not require significant environmental permitting efforts. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this facility can be obtained from the roadway.
Design / Construction	The design and construction of a new control structure would likely require coordination with property owner(s). County staff will coordinate with the facility owner to implement the project.

**Costs:**

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	\$5,000.00	\$1,000.00
Excavation/Grading (aquatic bench)	1245	CY	\$30.00	\$37,350.00
Riser	1	LS	\$10,000.00	\$10,000.00
Wetland Planting (aquatic bench)	934	SY	\$2.00	\$1,868.00
<b>Base Construction Cost</b>				<b>\$50,218</b>
Mobilization (5%)				\$2,511
<b>Subtotal 1</b>				<b>\$52,729</b>
Contingency (25%)				\$13,182
<b>Subtotal 2</b>				<b>\$65,911</b>
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$29,660
<b>Estimated Project Cost</b>				<b>\$96,000</b>

This project is part of the alternative project group for Regional Pond D-66. See Table 5-2 for the recommended disposition.

**Concept Sketch:**



**Project Site:**

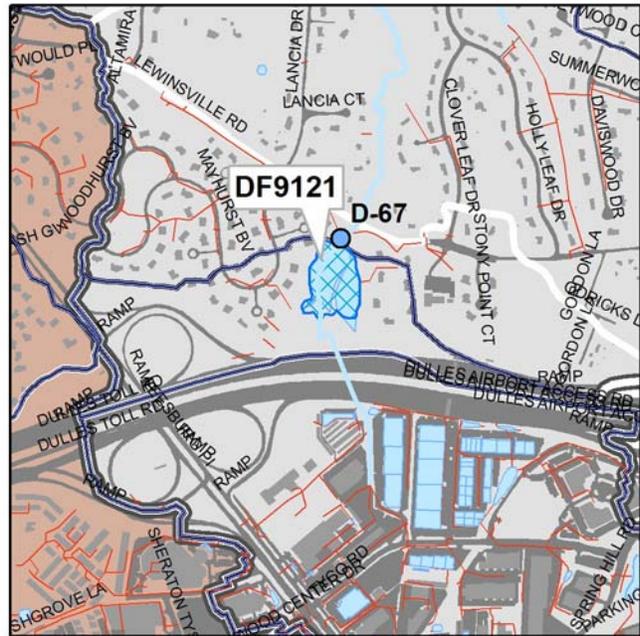


**Project Number:** DF9121  
**Catchment Code:** DFRR0001  
**Candidate Site:** C21

**Project Type:** Pond Retrofit  
**Project Size:** 4.1 acres  
**Treated Area:** 285 acres

**Project Location:** South of Lewinsville Road, west of Lewinsville Mews Court.

**Project Description:** This project consists of retrofits to the dry pond to provide improvements in peak flow and pollutant load reduction. Channel protection techniques in the natural channels upstream of the embankment will help reduce velocity and erosion. Water quality features exist in the form of ditches, settling pools, and small marshes within the basin. Instead of excavating and removing these features, their treatment function can be improved by adding both wet and dry vegetation to the natural channels and surrounding banks. In addition, a sediment forebay constructed in front of the closed storm drain outlet will further treat runoff.



**Potential Project Benefits:**

Streamflow	Approximately 40% of the channel protection volume can be achieved.
Water Quality	A variety of water quality components can be added to this facility to promote water quality improvement.

**Potential Project Constraints:**

Environmental	Environmental permitting issues would be anticipated for any activity around a stream corridor. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is available.
Design / Construction	No specific design or construction issues were noted for this project. County staff will coordinate with the facility owner to implement the project.

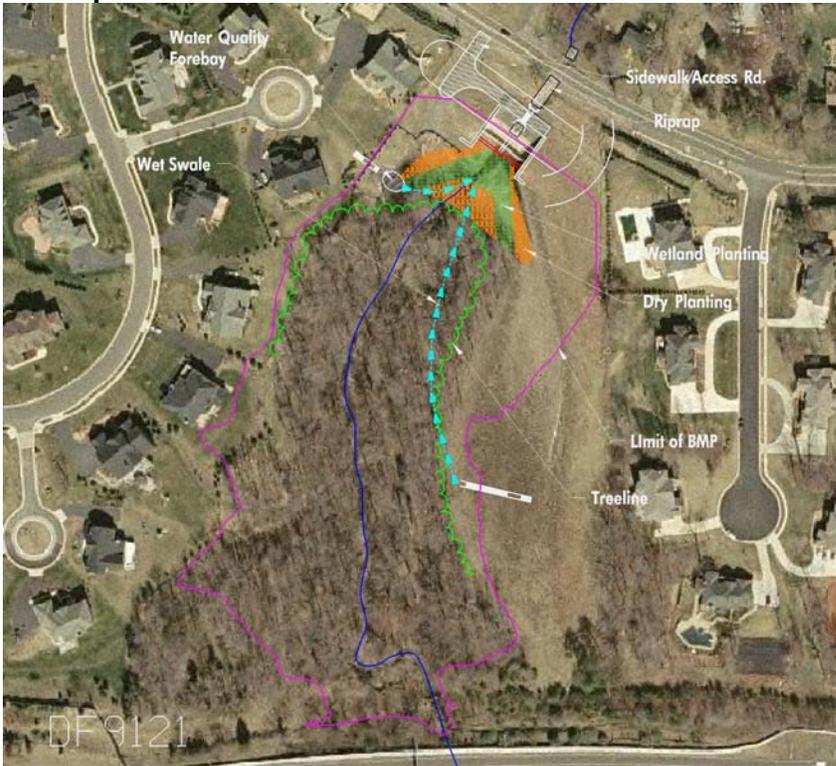
**Costs:**

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.4	AC	\$5,000.00	\$2,000.00
Dry Swale	440	LF	\$35.00	\$15,400.00
Forebay	988	CY	\$45.00	\$44,460.00
Riser	1	LS	\$10,000.00	\$10,000.00
Rip Rap Stabilization	75	LF	\$50.00	\$3,750.00
Wetland Planting	800	SY	\$2.00	\$1,600.00
Dry Landscaping	800	SY	\$2.50	\$2,000.00
<b>Base Construction Cost</b>				<b>\$79,210</b>
Mobilization (5%)				\$3,961
<b>Subtotal 1</b>				<b>\$83,171</b>
Contingency (25%)				\$20,793
<b>Subtotal 2</b>				<b>\$103,963</b>
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$46,783
<b>Estimated Project Cost</b>				<b>\$151,000</b>

**Project Site:**



**Concept Sketch:**

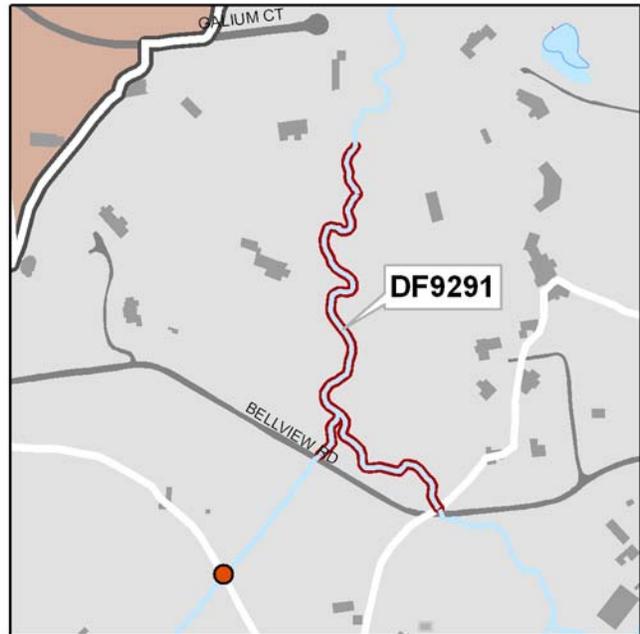


**Project Number:** DF9291  
**Catchment Code:** DFRR0006 or DFRR0005  
**Candidate Site:** S91

**Project Type:** Stream Restoration  
**Project Size:** 1,760 Linear Feet

**Project Location:** This project is located in a wooded area to the north of Bellview Road and south of Galium Road.

**Project Description:**  
 This stream reach is slightly incised with raw, eroding, stream banks. The stream is actively increasing its sinuosity. The streambed is affected by an excessive amount of fine sediments and the bedforms are poorly defined. The stream will be reconstructed with a more stable pattern and profile and a vegetated buffer will be restored in disturbed areas.



**Potential Project Benefits:**

Stream Stability	Stability will be improved with a pattern, dimension, and profile better suited to the existing flow regime.
Water Quality	Water quality will be improved by a reduction in future bank and streambed erosion.
Instream Habitat	Erosion reduction, and reconstructed streambed features will improve physical habitat conditions.

**Potential Project Constraints:**

Environmental	The site will require forest clearing and some impacts to jurisdictional wetlands. It will require a permit from both the U.S. Army Corps of Engineers and VDEQ. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this facility will require an easement on private property.
Design / Construction	Design efforts are significant compared to other stream restoration projects. General constructability is good.

Difficult Run Watershed Management Plan  
 Concept Plans  
*Rocky Run*

**Costs:**

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Reconstruct new pattern and profile	1607	LF	\$250.00	\$401,750
Stabilize in place -- grading	153	LF	\$175.00	\$26,775
Buffer restoration	included above	LF	\$25.00	\$0
Add'l cost, first 500 LF	500	LF	\$200.00	\$100,000
<b>Base Construction Cost</b>				<b>\$528,525</b>
Mobilization (5%)				\$26,426
<b>Subtotal 1</b>				<b>\$554,951</b>
Contingency (25%)				\$138,738
<b>Subtotal 2</b>				<b>\$693,689</b>
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$312,160
<b>Estimated Project Cost</b>				<b>\$1,006,000</b>

**Concept Sketch:**

